Magnetic Orbitals in the Real World

The First Visual Revelation of Quantum Geometries in the Macroscopic World

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MAGNETIC ORBITALS

CHAPTERS

KEYWORDS

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ABSTRACT

Have the shapes of atomic orbitals ever been observed in the real world? **This research presents the first experimental three-dimensional visualization of atomic orbital geometries using real magnetic fields.**

By employing a bipolar Hall sensor in dynamic mode at a constant angle, field configurations were detected that are consistent—down to the finest detail—with the solutions of the Schrödinger equation for the hydrogen atom.

The results suggest a structural connection between the probabilistic concepts of quantum mechanics and observable macroscopic phenomena, proposing a new paradigm for unifying classical and quantum physics.

The entire work also provides a replicable guide for generating magnetic orbitals, thus offering a precise method for the potential control of matter at the subatomic level, through the construction of a "Magnetic Map of Matter"—usable here, in our world.

INTRODUCTION

A non-conventional, yet deeply empirical approach to understanding the structure of magnetic fields and their connection to the quantum geometries known as atomic orbitals.

Through a series of experiments conducted with simple instrumentation, yet guided by an extremely rigorous method, it was possible to observe stable three-dimensional shapes of the magnetic field that precisely replicate all the theoretical figures predicted by quantum mechanics.

The entire work is based on the use of a bipolar Hall-effect sensor, employed dynamically at a fixed angle, with the goal of mapping—point by point—the shapes and polarity variations in space.

This led to the discovery of a method to physically and observably reconstruct orbitals that, until now, had remained confined within the mathematical representation of wave functions.

The results suggest that certain fundamental concepts of quantum mechanics, including wave function collapse, superposition, and even entanglement, might be understood here not as abstract or purely probabilistic phenomena, but as manifestations of real geometric interactions between observer and field.

If confirmed, this hypothesis would imply a structural connection between classical and quantum mechanics, overcoming the historical separation between the two disciplines and ushering in a new physical perspective based on the direct observation of fields.

The potential impacts of such research are manifold: from materials physics to magnetic technologies, from advanced electronics to the philosophy of science, and even to the possibility of a new approach to matter control.

This document was designed to be accessible, replicable, and verifiable by anyone—even outside the academic world. It is structured with clear language, supported by images, diagrams, and operational descriptions that allow the experiments to be repeated without complex instrumentation, making visible what until now was only imagined.

Finally, part of the reflections and theoretical validations were discussed through interaction with an artificial intelligence, with the aim of extending the analysis to the broadest possible spectrum of knowledge.

Theoretical Principles of Reference

Quantum mechanics is the physical theory that describes the behavior of matter and energy on the atomic and subatomic scale.

Unlike classical mechanics—which is based on continuous and deterministic quantities—quantum mechanics introduces a **probabilistic description** of reality, in which physical properties do not exist in a definite way until they are measured.

One of the central concepts of the theory is that of the **atomic orbital**: a region of space where there is a certain probability of finding an electron. These shapes do not represent precise trajectories, but rather **probability distributions** described by **wave functions**, which are solutions to the Schrödinger equation.

Each orbital is determined by a combination of quantum numbers:

• **n** (***principal*** *quantum number*): indicates the energy level of the orbital;

• **l** (***angular*** *quantum number*): determines the shape of the orbital (spherical, bilobed, etc.);

• **m** (***magnetic*** *quantum number*): defines the spatial orientation of the orbital;

• **s** (***spin*** *quantum number*): specifies the intrinsic orientation of the electron.

These theoretical structures, despite their extraordinary predictive power, have never been directly observed.

The graphic representations found in scientific textbooks are reconstructions derived from complex calculations, **not photographs of reality**.

Another key concept is **quantum superposition**, according to which a particle can exist in multiple states simultaneously, and the **collapse of the wave function**, which occurs at the moment of observation, reducing all possibilities to a single outcome.

The research presented here proposes a new approach: to investigate the possibility that these shapes—until now considered merely mathematical projections—may also emerge on a macroscopic level, through the interaction of **real magnetic fields** observed in a controlled manner.

In other words, it explores the hypothesis that the geometry of atomic orbitals is not an abstraction, but a **concrete manifestation of the magnetic field**, visible through the appropriate detection method.

Over the course of this work, the goal is not only to **experimentally reproduce** these shapes, but also to compare them with theoretical models and assess the possibility that the rules of quantum mechanics—including **superposition**, **collapse**, and **entanglement**—can be reinterpreted in light of a **measurable physical interaction**, and not merely as probabilistic behavior.

MAGNETS and ORBITALS

Hydrogen as the Archetype of Matter

One of the most surprising—and at the same time consistent—results of this research is that **all the shapes of atomic orbitals** obtained through the angular detection method using Hall sensors and axially magnetized magnets **exactly match the theoretical solutions** predicted for the hydrogen atom.

This is not a simple analogy: the reproduction of the **s, p, d, and f orbital geometries** appears with **visual, symmetrical, and topological fidelity**, exactly as described by quantum mechanics—**but without any mathematical equations**.

The mere use of a real magnetic field and angular detection produces structures **identical** to those of theoretical models, previously considered unobservable in practice.

This correspondence leads to a hypothesis as bold as it is inevitable:
A **permanent axial magnet**, observed through the method described in this research, **behaves like a macroscopic version of the hydrogen atom**.

The hydrogen atom is the **simplest quantum structure**: a single electron bound to a proton by a Coulomb interaction. Its orbitals arise from the exact solution of the Schrödinger equation under a central potential.

In the same way, a magnet is the **simplest and most stable field generator** we have in the macroscopic world.

Its axial field geometry and polar symmetries **surprisingly mimic** the probability distribution of the electron in the hydrogen atom—with the fundamental difference that this time, these shapes are not probabilities, **but measurable physical fields**.

Implications

• The magnet becomes an **archetypal structure**, a tangible, visible **"giant Hydrogen."**
• Orbitals are no longer abstractions: they are **recurring figures of the field**.
• This represents a **bridge between classical and quantum mechanics**, precisely where both converge: **in form, in Geometry**.

Extending the Map

If this hypothesis is correct, then other atoms—more complex than hydrogen—will require **more articulated magnetic configurations**, capable of emulating multiple interactions between electrons, energy levels, and spin.

To build a **complete magnetic map of matter** would therefore mean constructing the **archetypal field shapes** that describe all other atoms through combinations of multiple magnets, precise detection angles, and more—**a geometric art of the field**.

A New Idea of the Atom

The atom would no longer be an invisible point with quantum numbers. It would be a **coherent three-dimensional configuration** of the magnetic field, whose quantum state depends on the shape it assumes in space and on the **interaction with the observer**.

Field, Atom, Magnet: the Equation of Convergence

If the shape of the atomic orbital and that of the magnetic orbital are **identical in every detail**, and if both emerge from interactions between poles—between **electric charges** in the atom and **magnetic polarities** in the magnet—then a deeper vision becomes legitimate:

The atom is a magnet. The magnet is an atom. Not metaphorically, but structurally:

- Both **manifest fields**,
- Both can be described through **coherent three-dimensional shapes**,
- Both **collapse in the presence of observation** (in QM as in these experiments),
- Both **respond measurably to angular and geometric stimuli**.

From this equivalence arises not just a reflection, but a **tool**.

If atom and magnet are two manifestations of the same **geometric structure of the field**, then the **Map of Magnetic Orbitals** becomes an **operational guide** for interacting with real matter.

The manipulation of matter—currently reliant on extreme temperatures, pressures, and invasive reactions—could be replaced by **coherent, angular, programmable fields**.

Fields created not to **force** matter, but to **speak to it in its own language**.

SENSOR CONSTRUCTION

Construction of the Angular Magnetic Detection Sensor

The experimental core of this research is a magnetic field detection instrument specifically designed to represent **three-dimensional magnetic orbitals**, isomorphic to the atomic orbitals of the hydrogen atom.

A simple 4-pin Hall effect sensor, allowed to operate at its full potential (in my case, 12V). Normally, it is possible to purchase magnetic pens that use the same type of sensor, but they are all limited, as a resistor is always added to reduce the voltage to as little as 3V.

This instrument, when used at full power, is not only capable of detecting polarities, but—as will be seen in the usage method—is also able to detect the magnetic field at a distance of over 20 cm (with strong magnets), which is more than enough to define a clearly discernible shape.

A crucial aspect to keep in mind when building this sensor is that it must be **practical, small, and easy to handle** (FIG 3), because the detection process, as you will see, is **dynamic**, and you will need to move, rotate, and adjust it very frequently.

Main Components

- 1 Hall Effect Sensor: CC6470, CS477H, WSH416, or equivalent
- 2 LEDs of different colors
- 2 Resistors of 560 ohms
- 1 12V Battery
- 1 Switch
- 1 Casing

FIG. 3

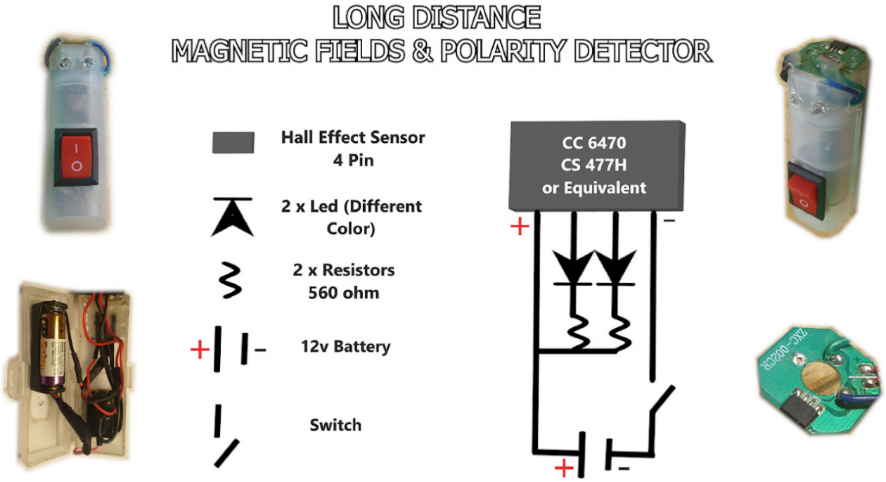
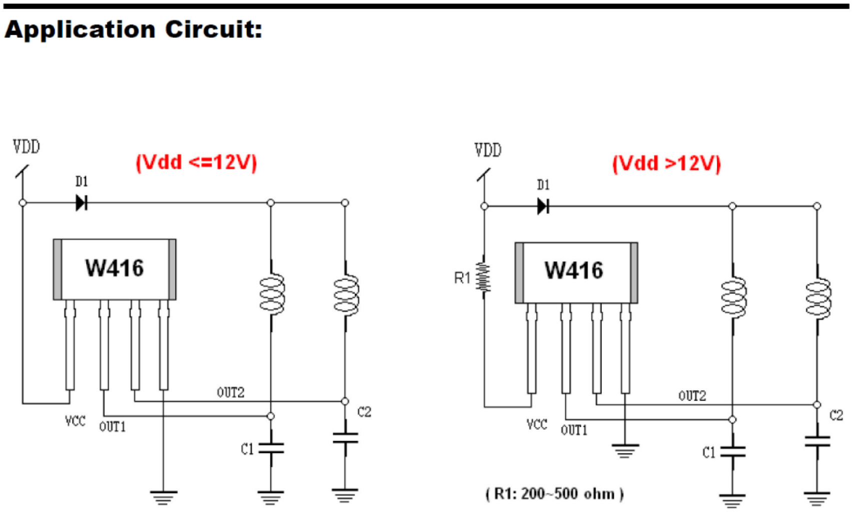
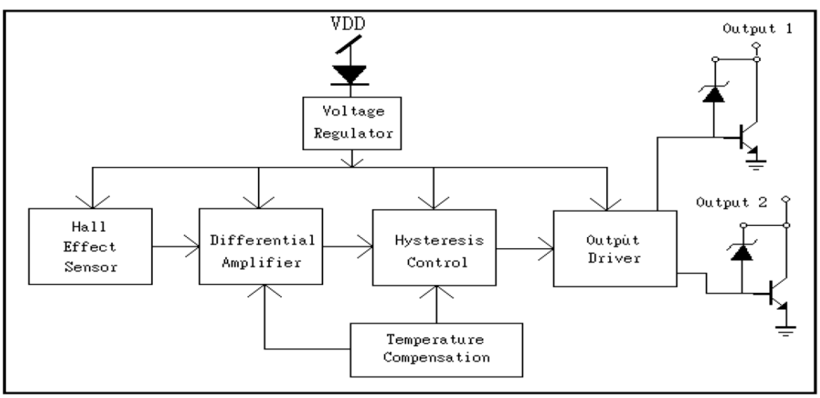


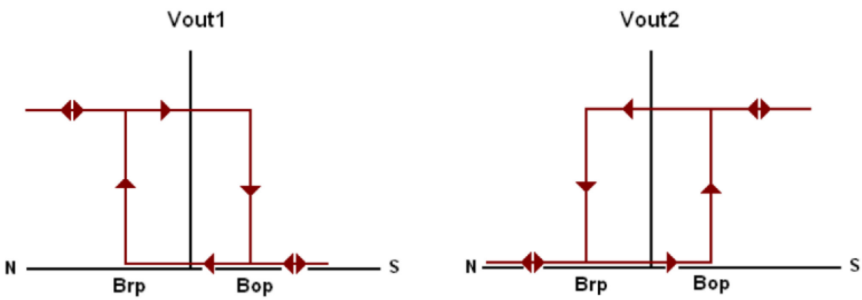
FIG 3: Components and Construction Diagram for Long-Range Magnetic Field and Polarity Detector – Do not buy the sensor; recover it from a 12V Fan for 3D Printers or PCs.

Hall Sensor Detection Mechanism





Current Deflection: When a magnetic field is present, the flow of electrons within the Hall sensor is deflected, creating a measurable potential difference, calculated independently for each polarity—as shown in the diagram below, taken directly from the WSH416 datasheet.



Perpendicular and Non-Perpendicular Components: The sensor is particularly sensitive to the perpendicular components of the magnetic field, providing an accurate measurement of the field's distribution in that direction... but not only that!

This capability, logically, allows it to assign a field value even for non-perpendicular lines, enabling it to define an **actual shape**; but this new characteristic will manifest **geometrically** only if the sensor is used in accordance with the detection method described in the next chapter.

Magnetic Characteristics:

Characteristics	Symbol	Quantity	Ta= -20˚C to +100˚C			Unit
			Min	Typ.	Max	
Operate Point	Bop	Grade A Grade B Grade C		25 30 50	50 70 120	Gauss
Release Point	Brp	Grade A Grade B Grade C	-50 -70 -120	-25 -30 -50		Gauss
Hysteresis Window	Bop-Brp			40	200	Gauss

Orientation and Measurement Dynamics

In this way, every point at which the LED lights up represents a **collapse of field information**: it's as if the sensor, in that moment, decides "where the field is"—just as in the collapse of the wave function.

From an interpretive standpoint, the device acts as a **local physical observer** of the field.

At each angular step, the sensor determines:

• presence or absence of polarity,

• relative orientation with respect to the magnet's axis,

• three-dimensional position within the detection space.

This dynamic made it possible to reconstruct the entire **three-dimensional shape** of the magnetic field around an axial magnet, with **point-by-point resolution**, consistent with the **visual representation of atomic orbitals**.

In the **double-slit experiment**, electrons exhibit wave-like behavior until they are observed, at which point they collapse into a defined position—something comparable to what occurs with this new method of detection.

The experiments surprisingly show a **potential collapse of the wave function**, with a different result for each angle of observation or collapse.

Indeed, it is precisely the act of observation that **CREATES the orbitals**, and the **angle of observation** will determine THE SHAPE; and it is only by maintaining the same angle throughout the measurement that we can obtain **precise and familiar shapes**, like those of all atomic orbitals.

I will continue this discussion in the "Detection Method" chapter, with examples.

Advantages over Other Instruments

Unlike iron filings, compasses, or magnetic visualization chambers, this sensor:

• does not orient itself automatically, but responds to an angular input chosen by the user,

• returns a **clear, digital signal**, avoiding subjective interpretations,

• enables **temporal reconstruction** of the field, point by point, creating orbitals **coherent in shape and polarity**.

Conclusion

This detection instrument, combined with this innovative method of use, represents an **accessible yet profoundly innovative technology**, capable of directly revealing the **invisible shapes of matter** through the magnetic field.

Its **replicability**, **simple construction**, and **compatibility with quantum interpretations** make it a **key tool** for visualizing, studying, and physically interacting with magnetic orbitals.

Two Perspectives on the Magnetic Field

- **Classical Perspective (Maxwell's Equations):**

Iron Filings: When using iron filings, you are observing the magnetic field's distribution on a macroscopic level. The filings align along the magnetic field lines, showing the field directions as predicted by Maxwell's equations.

Classical Magnetic Field: This field is described in terms of continuous lines of force extending through the space around the magnet. It is a macroscopic representation of the forces acting on moving charges.

- **Quantum Perspective (Probabilistic Mechanics):**

Hall Sensor: When using a Hall sensor, you are detecting the magnetic field at a **microscopic level of detail**. This may include **quantum effects**, such as the **collapse of the wave function** of electrons that contribute to the magnetic field.

Quantum Magnetic Field: Electrons in atomic orbitals and their magnetic moments produce a **local magnetic field**. This representation is far more detailed, and you will see how it strikingly reflects the **probability distributions** of electrons.

The two perspectives are not contradictory, but rather **complementary**. Both describe the magnetic field, but at different levels of detail.

Comprehensive Interpretation

The magnetic field around a magnet is **unique**, but its manifestation depends on the **measurement instruments** used for detection.

When you observe a magnet with different tools, you are seeing **different aspects of the same physical reality**.

Iron filings and the Hall sensor both provide valid information—but on **different levels of detail**.

- **Single Magnetic Field:** There is only one magnetic field, but its representation varies according to the measurement tool.

- **Complementarity of Perspectives:** The classical and quantum views complement each other, offering a **complete understanding** of the magnetic field.

In summary, interpretation depends on the measurement context: **classical and continuous** for ordinary phenomena, and **quantum** for probabilistic details. Both perspectives are necessary for a full understanding of the magnetic field around a magnet.

Different Types of Sensor Sensitivity

Using different types of sensors and/or powering them at different voltages, one might expect different results—and therefore **different field shapes** for the same magnet. But after analyzing **hundreds of diagrams**, I can tell you that this is not the case. The **sensitivity difference** between two sensors will only affect the **extension** of the orbital, but the **shape will always remain identical**, regardless of the magnet, sensor, or voltage used—and the reason for this is explained by **Quantum Mechanics**.

Look at the following two figures. In the next chapters, we will go into the construction of these shapes, but I must show them now to highlight the final concept just explained.

FIG. 32

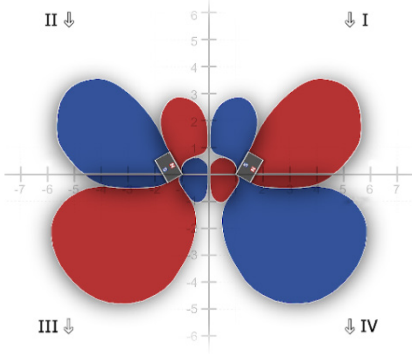


FIG. 33

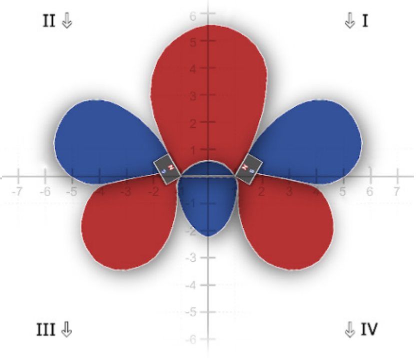


FIG 32: Dynamic Table – 2 Magnets in ATTRACTION at a distance of 2 cm, with a 60° angle relative to their axis – Side view of Rectangular Neodymium Magnets N35, 30(length) x 10(width) x 5(thickness)
FIG 33: Dynamic Table – Same magnets and same conditions but in REPULSION

These shapes are **proportional to one another**, and were detected with the **same sensor and in the same detection direction**. As we can observe, the **polarities extending vertically between the magnets** have completely different characteristics, which do **not** depend on the sensor's power, but on the **orientation of the polarities between the magnets**.

If the sensor's power had been the determining factor, we would have observed that the two polarities at the center of the magnets in FIG. 32 (those near the axis in quadrants I–II), which extend up to about **3 cm**, would have appeared as extended as the central one in FIG. 33, which reaches nearly **6 cm** in length.

The shapes remain **unchanged regardless of the sensor's power**, because they are **intrinsic forms of the Magnetic Field**, which are also **accurately described in Quantum Mechanics**.

DETECTION METHOD

The detection method developed in this research represents a genuine innovation in the observation of **macroscopic magnetic fields**.

Through the use of a **bipolar Hall effect sensor**, it has been possible to reconstruct the **three-dimensional geometry** of the magnetic field generated by permanent magnets, obtaining shapes **perfectly superimposable** on the atomic orbitals of the hydrogen atom.

This process was not merely an exercise in measurement, but a true **quantum interaction** between observer and field, in which **each measured point corresponds to a wave function collapse event**.

BIPOLAR, DYNAMIC DETECTION at CONSTANT ANGLE

This **“Long-Range Magnetic Field and Polarity Detector”** can detect the perimeter of each individual field bubble (or lobe), by recognizing polarity.

You will be able to reconstruct the shape of the magnetic or electromagnetic field through **multiple single detection points**, which you will eventually connect to create a complete drawing—just like a children's connect-the-dots game.

If I had to explain what’s happening in terms of classical mechanics:

In practice, with the ability to detect the maximum field value through perpendicular lines, using the sensor at precise angles, we also exploit all the **remaining capabilities**, precisely because it is used **DYNAMICALLY**.

For example, for field lines that are not perpendicular but almost parallel to the sensor, it will still indicate the polarity’s boundary at the point where its sensitivity reaches a lower value—but for us, **nothing changes**, since we will simply see the light turn on at that point.

Instead, the sensor is actually constructing the **exact image of the magnetic field**, based on different values—but in this case, the **difference in values manifests GEOMETRICALLY** through precise shapes that we can trace on a plane.

And this is precisely the **ASTONISHING characteristic**: by combining a Hall effect sensor with this detection method, we can **exploit the observation angle** to construct a **magnetic field geometry** corresponding to that **specific angle**.

To summarize, it would seem that:

THERE IS A MAXIMUM PROBABILITY OF FINDING THE ELECTRON AROUND THE NUCLEUS (Collapse Point), which here in reality we can now translate as: **THERE IS A SPECIFIC SHAPE... FOR EACH SPECIFIC MEASUREMENT ANGLE.**

Nonetheless, regardless of how we associate and interpret these quantum phenomena in the real world, all the **"results" and experiments** are **real and easily replicable**.

So now, let's look in detail at how to proceed, especially since this kind of experiment provides an **empirical and direct confirmation** of the strange shapes predicted by the Schrödinger equation— and all of this borders on the **incredible**… because for the first time, these measurements don't belong to the microworld, but are performed **here, in the real world!**

1 – Fix a preferably regular magnet, such as a cube, directly onto a sheet of paper using tape or double-sided adhesive. It must be **axially magnetized**, lying **sideways** on the sheet, so that when viewed from above, you see **North at the top and South at the bottom** (FIG 7).

2 – Keep in mind, as we said earlier, that this entire concept is **relative to the "detection angle";** therefore, you must always maintain the **same angle with the sensor** when detecting each point, in order to obtain realistic representations of the magnetic orbitals.

3 – For example, if you want to build the representation table of the magnetic field using vertical detection (parallel to the magnetization axis), place the sensor on the sheet and remember that **you can move it both up-down and left-right**, using rulers and set squares to help you. However, **you must never change the chosen angle relative to the magnet**—in other words, **the direction of the sensor** must always remain vertical (parallel to the magnet's axis in this case – FIG 7).

FIG. 7

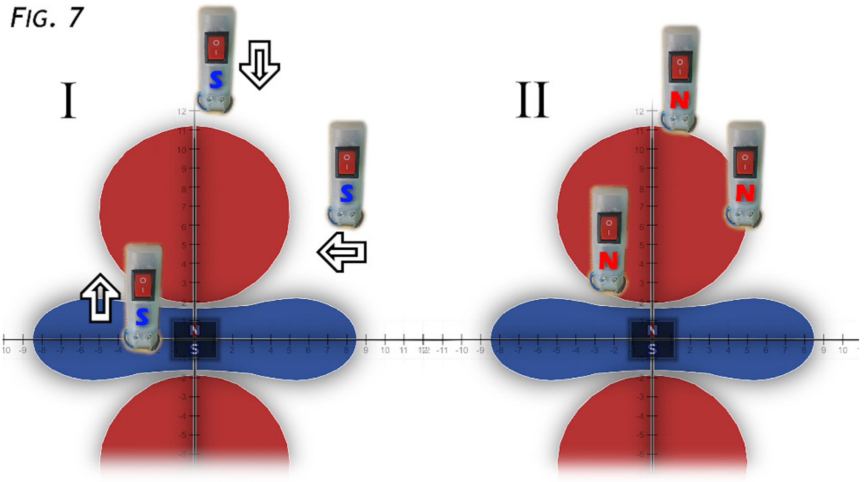


FIG 7.I: Approach with the sensor, extremely slow, precise, and with a fixed angle
FIG 7.II: Detection of selected points along the perimeter of the figure

4 – The sensor is capable of **switching polarity** as soon as you approach the **edge of a polarity bubble** (FIG 7.II), so movements must **always be slow and precise**, and go **from outside toward the inside** of the bubble to reconstruct its perimeter (FIG 7.I).

As soon as the sensor detects a polarity switch, **mark that point with a pencil** (FIG 7.II). A **full video** is included, demonstrating both 2D and 3D detection.

5 – The key to this detection mechanism lies in **"always resetting the sensor to the opposite polarity before measuring the next point."** In standby mode (when not inserted into a magnetic field), the sensor keeps the LED on from the **last detected polarity**.

So, if you're detecting a **north bubble**, you must **reset the sensor to south** before each point—using either an **external magnet** or the **opposite polarity bubbles** of the same magnet you're analyzing.

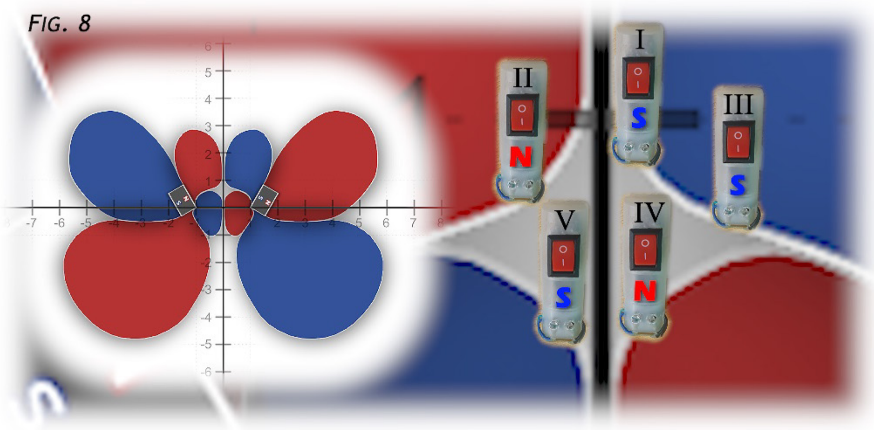


FIG 8: Sequence marked with numbers on the sensors, for complex detections within the neutral points between the polarity bubbles; a specific order is not important, but the alternation between polarities—above-below, right-left—supports the process..

Alternatively, you could simply create single points by **alternating one point on a north bubble with one on a south bubble**.

Even though this method may feel a bit chaotic or dynamic when mapping out the entire shape, this **alternating pattern will become necessary** whenever you need to identify **"neutral points"**—those that lie in the middle of multiple polarities, such as in **interactions between two or more magnets** (FIG 8).

In such cases, it's better to proceed by marking **one point at a time** between both polarities, moving **left-right or top-bottom**, always without changing the **sensor's angle** (FIG 8 – I, II, III, IV, V).

Naturally, the **more detection points** you mark, the **higher the resolution** and definition of the polarity shape.

FIG. 9

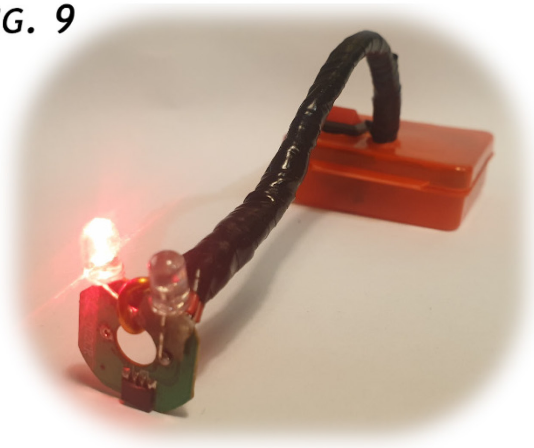


FIG 9: Construction method of the sensor, which distances the battery from the magnetic field being measured to avoid distortions. The sensor and LEDs remain close together for quick visualization of polarity changes.

It's important to know that a vertical scan going from **North to South is different from one going from South to North**.

This means you cannot detect field shapes by simply flipping the sensor (for example, after the diameter, during vertical scans) and completing the measurement in the opposite direction; doing so would alter the field's metrics (you might end up with a larger torus and smaller lobes), even if the overall shape remains the same.

Therefore, if you begin the detection from **north to south**, even after crossing the center line, you must **use the other side of the sensor** and **continue in the same direction**.

The tool shown in **Fig. 9** helps to distance the **battery** from the magnetic field being measured, avoiding **distortions**, specifically to support this phase of the detection.

Once you've completed the full detection, you'll be faced with these **geometrically stunning figures**, which you should **scan using a flatbed scanner** (not a photo), in order to preserve proportions.

Once the scan is on your computer, you can import it into any video editing software to trace and refine the image. I recommend **Premiere Pro**, due to its excellent **layer management** and its **simple, intuitive pen tool**, which allows you to quickly create filled bubbles, apply transparency, gradients, etc.

FIG. 10

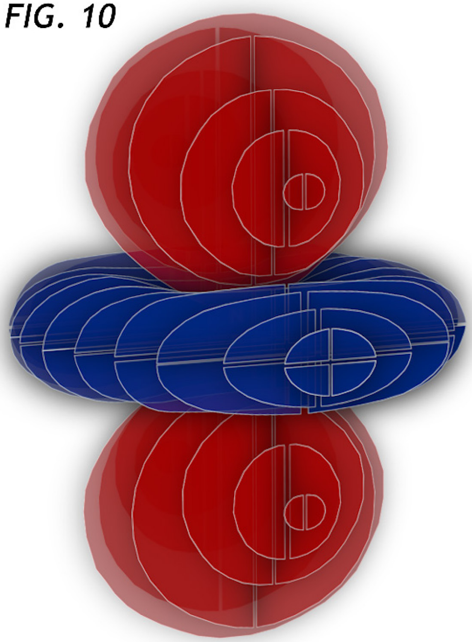


FIG 10: Multiple measurements of the magnetic field of a simple magnet at different distances, later assembled to form a 3D image – This image was created using Premiere Pro for the individual plates, and Paint3D for the 3D composition.

If you wish to go further and obtain **three-dimensional figures** of the magnetic field, you'll need to perform detections at **different distances**, as if you were doing a **CT scan of the magnet**, and then assemble the results using any **3D editing software**—even the basic **Paint3D** works well for this purpose (FIG 10).

Reproducibility and Precision

The simplicity of the method, combined with the accuracy of angular detection and the quality of the sensors used, makes the procedure highly reproducible.

Even in non-shielded environments, the results remain consistent and repeatable. Each figure can be reconstructed and verified by independent observers, without the need for expensive instruments or mathematical simulation algorithms.

This methodology thus offers a visual, tactile, and educationally accessible alternative for studying the structure of magnetic fields, with direct implications for understanding the geometric nature of quantum systems.

Theoretical Implications

The fact that the shapes obtained match the orbitals of the hydrogen atom suggests that the macroscopic magnetic field, when detected coherently, manifests the same geometric rules as subatomic systems.

This crucial insight lays the foundation for a unified vision between classical and quantum mechanics and allows us to propose a structural equivalence hypothesis between magnets and elementary particles.

EXPERIMENTAL RESULTS 2D

STUDY & DYNAMIC BOARDS

Foreword:

The first boards presented here are in **2D**, to allow us to address some fundamental concepts before introducing the **3D magnetic orbitals**. However, even these 2D boards correspond to **probabilistic equations**, and specifically represent the **inner cross-sections** of **D and P orbitals**.

So far, we've seen how to obtain **precise images** of the **magnetic field**, especially in terms of **shape**. Now, let's work through a line of reasoning that will serve to introduce **two different methods** for interpreting **polarities**.

NB: For easier interpretation of the boards, I've included **arrows** that indicate the **angle and direction** of the detection within the respective quadrant. So, if the type of board or the direction of detection is not explicitly stated... **refer to the arrows**.

And now, one of the most important moments in this research: **HERE'S WHAT ACTUALLY EXISTS IN 2D AROUND A MAGNET OR ELECTROMAGNET!**

Magnet used: Neodymium – N52 – Axial Magnetization – Cube Shape – mm: 25

STUDY BOARDS: 3 examples of detection using different angles, with appropriately mirrored polarities.

FIG. 13

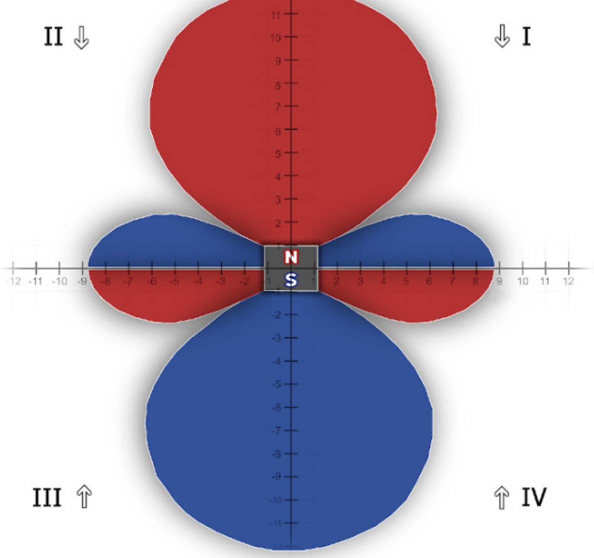


FIG 13: STUDY BOARD – Vertical Detection (Parallel to the Axis) – With mirrored polarities beyond the diameter

FIG. 14

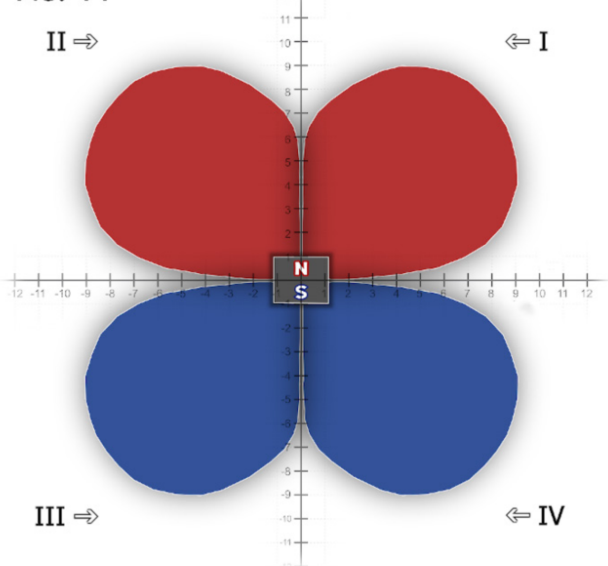


FIG 14: STUDY BOARD – Horizontal Detection (Parallel to the Diameter) – With mirrored polarities beyond the axis

FIG. 15

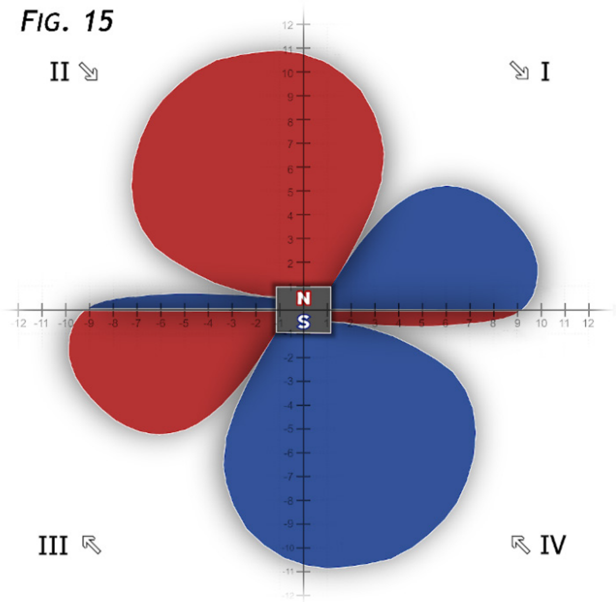


FIG 15: STUDY BOARD – 45° Detection (Relative to the Magnet) – With mirrored polarities beyond the diameter

Analyzing the **vertical detection** (FIG 13) or the **45° detection** (FIG 15), it might seem natural to think that, laterally, we're simply seeing the **two classic polarities** of the magnet extending in an unusual way—reaching even **beyond the central diameter** and over the opposite pole's surface. And while this may be **partially true**, we also need to consider **another way of reading** these configurations.

These boards were constructed based on the **current representations** we have of magnets, with a **north and a south pole**. We can say they are **more suitable for study purposes** than for practical applications.

To explain this, let's start with a simple question: **"A complete representation of magnetic field polarities—what kind of object is it usually meant to interact with?"**

If we eliminate all non-magnetic matter and various subcategories, the answer becomes clear: **"It's meant to interact with another dipole."**

Given this, mirroring polarities on a board (beyond the initial study phase) becomes a bit unrealistic—because if you intended to interact dynamically with another magnetic object using that board as a guide, you'd essentially need to work with a monopole, which we don't have.

Let's look more closely at the two types of boards, both created using vertical detection (though the same reasoning applies to any detection angle)

NB: When I talk about "respected interactions" in the boards, for clearer visual reference, I mean this: If the first attractive interaction is marked in red, then every subsequent attractive interaction should also be red, and likewise for repulsion.

FIG. 16

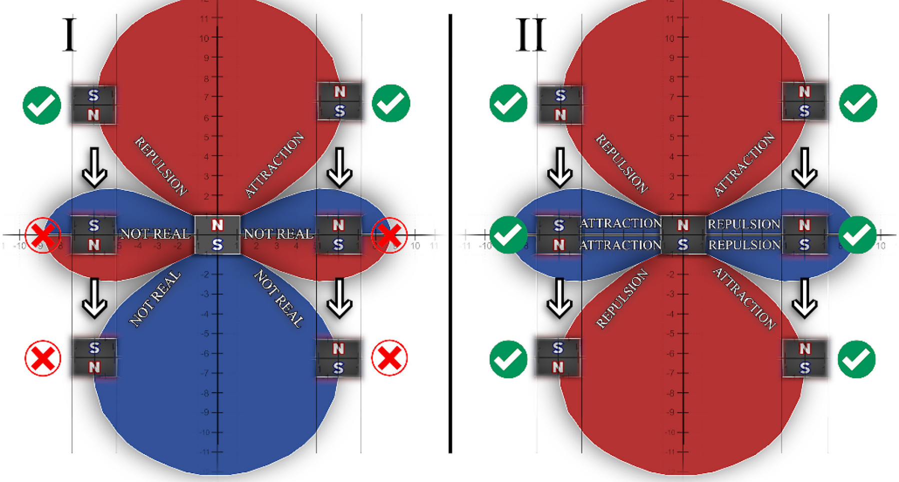


*FIG 16.I: **STUDY BOARD** (with mirrored polarities beyond the diameter) – Sequence of dynamic interactions between magnets not respected*
*FIG 16.II: **DYNAMIC BOARD** (continuous polarities) – Sequence of dynamic interactions between magnets all respected*

STUDY BOARD – FIG 16.I – If I take two magnets and place them with opposite orientations (to account for both polarities), and slide them from top to bottom near the magnet under analysis, we can observe that this **mirrored board** does not reflect the actual dynamics of reality. In order to use it effectively, I would have to **rotate the magnets** once I cross the central diameter.

DYNAMIC BOARD – FIG 16.II – With this type of board instead, if I perform the same actions, the result will be: attraction – repulsion – repulsion – attraction, or even: repulsion – attraction – attraction – repulsion; in other words, **all real-world interactions are respected.**

This happens because we know that after crossing the diameter of the magnet under analysis, everything is inverted—**but it is also inverted for the magnet I'm using to interact with it.**

It's important to stress that study boards are still essential, because we need to be aware of the various characteristics of the field with respect to its different polarities.

This reasoning serves to introduce a key concept: comparing the Hall effect sensor to the magnetization of the dipole used for interacting with the magnet under analysis.

In fact, when using Dynamic Boards—and more generally (especially considering the quantum mechanical connections we'll explore shortly)—it becomes advisable to move beyond the idea of "north" and "south" to describe a magnetic or electromagnetic field, and to focus solely on conditions like attraction and repulsion.

This shift makes it much easier to interpret a representation like FIG 16.II, and not go crazy wondering why two red indicators appear on opposite polarity lobes of a magnet.

Moreover, as we'll soon see, only dynamic boards show analogies with quantum mechanics—likely because the results of Schrödinger's equation describe interactions between atoms (dipoles) that reflect the dynamics of the real world, even if on a microscopic scale.

And so, without further ado, here they are...

THE DYNAMIC BOARDS...

FIG. 17

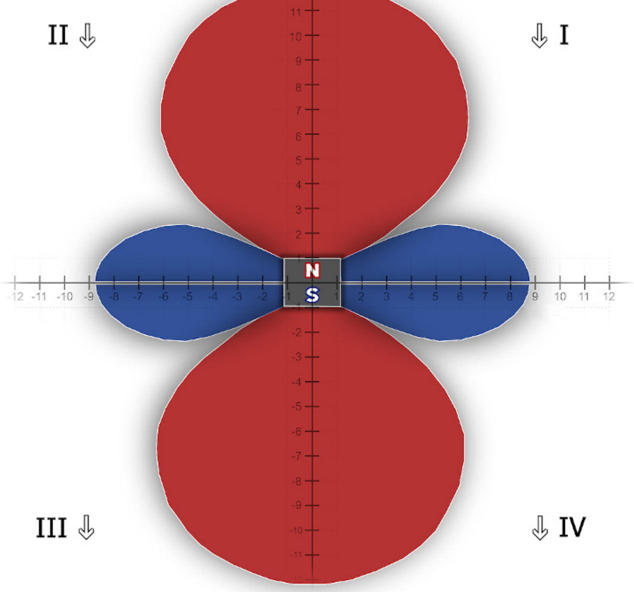


FIG 17: DYNAMIC BOARD – Vertical Detection (Parallel to the Axis) – With continuous detection – Central section of Atomic Orbital D – Quantum Numbers: n=3, l=2, mz=0

FIG. 18

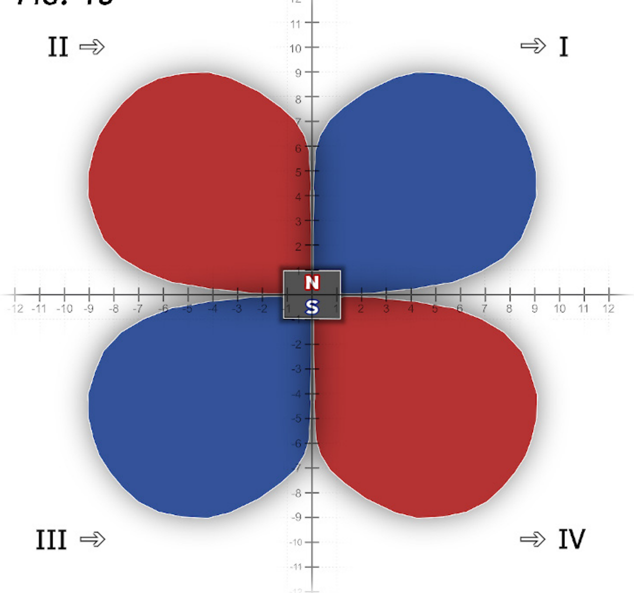


FIG 18: DYNAMIC BOARD – Horizontal Detection (Parallel to the Diameter) – With continuous detection – Central section of Atomic Orbital D – Quantum Numbers: n=3, l=2, mz=±1 (superposition)

FIG. 19

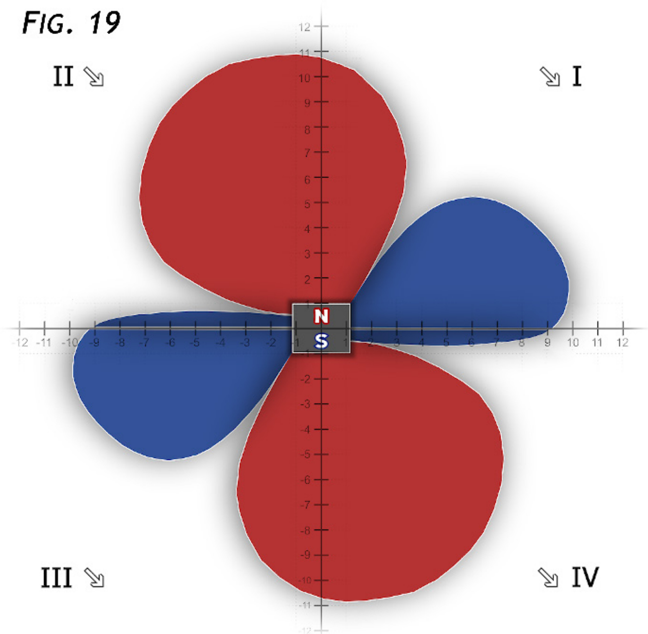


FIG 19: DYNAMIC BOARD – 45° Detection (Relative to the Magnet) – With continuous detection – Experimental Board that will be useful later in this Research

FIG. 20

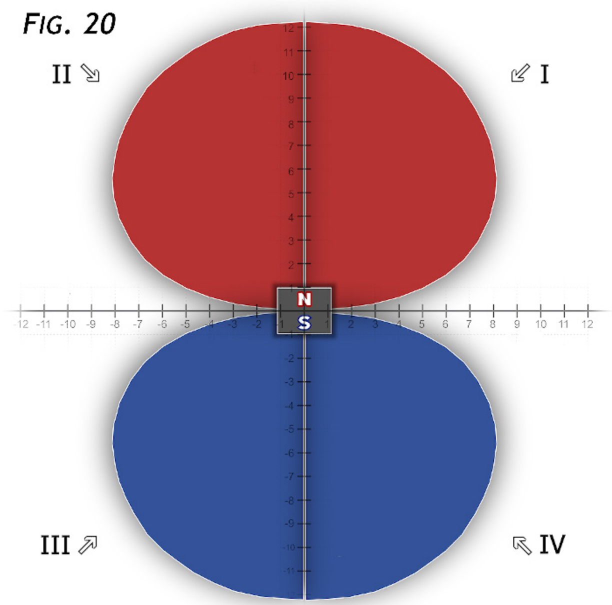


FIG 20: DYNAMIC BOARD – 360° Detection (Relative to the Magnet) – Sensor always pointing toward the magnet for each detection point – Central section of Atomic Orbital P – Quantum Numbers: n=2, l=1, mz=0

These boards **do not change their shape at all**—it is only the **concept of their use** that shifts to enable proper interaction with other dipoles.

In fact, as we can see in **FIG 17** or **FIG 19**, that **side polarity of opposite sign** I previously mentioned (which in 3D would appear as a **toroidal ring**), and which, in the **Study Boards**, is interpreted simply as a "**strange extension of the polarities above the diameter**,"—here instead becomes a **Real Independent Polarity**, one that can be **verified, experimented with, and applied**.

EXPERIMENTAL RESULTS 3D

MAGNETIC ORBITALS

Relations with QM

How to create a 3D reproduction of the magnetic field of a magnet or electromagnet?

You need a two-plane setup that allows you to place the magnet on the lower plane and gradually move it away to perform 2D scans at various distances from the magnet. Then, you stack these scans side by side at the same distances where you measured them—like a CT scan. A full 3D scanning video is attached to this research.

The first time I started marking these measurement points, I had absolutely no idea what shapes would emerge. I kept marking points randomly, without any clear awareness, noting the polarity near each point. Only at the end, by joining all the points of their respective polarities, did these wonderful, familiar figures explode before my eyes—figures we already know well.

I'd also like to emphasize that the first three comparisons you'll see were made with THE SAME MAGNET under analysis, changing only the SENSOR'S DETECTION ANGLE! This is how we begin to witness firsthand what it means to have quantum world rules here, in the real world! More on this in the next chapters...

After understanding the mechanism well, I dedicated myself to interpreting the shapes of atomic orbitals through the magnetic field I was detecting; in other words, finding all the identical shapes through Hall effect sensor measurements.

Here are the results: on the left, the theoretical representations from Schrödinger's equation, and on the right, the corresponding 3D magnetic field measurements**. Images and GIFs are always attached to this research.**

FIG. 54

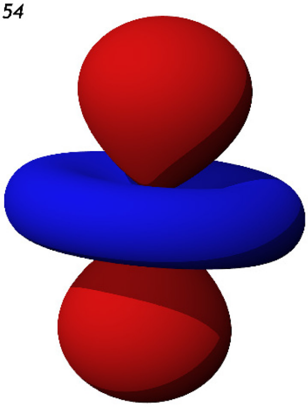


FIG. 55

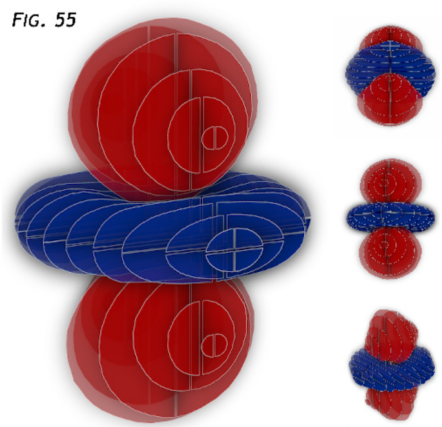


FIG 54: Wikipedia – Atomic Orbital D – Quantum Numbers: n=3, l=2, mz=0
FIG 55: Dynamic Board – Vertical Detection: Parallel to the axis of a magnet with axial magnetization. 3D effect recreated by overlapping multiple boards detected at different distances from the magnet

Observing FIGS. 54 - 55, we can see that they match perfectly from every point of view; from the shapes of the main polarities to the doughnut that surrounds the core and the magnet.

It is worth noting even the internal tilt of the measurements exactly at the center of the doughnut and the lateral bulge, in addition to the perfect proportions between the polarities.

In my opinion, this is one of the perfect representations that lead us to completely exclude a mere coincidence, considering that the chances of recreating such a particular shape in minute detail, using a Hall effect sensor and a magnet, were really low…

To obtain ideal shapes, I recommend using very powerful magnets, such as neodymium N52, and a regular shape; I believe a magnetic cube is the best solution.
However, while the shape of the magnet is important to adequately respect the shapes of the orbitals, if a different shape is used but with approximately the same dimension between axis and diameter, the magnetic field will still be identical.

FIG. 56

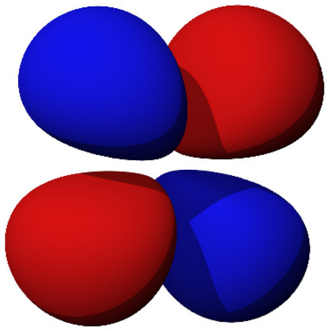


FIG. 57

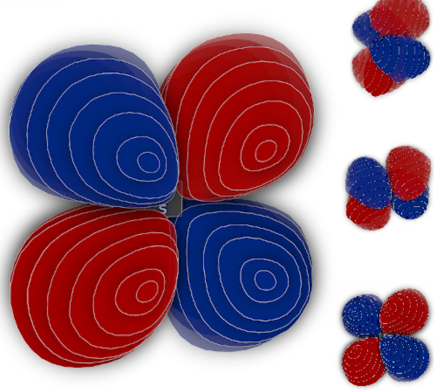


FIG 56: Wikipedia – Atomic Orbital D – Quantum Numbers: n=3, l=2, mz=±1 (superposition)
FIG 57: Dynamic Board – Horizontal Detection: Perpendicular to the axis of a magnet with axial magnetization. 3D effect recreated by overlapping multiple boards detected at different distances from the magnet

Even in the representation of **FIG 57**, we can observe that the main characteristics of the corresponding orbital (**FIG 56**) are respected:

- The bubbles are closer above the main polarities and more distant along the magnet’s diameter;
- The particular, more tapered shape toward the center of the magnet;
- The position of the final bulge of the bubbles, which seems to align perfectly with that of the orbital.

As we can see, simply observing the same magnet horizontally causes the magnetic field shape to change completely — it doesn't just distort.

While a vertical observation reveals **two large polarity bubbles and one torus** (**FIG 55**), by changing the angle, you can observe **four large polarity bubbles**, separated and in completely different positions (**FIG 57**).

FIG. 58

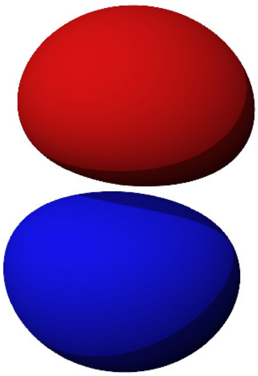


FIG. 59

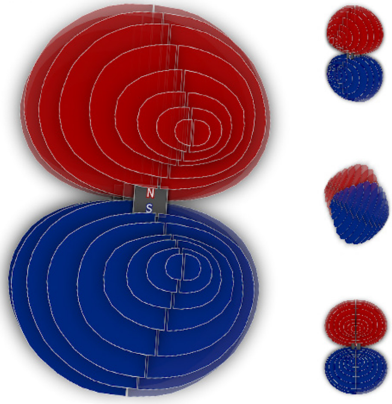


FIG 58: Wikipedia – Atomic Orbital P – Quantum Numbers: n=2, l=1, mz=0
FIG 59: Dynamic Board – 360° Detection around the magnet (marking each point with the sensor always pointed towards the magnet). 3D effect recreated by overlapping multiple boards detected at different distances from the magnet

The detection of this mapping (**FIG 59**) was particularly challenging.

The reason I created this specific chart was to attempt a measurement that would be completely **perpendicular to that of a compass**.

I had to **gradually rotate the sensor 360°**, always pointing it toward the magnet, which meant respecting a different angle for each detection point, approaching from the outside toward the center of the polarity bubbles, **with one fixed angle at a time**, calculated beforehand.

Later, I discovered that there was an **identical orbital** (**FIG 58**). In this case, the key features to note are the **compression of the bubble at the top** and the **angled bulge** that forms on the sides.

Given the particular nature of the **360° scanning**, which is unlike any other fixed-angle detection, I believe this specific orbital is trying to **tell us something different** from all the others...

By examining some of the more complex shapes, I began exploring precise **interactions between magnets**, aiming to recreate as many mappings as possible that **match the features of the primary atomic orbitals**.

FIG. 60

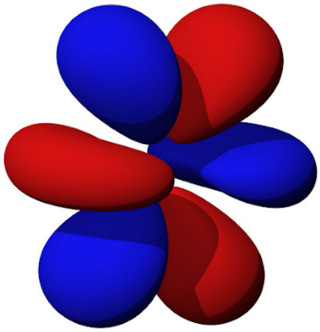


FIG. 61

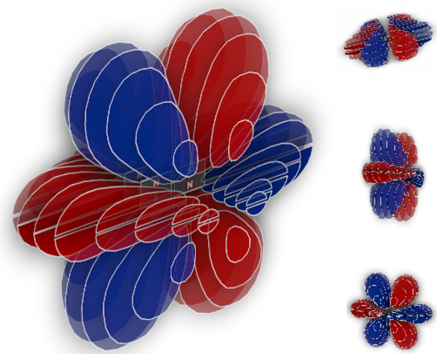


FIG 60: Wikipedia – Atomic Orbital F – Quantum Numbers: n=4, l=3, mz=±1 (superposition)
FIG 61: Dynamic Board – Vertical detection of 2 parallel magnets with axial magnetization in attraction, attached to each other – 3D effect recreated by overlapping multiple boards detected at different distances from the magnets

Even among these figures (**60–61**), we can observe the **same polarity sequence**, the **close proximity** of the two bubbles above the main poles, and most notably, the **greater length** of the two bubbles extending along the **diameter**—both in the orbital representation (**FIG 60**) and in the magnetic field detection (**FIG 61**).

But these measurements raise an important question:
"Why did I need to use two separate magnets to represent this orbital—and the ones that follow?"

It is possible that, **as quantum numbers increase**, a more **complex magnetic field** becomes necessary—through the addition of one or more magnets—in order to **accurately reflect the properties of the corresponding orbitals**.

But it doesn't stop there:
This also involves the **orientation of the polarities** and the **spatial arrangements** between the magnets being analyzed, as we can see here and in the upcoming figures.

FIG. 62

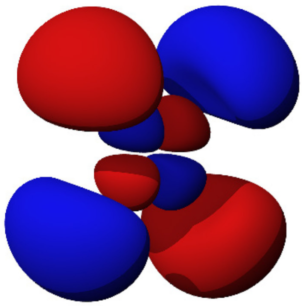


FIG. 63

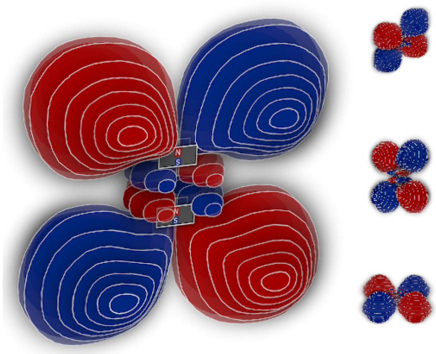


FIG 62: Wikipedia – Atomic Orbital D – Quantum Numbers: n=4, l=2, mz=±1 (superposition)
FIG 63: Dynamic Board – Horizontal detection: Perpendicular to the magnets' axis – 2 magnets facing each other in attraction at a distance of 2 cm. 3D effect recreated by overlapping multiple boards detected at different distances from the magnets

Here as well (**FIG 62–63**), the main characteristics appear to be respected:

- the **closer proximity** between the large bubbles extending from the external main polarities;
- the **proportion** between the large and the small central bubbles;
- their **position**, all clustered in the center;
- and the **shape** that forms in the central neutral point (even if it seems larger in the magnetic field, that's only because the sensor isn't as powerful as an equation).

Had I not positioned the magnets that way, at that specific **distance** and in **attraction**, I would not have been able to generate that particular configuration.

As we've said before, we're not just talking about injecting more energy by adding the magnetic field of another magnet; in this case, it seems we also need to consider the **SHAPE**, the **POLARITIES**, and the **ORIENTATION** of that added energy!

FIG. 64

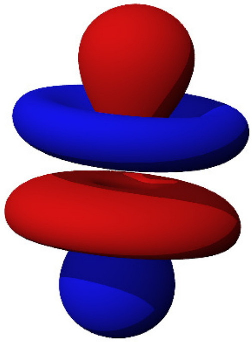


FIG. 65

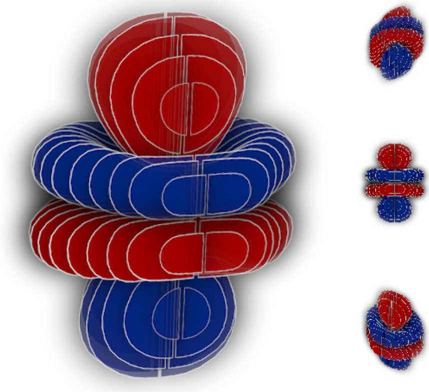


FIG 64: Wikipedia – Atomic Orbital F – Quantum Numbers: n=4, l=3, mz=0
FIG 65: Dynamic Board – Vertical detection: Parallel to the magnets' axis – 2 magnets in repulsive interaction, attached axially with acrylic glue. 3D effect recreated by overlapping multiple boards detected at different distances from the magnets

This detection was particularly challenging due to the **magnetic configuration**, which required attaching magnets together using **faces with the same polarity**—for example, I had to connect the **south pole** of one magnet axially to the **south pole** of another. Needless to say, there was a fair amount of **bloodshed and acrylic glue**, because these magnets were quite large and made of **N52 neodymium**.

I must say, the first time I tried it, they **practically exploded after a few seconds**, as I hadn't glued them properly. The energy trapped within was almost **tangible**… Yet the resulting shape **perfectly matches** that of the reference orbital, from the main polarity bubbles to the **two toroidal lobes** extending upward.

If I were to assign a value to the field, the **main polarities** are heavily affected by the forced magnetic flux variations caused by connecting the magnets in this unnatural way, which significantly **diminishes their original magnetic strength**.

On the contrary, the **energy radiating from the toroidal lobes** is the **strongest encountered** so far in any of the mappings.

FIG. 66

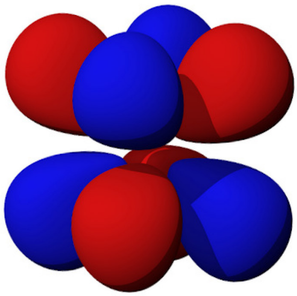


FIG. 67

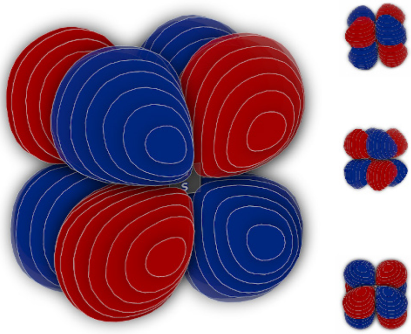


FIG 66: Wikipedia – Atomic Orbital F – Quantum Numbers: n=4, l=3, mz=±2 (superposition)
FIG 67: Dynamic Board – Horizontal detection of 2 parallel magnets with axial magnetization in diametrical attraction, attached to each other – 3D effect recreated by overlapping multiple boards measured at different distances from the magnets

This is the only orbital so far where I had to perform the detection **from above and below the magnets**, rather than from the side like all the others. Essentially, I had to place the magnets flat on the sheet, so that the **polar faces were oriented toward me**, instead of sideways.

The magnets were attached **in attraction**, aligned along their diameter, with the **detection aimed at the short side** of the magnets (details provided in the next chapter).

This magnetic orbital (**FIG 67**) features **eight symmetrical lobes**, with proportions that consistently align with all the predictions of the orbital equations (**FIG 66**).

With these comparisons, we may genuinely begin to answer some of the more **peculiar questions in quantum mechanics**, using these findings as **directional insights** for future reasoning—especially if it becomes definitively confirmed that these measurements are **an integral part of complex quantum systems**.

FIG. 68

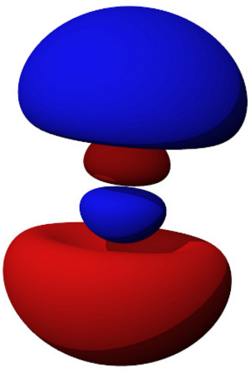


FIG. 69

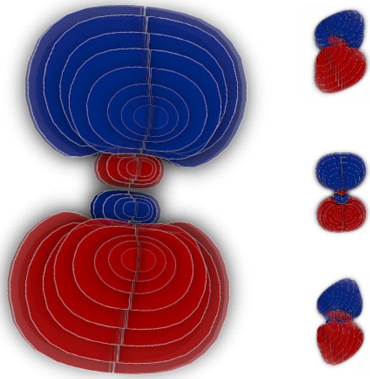


FIG 68: Wikipedia – Atomic Orbital P – Quantum Numbers: n=3, l=1, mz=0
FIG 69: Dynamic Board – 360-degree detection of 2 magnets with axial magnetization in attraction at 3 cm distance – 3D effect recreated by overlapping multiple boards measured at different distances from the magnets

This "SUPER MARIO MUSHROOM"-like configuration is created using **two magnets**, placed approximately **3 centimeters apart**, in an **axial arrangement**, and **oriented attractively** toward each other.

Just like the detection of the **single-magnet P orbital** we saw earlier, the measurement here is performed at **360 degrees around the two magnets**, but **focusing on the center** of the magnetic system—that is, the **center of the Cartesian axes**.

Again, as with all the other detections involving two spaced magnets, it's necessary to **find the correct spacing** to ensure that the representations match the predictions of the equations. Keep in mind: **the farther apart the magnets are**, the **larger the internal lobes** between them will become.

Naturally, this reasoning can be extended by **adding more magnets**, **properly oriented**, which gradually increase in size with **greater distance from the center** of the magnetic system—drawing a direct analogy to the **increase in energy with distance from the nucleus** (to be explored in the next chapters).

FIG. 70

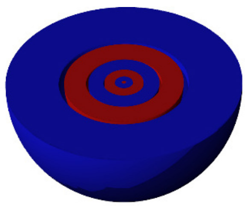


FIG. 71

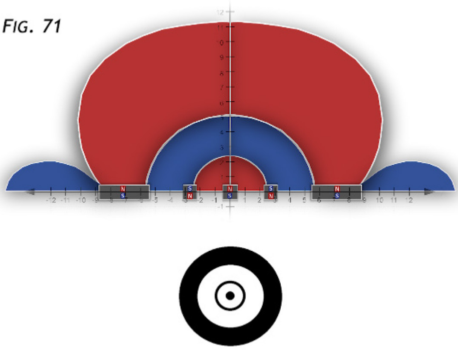


FIG 70: Wikipedia – Atomic Orbital S – Quantum Numbers: n=6, l=0, m=0
FIG 71: Dynamic Board – Vertical detection of 3 magnets with axial magnetization – First Magnet (Round) with NORTH facing up, Second Magnet (Ring-shaped) with SOUTH facing up, Third Magnet (Ring-shaped) with NORTH facing up.

For completeness, I also attempted to represent an "**S**" orbital—so far, the only one that has posed a bit of a challenge. In fact, I included the **2D image** to show that, while the final shape doesn't form a perfect **sphere**, the **interior of the figure** is made up of **perfectly concentric spheres**, with a **millimetric gap** between them. And this, taken on its own, still effectively represents all "S" orbitals.

Of course, it's important to remember that **I** was the one who chose this particular magnet configuration and spacing, and maybe with a **different setup**, this form would have matched **perfectly** as well.

For instance, I would have liked to try a **radially magnetized ring magnet** as the final magnet in analysis, in order to ensure spherical symmetry **even on the outside**—but unfortunately, I don't have access to every magnet in the world, and it seems that in Italy, magnets of this type have practically been **banned**!

But this is really just for the **sake of completeness** in the measurements, because after all the orbitals already shown, we now have **all the confirmations** we were looking for—and are about to discuss…

FIG. 72

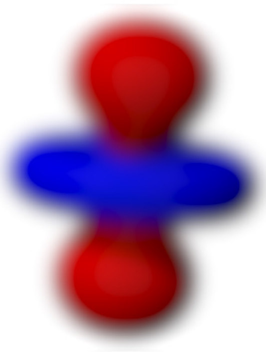


FIG. 73

FIG 72: Blurred representation of an atomic orbital, showing a somewhat more accurate probability of finding an electron around the nucleus
FIG 73: Similarly to the probability of finding an electron around the nucleus, it is possible to compare the magnetic intensity gradient of a magnet developing around it

Continuing with the analogies, **atomic orbitals** are often described as **regions in space where the probability of finding an electron is highest**. Similarly, the **magnetic field** manifests in **spatial regions where the magnetic force is strongest**, following a **distribution strikingly similar** to that of atomic orbitals.

We can, in fact, point out that the **probability of finding an electron around the nucleus** (FIG 68)—which gives those characteristic blurry shapes—is the direct analogue of **magnetic field intensity**, which **gradually decreases with distance** (FIG 69), and thus **requires** a visual “blur” of magnetic field lobes for an accurate representation.

After all the diagrams compared so far, we can reasonably conclude that the **shapes of atomic orbitals and magnetic fields** appear to be **virtually identical**.

Simple Divine Coincidence?

The only discrepancies that may arise are tied to **physical reality** itself: the **type and shape of magnets** in use, the **chosen spatial configurations** for the representation, the **sensor used**, the **precision** of the detection process, and countless other subtle details that reality inevitably confronts us with—**unlike the idealized world of equations and simulations**.

It’s also worth noting that all these shapes were created using **axially magnetized magnets**. Who knows **how many other forms** we might encounter by using **other types of magnets**, or **electromagnets**, or even creating **hybrid interactions** between them…

MAGNETIC ORBITALS

Guide to Construction

Thus, after having successfully recreated the exact shapes of atomic orbitals through the detection of the magnetic field generated by one or more magnets using a Hall effect sensor, **we can now establish a practical guide to the "CREATION" and "CONTROL" of these remarkable forms within our macroscopic world.**

Based on all the characteristics observed in the experimental measurements so far, we can make the following assumptions:

- **SINGLE MAGNET**:
  A SPECIFIC ANGLE OF MAGNETIC FIELD DETECTION "CREATES" A PRECISE ORBITAL THAT ALSO REFLECTS THE SHAPE AND PROPERTIES OF THE MAGNET ITSELF.

- **TWO OR MORE MAGNETS**:
  THE SHAPE OF THE MAGNETIC FIELD ORBITAL ALSO DEPENDS ON THE SPATIAL CONFIGURATION OF THE MAGNETS AND ON THEIR RELATIVE POLARITY ORIENTATION, IN ADDITION TO THE DETECTION ANGLE AND THE INTRINSIC CHARACTERISTICS OF THE MAGNETS USED.

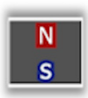
Furthermore, the detection angle can "DYNAMICALLY" alter the orbital shape **on demand**, effectively enabling control over the magnetic orbital structure (see Chapter: *Entanglement* for an in-depth analysis).

In this way, we will understand beforehand the entire creation dynamics, thanks to the structure of a precise method that starts from the identification of these shapes through specific magnetic measurements and configurations, as we saw in the previous chapter.

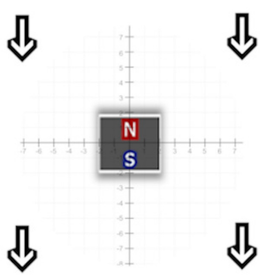
And here is a kind of useful guide to recreate the results of Schrödinger's equation using magnets or electromagnets in our macroworld; of course, this method should be assimilated after learning to use the sensor for 2D and 3D measurements, as explained in the chapters 'Measurement Method' and 'Settings'.

To perfectly recreate shapes that respect atomic orbitals, it would be advisable to use magnets with equal dimensions between axis and diameter, such as regular magnets like a cube or a sphere (a cube facilitates stability in measurements, so it's the better choice).

Furthermore, the instructions that follow will always pertain to magnets with AXIAL MAGNETIZATION, to clearly understand the magnet's orientation, identified with N and S written on the axis.



The direction of the measurement will be identified by arrows; **the following plane should be viewed as if you are placing a magnet on a sheet and looking at it from above**. Therefore, you should also place the sensor on the sheet and keep it exactly in the direction of the arrows throughout the measurement to obtain the shape of the orbital being discussed.



MAGNETIC ORBITALS OF 'S' TYPE

Let's start with the only type of orbital that has posed some challenges. As you saw in the previous chapter, these types of orbitals have the peculiarity of being concentric spheres like 'Matryoshka' dolls.

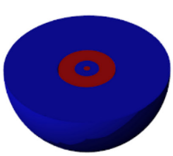
Although the external appearance may need to be adjusted with a specific type of final magnet, I found it useful to mention in this guide the method to recreate the interior of this type of magnetic orbital. **In reality, it features perfect spheres with inverted polarities, with a millimetric gap between them, exactly like all 'S' orbitals.**

The measurement with the Hall effect sensor should always be parallel to the magnetization axis.

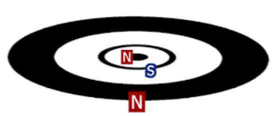
The sequence of magnets to increase energy in accordance with the results of probabilistic equations should be represented by a central magnet and several ring magnets, nested inside each other, progressively larger, all with inverted polarities. This means that if the first magnet, whether round or cylindrical, has the North pole facing up, the second magnet, which is a ring, will have the South pole facing up, the third magnet, also a ring, will have the North pole facing up, and so on...

ORBITAL TYPE

S - N=4, L=0, M=0

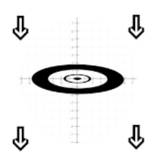


MAGNETS ARRAY



AXIAL MAGNETIZATION

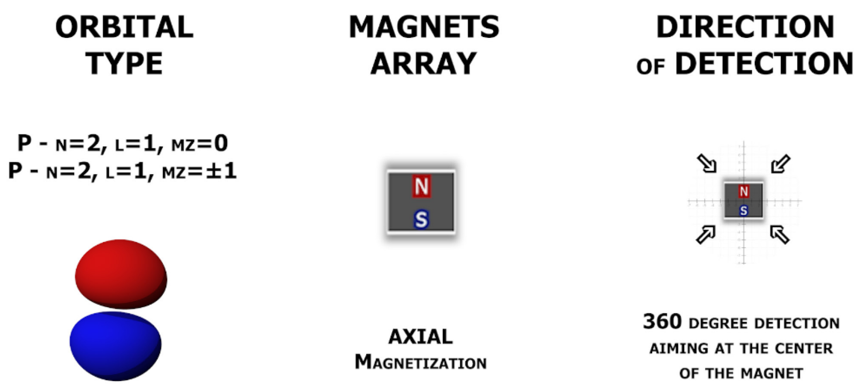
DIRECTION OF DETECTION



PARALLEL TO THE AXIS OF MAGNETIZATION

MAGNETIC ORBITALS OF 'P' TYPE

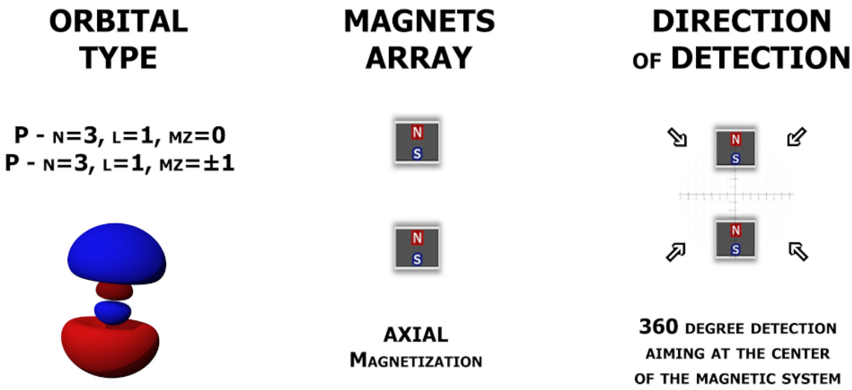
This type of orbitals has the most challenging detection of all; you must proceed 360 degrees with the sensor, changing the angle for each measurement point, always aiming at the center of the magnet under analysis, if using a single magnet.



A single magnet, analyzed 360 degrees, will produce the shapes of 'P' type orbitals: n=2, l=1, m_z=0 and n=2, l=1, m_z=±1.

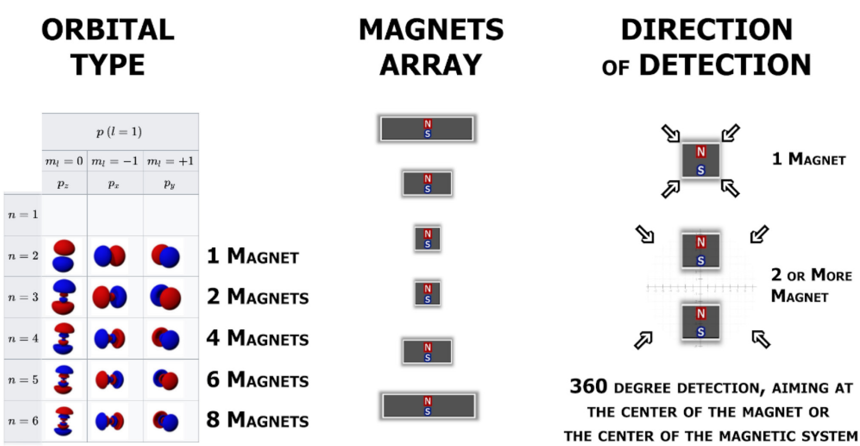
With 2 magnets, placed approximately 2-3 centimeters apart in an axial position and oriented attractively towards each other, it is instead possible to obtain the atomic orbitals of 'P' type: n=3, l=1, m_z=0 and n=3, l=1, m_z=±1.

The 360-degree analysis in this case must be performed aiming at the center of the magnetic system; by magnetic system, I mean the entire configuration set up to represent the orbital. Therefore, aim the sensor always at the center of the axes of a hypothetical Cartesian plane, as described in the following Figure.



It is possible to further increase the energy of the system by introducing additional magnets. However, to properly respect the shapes of more complex orbitals, it is important to consider that electrons farther from the nucleus have more energy. Therefore, applying this reasoning to representations through magnetic fields, we will need increasingly larger magnets as we move away from the center of the magnetic system.

The arrangement of magnets for complex shapes, as seen in the figure, is always in AXIAL position with attraction-oriented polarities between them. Additionally, it's necessary to always use an even number of magnets and space them proportionally apart.



MAGNETIC ORBITALS OF 'D' TYPE

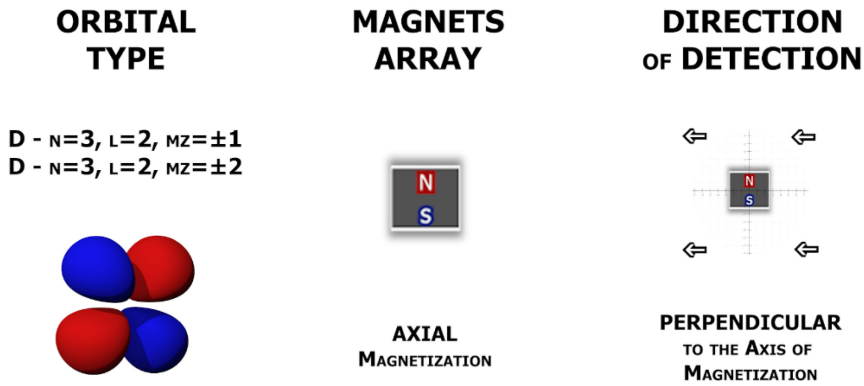
It's absolutely fascinating to observe how the simple act of measurement can change the shape of the magnetic field we are detecting. In fact, in this measurement, we can always observe a single magnet taking the shape of a 'D' orbital: n=3, l=2, m_z=0, simply because we are observing it parallel to the magnetization axis.

So, to summarize, a single magnet observed 360 degrees will produce a 'P' orbital: n=2, l=1, m_z=0/±1, but if observed parallel to the magnetization axis, it will appear as a 'D' orbital: n=3, l=2, m_z=0, which will not only have 2 lobes but will also include a toroidal shape around the magnet.

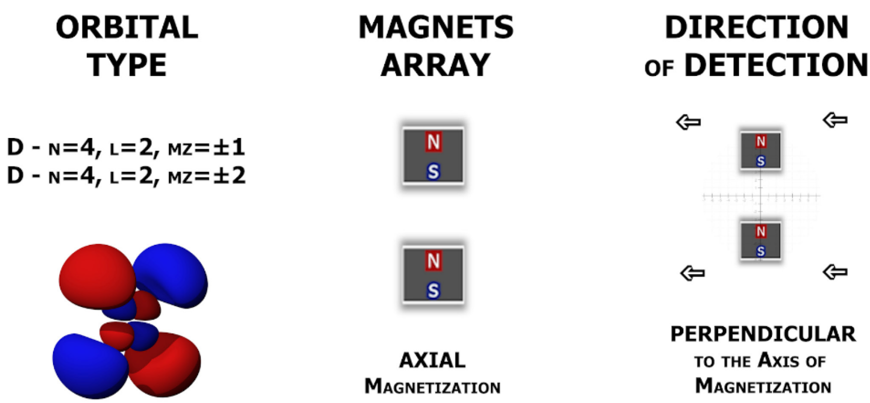
But it gets even more absurd than this...

Analyzing the same single magnet perpendicularly to the magnetization axis presents yet another type of orbital, completely different in shape and characteristics.

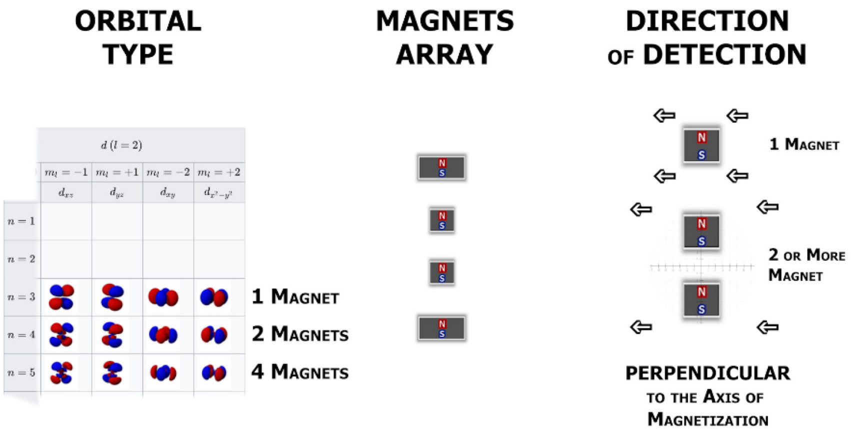
In reality, considering the different inclinations, a family of orbitals is obtained, specifically the 4 'D' type orbitals: n=3, l=2, m_z=±1, n=3, l=2, m_z=±2, as depicted in the following Figure.



With the same configuration of 2 magnets used to represent the more complex 'P' orbitals described earlier (n=3, l=1, m_z=0/±1), that is, positioned approximately 2-3 centimeters apart in an axial position and oriented attractively towards each other, simply observing the field perpendicularly to the magnetization axis will instead present us with the family of 'D' orbitals: n=4, l=2, m_z=±1 and n=4, l=2, m_z=±2.



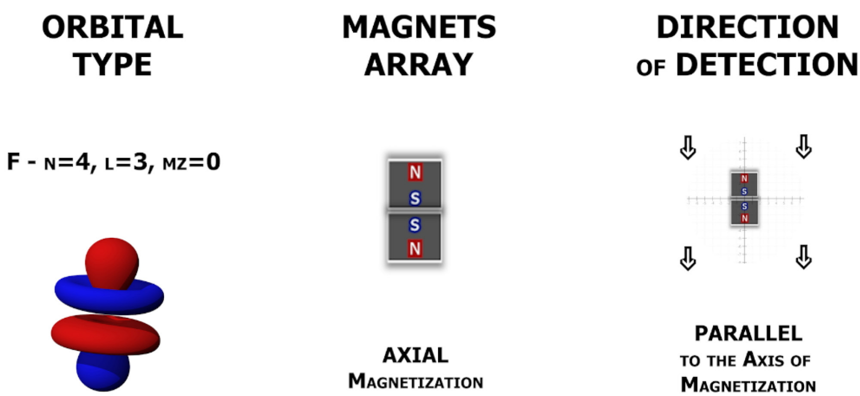
It's possible to continue adding energy through additional magnets to achieve even more complex shapes, always respecting both the orientation and proportion of magnets based on their distance from the center of the magnetic system, analogous to the distance from the nucleus for electrons. So, in summary, the process will proceed as follows, speaking in terms of detection, arrangement, and magnetic orientation, to create all forms of 'D' orbitals 'without torus'.



MAGNETIC ORBITALS OF TYPE 'F'

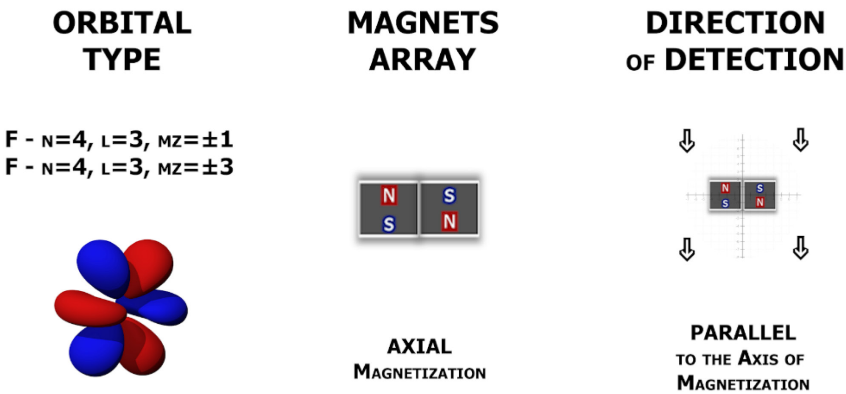
These detections required a bit more creativity and luck, considering the multiple possibilities of arrangement, orientation, and distance needed to interact the magnetic field of 2 magnets in ways suitable for our objective.

For example, I had to glue together 2 neodymium magnets with the same polarities facing each other, thus repelling, using a significant amount of acrylic glue. This axial arrangement, always oriented with detection parallel to the axis, will produce the shape of an 'F' orbital: n=4, l=3, m_z=0, as depicted in the following schematic...



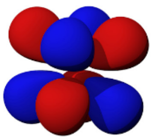
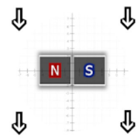
The fact that the same polarities of 2 magnets are oriented in repulsion and were glued together without any gap allows the creation of 2 toroidal shapes protruding towards the axis of the magnet, rather than the diameter like the 'D' orbital n=3, l=2, m_z=0.

The bubbles of the two main polarities, above and below the figure, are greatly affected by the contrast of polarities and are less powerful, thus much smaller than those of the 'D' orbital. With 2 magnets positioned diametrically to each other, oriented in attraction, we move to another orbital, or rather another family of 'F' orbitals: n=4, l=3, m_z=±1 and n=4, l=3, m_z=±3.



The detection of these shapes is parallel to the axis of magnetization, and we can see 4 larger lobes belonging to the main polarities, above and below the magnet which is surrounded by 2 other polarities extending horizontally; it's not difficult to imagine that these two polarities represent the same torus, for example, as the 'D' orbital n=3, l=2, m_z=0, which, being formed by distinct polarities in this case, does not complete the toroidal shape.

The following type of orbital, instead, is characterized by 8 lobes. It requires a particular detection method, considering that unlike all the others, it must be performed not only perpendicular to the magnetization axis of the magnets but also perpendicular to the long side of the magnetic system, as shown in the figure. Orbital 'F' n=4, l=3, m_z=±2.

ORBITAL TYPE	MAGNETS ARRAY	DIRECTION OF DETECTION
F - N=4, L=3, MZ=±2 	 AXIAL MAGNETIZATION	 (TOP VIEW) PERPENDICULAR TO THE LONG SIDE OF THE MAGNETIC SYSTEM

And finally, with all the supporting evidence, I would like to delve into these results conceptually... As we have just observed, this work leads us to seriously compare the macro magnetic and electromagnetic field to the probability of finding an electron around the nucleus, which indeed, shouldn't be exactly the same thing, right?

But...

What could it mean to have recreated **ALL** atomic orbital shapes with perfect detail through the magnetic and/or electromagnetic field? Moreover, even more surprisingly, as you've surely noticed, simply adjusting the angle in the analysis of a single magnet can generate 3 different Families of Orbitals. Now, saying it's a coincidence becomes quite bold at this point...

So, the real question we should now ask ourselves is:

How do we translate all the rules of Quantum Mechanics into the real world to describe and understand the behavior of this strange quantum magnetic/electromagnetic field?

INTERACTIONS BETWEEN MAGNETS

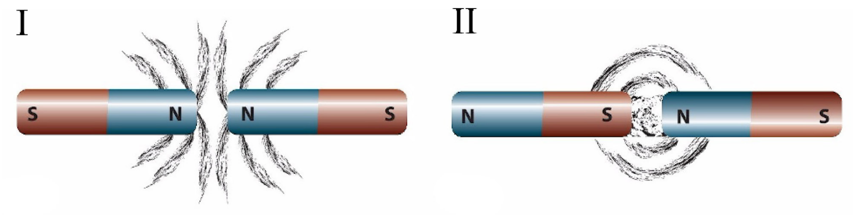


FIG 25.I: 2 Magnets in REPULSION - Magnetic Field Lines with Iron Powder
FIG 25.II: 2 Magnets in ATTRACTION - Magnetic Field Lines with Iron Powder

After structuring this method, I delved into the interactions of the magnetic field between 2 or more magnets to clearly distinguish what happens. Currently, we have representations that indicate the presence of a neutral point in the field exactly at the center of 2 repelling magnets (FIG 25.I), while lines intersect each other in magnets that attract (FIG 25.II).

I recreated the same conditions (we'll see it in a few tables), but to make things more interesting, knowing now that thin and powerful magnets have strange bubbles of inverse polarity that extend in much more peculiar ways, I present a sequence of dynamic tables (also available as GIFs) between 2 magnets in attraction compared to the same magnets in repulsion, at different distances and positions from each other, detected vertically.

It should always be remembered that the tables we are about to see in 2D actually have very different three-dimensional aspects that are difficult to imagine quickly, but we will see it better in the quantum part of this research.

FIG. 26

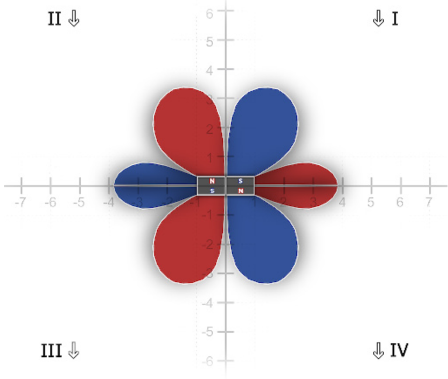


FIG. 27

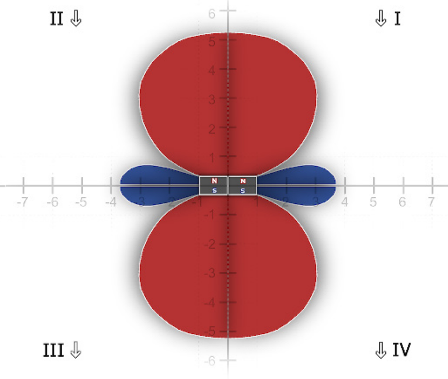


FIG 26: Dynamic Table - 2 Magnets in parallel ATTRACTED attached to each other - Side view of Neodymium N35 Rectangular Magnets 30(length) x 10(width) x 5(thickness) FIG 27: Dynamic Table - Same magnets and conditions but in REPULSION attached to each other with force and lots of acrylic glue

Considering that the proportions of the magnetic field between the tables are also respected, we can observe the amount of extra energy obtained by forcing two magnets in repulsion to be perfectly attached to each other (FIG 27), in addition to the extreme difference in shape with the magnets in attraction that maintain the polarities well separated from each other (FIG 26).

We are talking about 6 polarities in attraction and 4 in repulsion (counts on 2D images); because in 3D there would always be 6 magnets in attraction, compared to 3 in repulsion, because the two lateral blue polarities in FIG 27 are actually a single toroid, as we will see in the following chapters.

This sequence of magnet interactions we are observing will indeed help us approach the 3D forms we will see in the quantum chapters; these interactions are truly unique and unpredictable, allowing us to see them in action.

FIG. 28

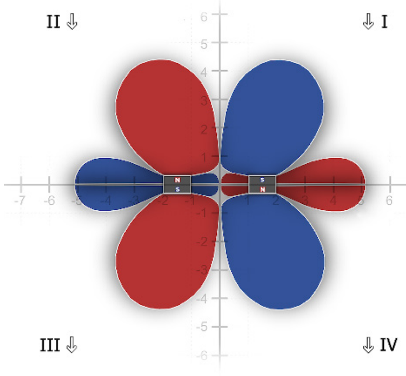


FIG. 29

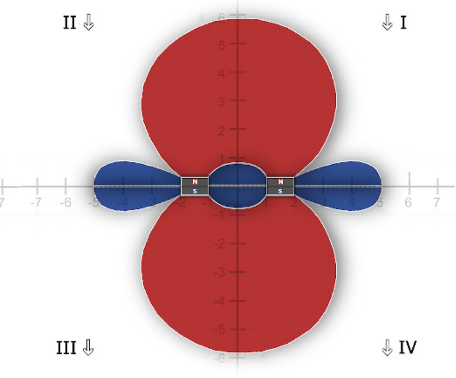


FIG 28: Dynamic Table - 2 parallel Magnets in ATTRACTION at a distance of 2 cm - Short side view of Neodymium N35 Rectangular Magnets 30(length)x10(width)x5(thickness)
FIG 29: Dynamic Table - Same magnets and same conditions but in REPULSION

If we move the magnets 2 cm apart, we start to observe fantastic things; in the magnets in attraction (FIG 28), the external polarities remain well distinct, and two additional polarities are added in the center of the magnets, creating two neutral points above and below the diameter with their perimeters.

In the magnets in repulsion (FIG 29), however, we can see that a single reverse polarity is added between the magnets, which rises up to about 7mm above the faces of the two magnets.

It's curious to see that the neutral points, in this probabilistic view of the magnetic field, appear only between bubbles of opposite polarities, which is completely opposite to what we have always seen when measuring with iron in the classical version of the magnetic field.

FIG. 30

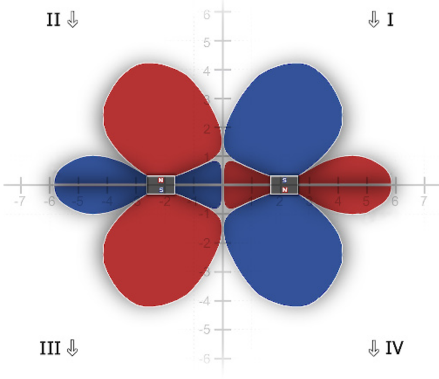


FIG. 31

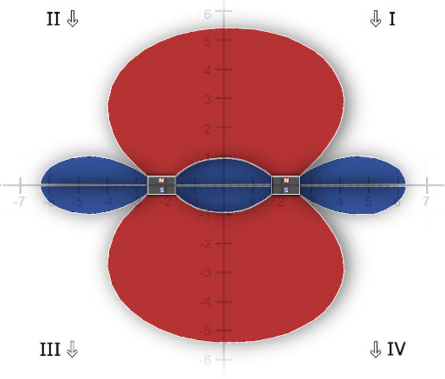


FIG 30: Dynamic Table - 2 Magnets in attraction at a distance of 3 cm - Short side view of Neodymium N35 Rectangular Magnets 30(length)x10(width)x5(thickness)
FIG 31: Dynamic Table - Same magnets and same conditions but in repulsion

If we separate the magnets by 3 cm, we can observe how the sensor always detects the 2 neutral points between the magnets in attraction (FIG 30), but the central polarities increase in intensity.

Analyzing the magnets in repulsion (FIG 31), besides noticing a further increase in the field, we can observe that the inverse polarity within the main polarities grows precisely up to 1 cm, and the external main polarities also increase proportionally.

I always remind that by using the verification methods seen previously, we can validate the sensor's readings.

Magnets in repulsion exhibit 5 polarities compared to the 8 in attraction (counting based on 2D images).

FIG. 32

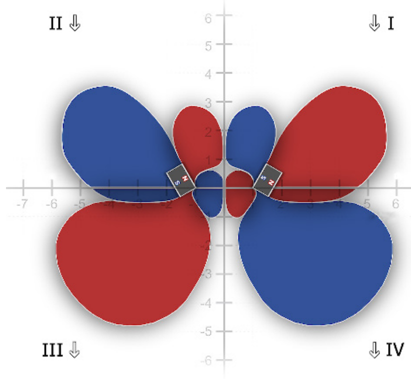


FIG. 33

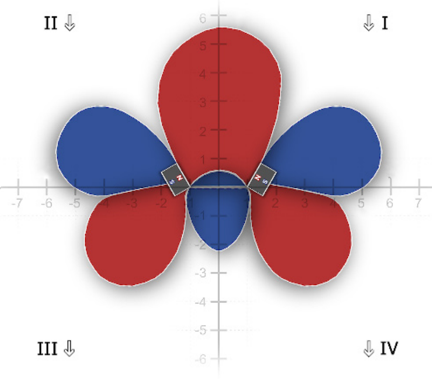


FIG 32: Dynamic Table - 2 Magnets in ATTRACTION 2 cm apart, with a 60° angle relative to their axis - Short side view of Neodymium N35 Rectangular Magnets 30(length)x10(width)x5(thickness)
FIG 33: Dynamic Table - Same magnets and conditions but in REPULSION

Tilting the magnets between them (in this case 60°), we obtain these stunning figures that indicate the behavior of the polarity bubbles concerning attraction (FIG 32) and repulsion (FIG 33); a completely different behavior.

Once again, we find a neutral point only in the attractive interaction. The polarities in repulsion return to being 6, and there are still 8 in attraction (counts based on 2D images).

Imagine how astonishing magnetic fields must be when viewed in this way, if we had the ability to dynamically observe these interactions simply by changing the orientation of the magnets.

Moreover, consider the fact that (as we have seen) changing the observation point also changes the shape; now imagine varying the positions of the magnets while the observer is also moving!

FIG. 34

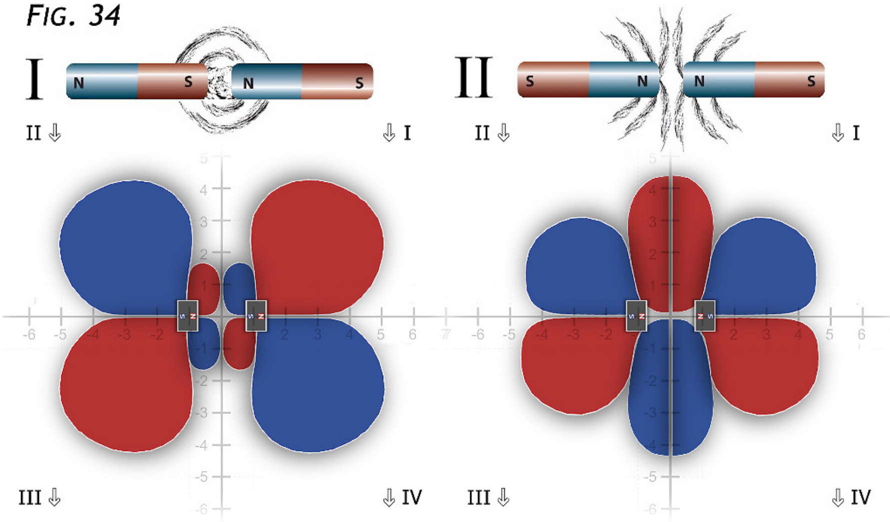


FIG 34.I: Dynamic Table - Perpendicular Detection to the Axis - 2 Magnets with faces in ATTRACTION at a distance of 2 cm - Short side view of Neodymium N35 Rectangular Magnets 30(length)x10(width)x5(thickness)

FIG 34.II: Dynamic Table - Perpendicular Detection to the Axis - Same conditions but in REPULSION

In these 2 tables, the same conditions shown in the books have been recreated for further investigation; indeed, we can observe that at the center of the magnets in repulsion (FIG 34.II), a large neutral point is effectively marked by the sensor, extending parallel to the axis of the magnets.

Additionally, the magnets in attraction (FIG 34.I) also seem to present a neutral point exactly at the center of the 4 polarities. The number of polarities remains 6 in repulsion and 8 in attraction (counts on 2D images).

As you may have understood, the magnetic field detections of a simple magnet can be multiple; indeed, we could provide many other comparisons with the simple representations in the books, for example:

FIG. 35

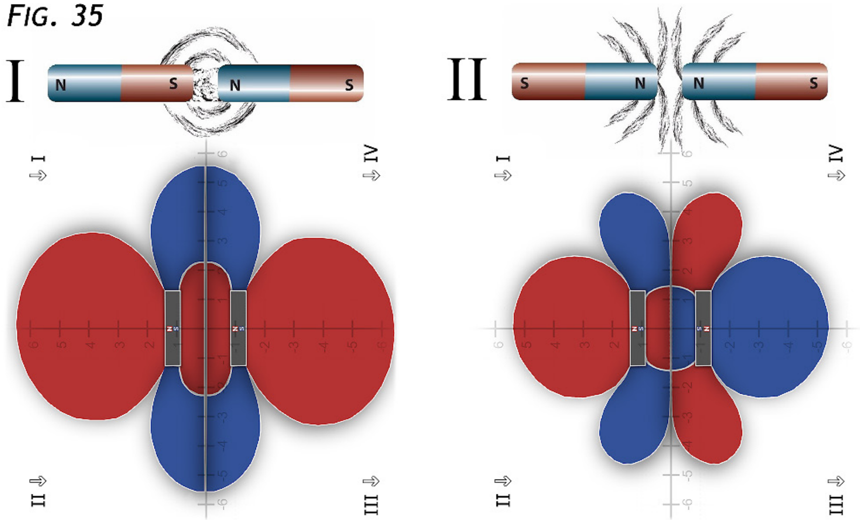


FIG 35.I: Dynamic Table - Detection parallel to the axis - 2 Magnets facing each other in ATTRACTION at a distance of 2 cm - View from the long side of Neodymium N35 Rectangular Magnets 30(length)x10(width)x5(thickness)
FIG 35.II: Dynamic Table - Detection parallel to the axis - Same conditions but in REPULSION

This detection is perpendicular to the previous ones (I also tilted the tables for a better visual comparison), made with rectangular magnets, and with this detection angle, we can observe how all the neutral points disappear both between the magnets in attraction (FIG 35.I) and in repulsion (FIG 35.II), and well-defined internal polarities are created.

Furthermore, with this angle, we see for the first time that the magnets in repulsion show more polarity bubbles, 8 compared to the 5 in attraction (counts on 2D images).

These detections are excellent for understanding the interactions of the magnetic field between magnets, even though the magnets used are much thinner (in length) than those used for the normal representations in textbooks.

FIG. 36

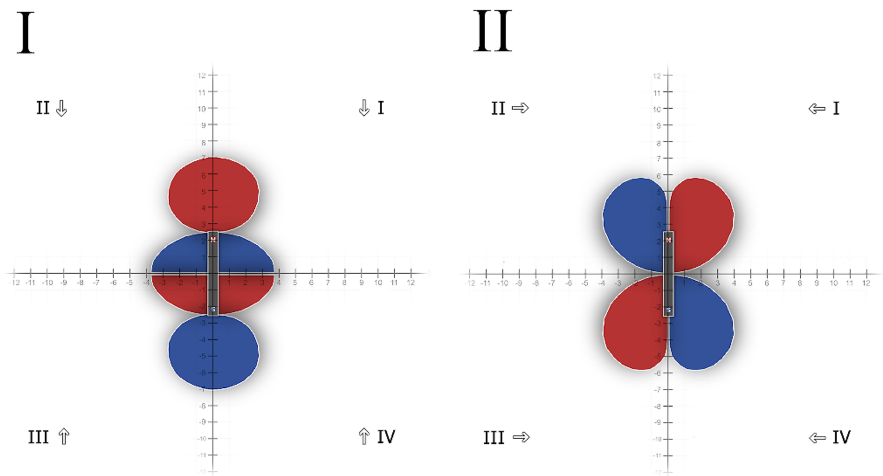


FIG 36.I: Dynamic Table - Detection parallel to the axis - Long side view of 1 Neodymium N35 Cylindrical Magnet 5 (diameter) x 50 (length)
FIG 36.II: Dynamic Table - Detection perpendicular to the axis - Same Magnet

The table in FIG 36.I shows a vertical detection of a long magnet where we can observe the lateral bubbles lowering below the main polarity face of the magnet, but still extending above its diameter; FIG 36.II shows a horizontal detection.

The reason I chose thinner magnets for the previous tables is precisely because with long magnets, the lateral polarities are much less pronounced, and with these comparisons, I wanted to make the interactions between the bubbles as evident and dynamic as possible.

At the end of the book, it is written where you can find the link that will take you to a folder full of GIFs of these interactions, 3D scans, and much more...

FIG. 23

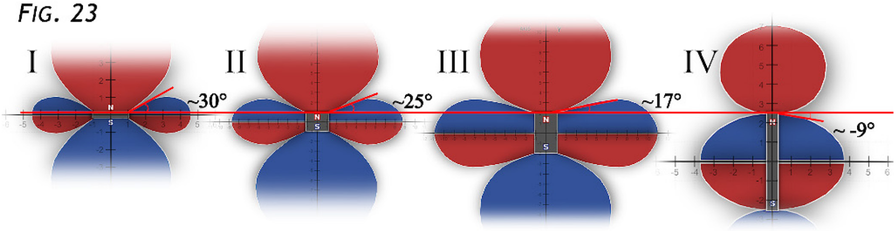


FIGURE 23.I: Magnet Thickness 4mm - Reverse Polarity Angle 30°
FIGURE 23.II: Magnet Thickness 20mm - Reverse Polarity Angle 25°
FIGURE 23.III: Magnet Thickness 40mm - Reverse Polarity Angle 17°
FIGURE 23.IV: Magnet Thickness 50mm, but much thinner and less powerful - Reverse Polarity Angle -9°

- Magnets used in .I, .II, .III: N52 Axially Magnetized Diamond Shape (Triangular with the top 2 corners cut) - 25(length) x 24(width) x 4(thickness) x 1 (FIG 23.I), x5 (FIG 23.II), x10 (FIG 23.III) - stacked on top of each other
- Magnet used in .IV: 1 N35 Axially Magnetized Cylindrical Magnet - 5mm (diameter), 50mm (length)

One of the most peculiar things we can observe in these measurements (in this case vertical – FIG 23) is the presence of an opposite polarity above the diameter of the magnet; in some cases, it even appears above the face of the main polarity laterally, and it seems to have a direct connection with the size of the magnet faces, the power, but especially with the distance between the two opposite polarities.

As we can see in FIG 23:

• I: A single magnet with a thickness of 4mm shows a bubble rise angle of about 30° from the start of the magnet;

• II: 5 magnets with a thickness of 20mm show an angle of about 25°;

• III: 10 magnets with a thickness of 40mm reduce the angle to about 17°;

• IV: A cylindrical magnet with a length of 50mm shows a negative angle, although it still has this inverse polarity above the diameter.

In the first three figures, N52 triangular magnets – 25mm side – were used, increasing their number, while in the fourth, the cylindrical magnet has a polarity face size of only 5mm in diameter and is N35; this indicates, as mentioned before, that the face size and power also play an important role in the structure of this particular polarity bubble, because reaching 50mm with the triangular N52 magnets of the other figures would not have produced a negative angle, but about 7° above the main face.

Attached to this research, you will find a folder full of GIFs of these interactions …

Obviously, one of the main questions I asked myself after noticing all this was: “What about electromagnets? Do they behave similarly?” And we’ll see that right away …

ELECTROMAGNETS

It was inevitable to move on to the detections of electromagnets as well, to find out if these new representations also apply to them. It seems that they do, but there are additional characteristics to consider, such as the amount of current used and the presence or absence of iron in the core.

Here are some study tables with vertical and horizontal detection of an aluminum wire coil, quite large: 320 grams - Inner air core (diameter): 2.5 cm - Outer diameter: 6 cm - Length: 6 cm - powered at 24 V 4.5 A.

FIG. 37

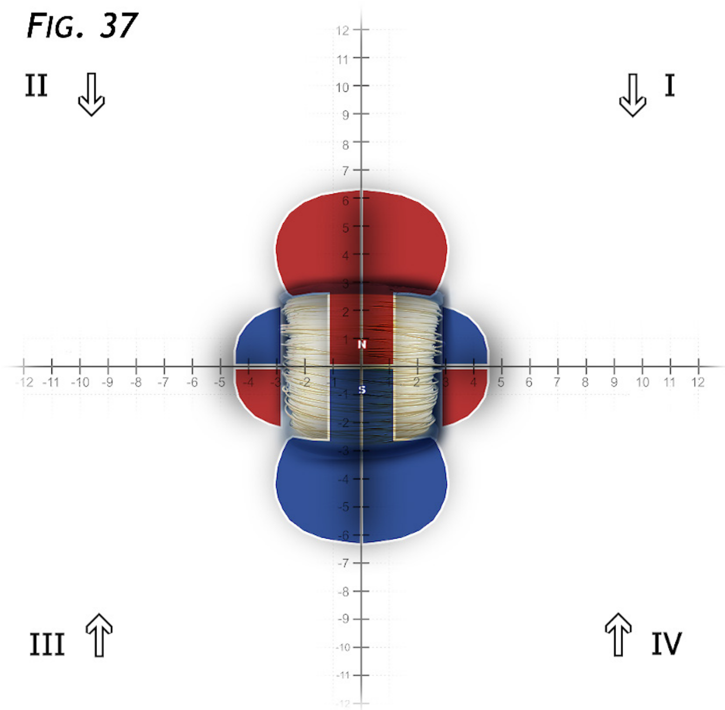


FIG 37: Study Table - Detection Parallel to the Axis - Winding with 1mm Enameled Aluminum Wire Powered at 24V 4.5A

FIG. 38

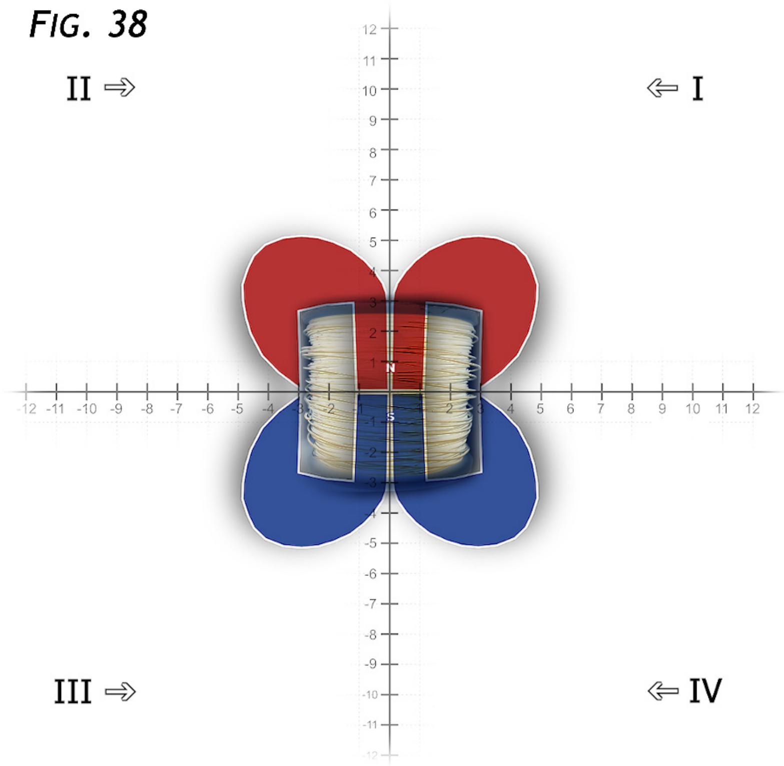


FIG 38: Study Table - Detection Perpendicular to the Axis - Winding with 1mm Enameled Aluminum Wire Powered at 24V 4.5A

As we can see (FIG 37-38), the shapes tend to be similar to magnets, but less bulging and extended. Additionally, even though the coil has a nice central air core, it doesn't seem to behave like, for instance, a ring magnet, which exhibits a central polarity reversal.

Inside the core, it appears to continue normally with the main polarity, as we know.

FIG. 39

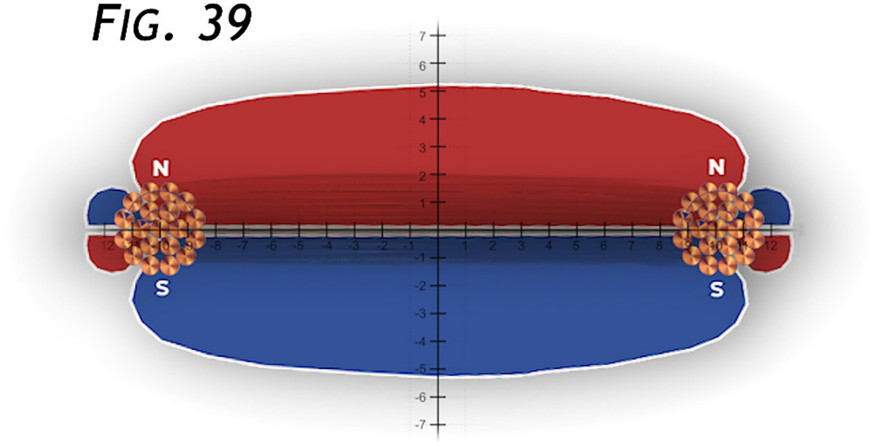


FIG 39: Study Table - Parallel Axis Detection - Coil with 20 cm air core, 1mm copper wire, powered at 24V 4.5A

To be a bit more certain about this, I analyzed a coil with a 20cm core (FIG 39) to dispel any doubt, and indeed, even with such a large core, there is no central polarity inversion.

As for the extent of the bubbles, I present this sequence with a gradual increase in current and the insertion of 2 cores of different sizes.

There is also a GIF available for this sequence

"Energy Increment Sequence": FIG 40 - 41 – 42:

FIG. 40

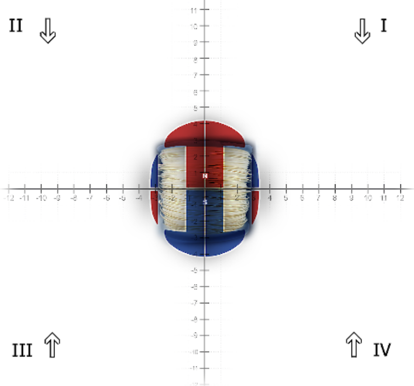


FIG. 41

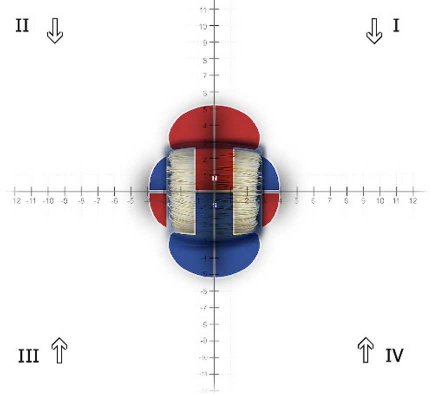


FIG. 42

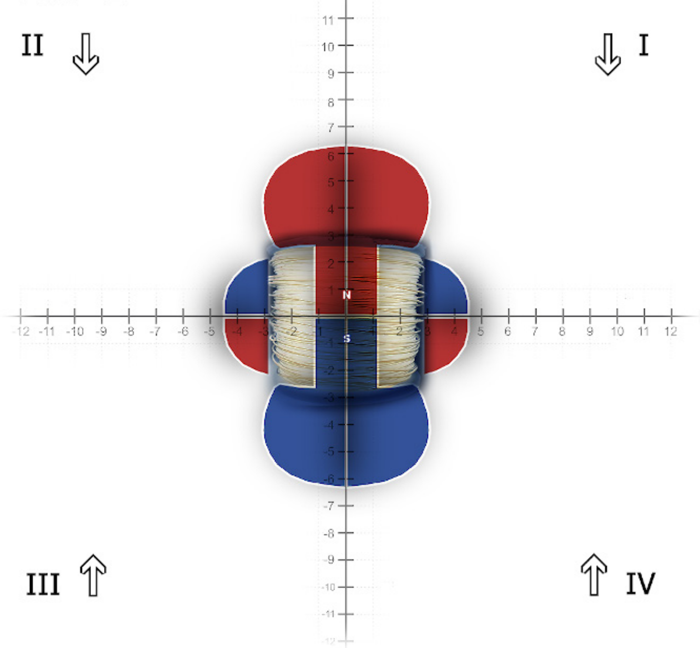


FIG 40: Study Table - Parallel Axis Detection -
Coil with 1mm enameled aluminum wire powered at 12 V 1 A
FIG 41: Study Table - Parallel Axis Detection -
Same conditions, same winding powered at 18 V 2.7 A
FIG 42: Study Table - Parallel Axis Detection -
Same conditions, same winding powered at 24 V 4.5 A

"Sequence of Inserting Iron Cores of Different Sizes at Equal Energy":
FIG 43 – 44:

FIG. 43

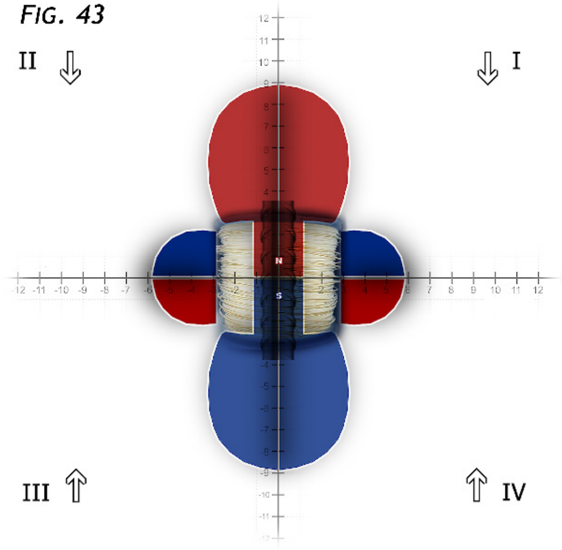


FIG 43: Study Table - Parallel Axis Detection - Winding with 1mm Enamel-Coated Aluminum Wire Powered at 24 V 4.5 A with Iron Core Same Size as the Air Core Inside the Coil

FIG. 44

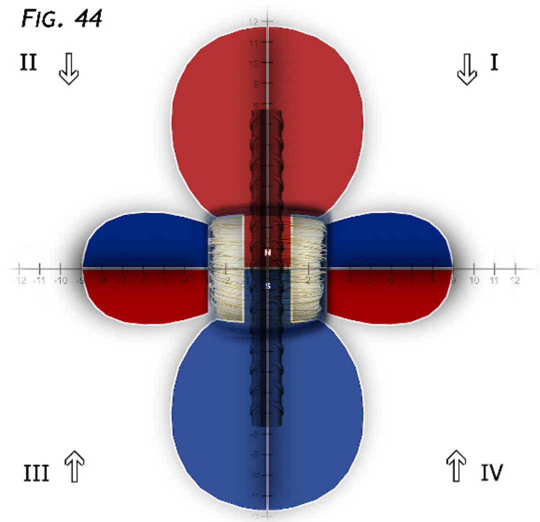


FIG 44: Study Table - Parallel Axis Detection - Same Conditions, Same Winding Powered at 24 V 4.5 A with Iron Core Larger Than 3 Times the Size of the Core Inside the Coil

Powered by 12 V 1 A (FIG 40) - 18 V 2.7 A (FIG 41) - 24 V 4.5 A (FIG 42), we can see that the magnetic field extends up to a maximum of 6 cm on the y-axis (FIG 42).

By inserting iron of the same size as the core (FIG 43), it expands up to 9 cm, and increasing the size of the iron in the core by 3 times (FIG 44), the shape of the detection resembles that of a magnet; we can also notice the significant expansion of the lateral polarities.

So, summarizing and generalizing this discussion, we could represent the magnetic field of a "current-carrying loop" in the following way.

FIG. 45

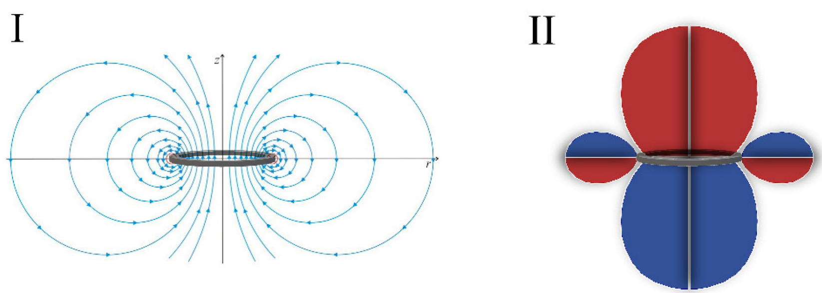


FIG 45.I: Representation of the magnetic field lines of a current-carrying loop.
FIG 45.II: Study Table - Parallel-axis Detection - Representation of the entire magnetic field of a current-carrying loop.

In box I of FIG 45, we find the current representation of the magnetic field, which instead appears to be the magnetic short circuit of the loop. Therefore, we can complement the representation with box II of FIG 45: a vertical detection of the entire field (slightly inflated).

FIG. 46

I II

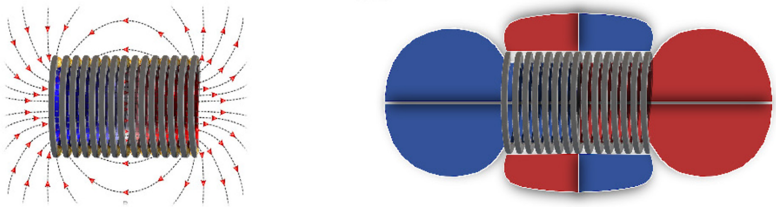


FIG 46.I: Representation of the magnetic field lines of a current-carrying solenoid.
FIG 46.II: Study Table – Parallel-axis detection - Representation of the entire magnetic field of a current-carrying solenoid.

Similarly, here is the current representation of the magnetic field of a solenoid (FIG 46.I) and the parallel-axis analysis of the winding showing the entire magnetic field (FIG 46.II).

In this case as well, observing how the polarities extend within the coil and the solenoid, it seems appropriate to refrain from determining the orientation of the field, as it will solely depend on the interaction we choose to have with it.

SPHERICAL HARMONICS and QUANTUM NUMBERS

A Possible Structural Link Between Macroscopic Magnetism and Quantum Mechanics

Within the framework of quantum mechanics, the shapes of atomic orbitals emerge as stationary solutions of the Schrödinger equation under conditions of spherical symmetry. The three-dimensional structure of these orbitals is determined by functions known as spherical harmonics, which describe the angular distribution of the electron's probability density.

These very same harmonics underlie many other physical structures: they appear in acoustics, electrostatics, gravitation, optics, and—as demonstrated by the results of this research—in the three-dimensional geometry of the magnetic field generated by macroscopic magnets.

Recurring Structures and Central Symmetry

In the case of permanent magnets, the external magnetic field can be described as a vector field endowed with axial symmetry. Considering the set of surfaces of equal intensity or polarity, detected by the angular and point-by-point method, stable, repeatable configurations emerge that are geometrically consistent with those predicted for atomic orbitals (s, p, d, f…).

This formal coincidence is not accidental. In all physical systems where a central and symmetric source is present, spatial solutions (whether static or dynamic) tend to organize themselves according to a discrete and well-defined set of forms. Spherical harmonics represent exactly these forms: the only stable angular configurations compatible with radial symmetry conditions.

Detection as Angular Selection

The experimental method described in this work—based on a bipolar Hall sensor used in a dynamic and angular mode—allows the selective reconstruction, point by point, of the geometric behavior of the field as a function of orientation. This process does not merely describe the field intensity but reveals true "structural sections," i.e., spatial regions consistent with the lobes, doughnuts, and nodes typical of orbitals.

The result is that each measurement angle defines a combination of symmetry and polarity that coincides with those predicted for specific quantum numbers (l, m), making possible a macroscopic mapping of quantum geometries.

Confirmation of the Parallelism with Quantum Numbers

In light of this structural analogy, the conceptual association between:

• n (principal quantum number): corresponds to the level of geometric complexity observable in the field, determined by the quantity and arrangement of magnetic sources (e.g., more magnets = greater spatial "energy" = higher n).

• l (angular quantum number): is reflected in the specific shape of the magnetic orbital, defined by the geometry of the polarities detected at a fixed angle (e.g., spherical, bilobed, multi-lobed).

• m (magnetic quantum number): manifests as variation in the orientation of the shape in the observed plane, depending on the axial rotation of the measurement angle.

• s (spin quantum number): The binary polarity reflects the spin.

These correspondences should not be understood as physical identities between magnets and electrons, but as structural analogies based on the common geometry of spatial solutions under similar conditions (central symmetry, radial propagation, scalar or vector field).

Conclusions

The experimental observation of shapes identical to atomic orbitals around macroscopic magnets can be interpreted as a universal geometric manifestation: in the presence of radial symmetry and stability conditions, the universe tends to generate the same spatial configurations, regardless of scale.

This suggests that the geometry of orbitals is not exclusive to quantum mechanics, but an emergent property of field structures in a broader sense.

Thus, spherical harmonics act as a conceptual bridge between the micro and the macro, between the atom and the magnet.

COLLAPSE OF THE WAVE FUNCTION

In the experimental method adopted in this research, each individual point detected by the Hall effect sensor can be interpreted as a discrete event of interaction between the field and the observer. When the sensor enters the magnetic field's range of action, an immediate and localized manifestation of the field’s polarity occurs, visibly indicated by the LED activation.

This event can be interpreted as **a local collapse of the field’s wave function—**not in a probabilistic or abstract sense, but **as a concrete physical phenomenon**: in that precise moment, and only in that specific point of space, the field manifests itself deterministically as North or South polarity.

The sensor, therefore, does not return an average or probabilistic value, but a binary and punctual response, which defines a concrete instance of the magnetic field in relation to observation. This event is not isolated: as the sensor moves along a defined axis, whether angular or linear, it generates an ordered sequence of new informational points.

Each subsequent detection point represents a new collapse, a new localized manifestation of the field.

The coherent sum of these angular collapses, distributed throughout three-dimensional space, generates a complete and repeatable orbital shape, identical to the theoretical configurations known in atomic physics.

This process can be described as a progressive revelation of the entire field geometry, where each partial collapse contributes to the composition of the overall structure.

From this perspective, the Hall effect sensor becomes not merely a measuring device, but a physical agent of collapse: a tool that, by locally interacting with the field, forces its precise manifestation—thus creating a tangible three-dimensional map of the magnetic orbit.

SUPERPOSITION

Geometric Superposition and Observable Collapse

A physical reformulation of quantum behavior within the experimental reality of magnetic fields

Collapse as a Real Event

In quantum mechanics, the *"collapse of the wave function"* is the process by which a superposition of states reduces to a single state upon observation. Historically, this process has never been directly observed and is only described as a theoretical event.

In this work, however, a physical and experimental description of the collapse is proposed:

The collapse occurs precisely at the moment an angular Hall sensor detects a clear polarity switch—that is, when a region of the field visibly manifests as a *"detection bubble."*

Each detected point in the magnetic field can therefore be interpreted as a deterministic collapse that locally selects a portion of the real orbital structure.

This explains why the observed shapes match those known in QM: my detections are series of localized physical collapses, spatially distributed, which trace the same configurations of the theoretical wave function.

Superposition Between Forms

Similarly, it has been experimentally verified that some observed orbital shapes—particularly D orbitals—emerge as a result of the interaction between two simpler forms, generated by two separate magnets.

The final, stable shape is not an average but a coherent *geometric synthesis* that visually matches known combinations in quantum mechanics. This observation confirms that:

Even in the experimental magnetic model, there exist complex forms that derive from the *"sum"* of more elementary ones, analogous to QM. However, these forms are not abstract—they are physically realized through the interaction of two real fields.

In short: in the case of magnetic fields, the word "superposition" becomes somewhat unnecessary…

And for this very reason, I propose we repurpose this same science-fiction-sounding term for something far more powerful.

The True Superposition: Simultaneous Observational Coexistence

The most radical point of this research is the proposal of a new concept of superposition, based on *real-world observation*:

By placing two angular sensors simultaneously around the same magnetic field configuration, two distinct orbital shapes are observed at the same time and in the same space—determined solely by the angle of detection (FIG 21.1).

FIG. 21.1

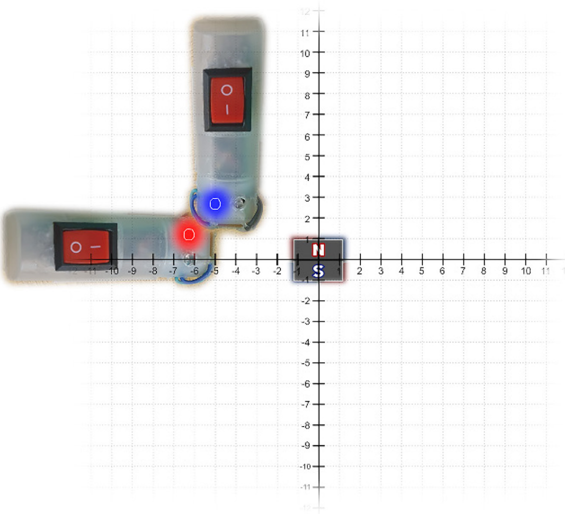


FIG 21.1: Simultaneous Detection of the Same Point with 2 Hall Sensors, Vertical and Horizontal; it can be observed that they register different polarities because they "read" 2 distinct shapes of the magnetic field.

This is the situation illustrated in FIG 21.1:

The same point under analysis—located above the diameter of a magnet, which we know for certain has only one polarity—is simultaneously measured by two Hall sensors placed at different angles, and the result is the detection of *two opposite polarities.*

This is just one example, as there are countless situations in which this behavior can be observed using Hall sensors.

By breaking down the measurement to understand what is truly happening, we arrive at **FIG 21.2.**

FIG. 21.2

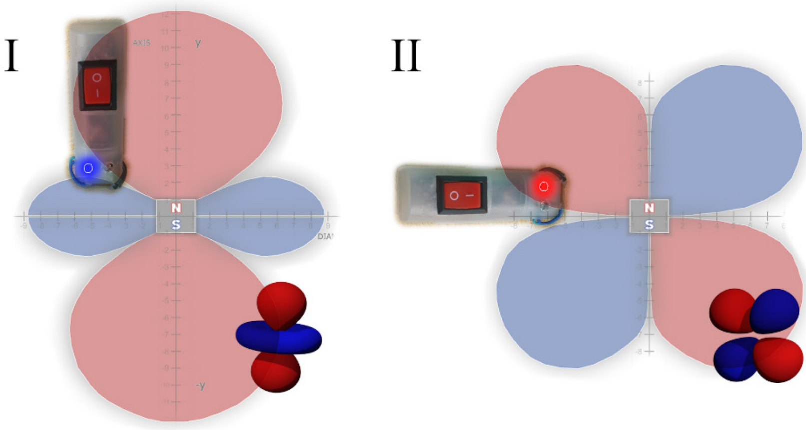


FIG 21.2: This figure is identical to the previous one, 21.1, but examines the sensors separately.
FIG 21.2 - I: Vertical Detection of a Single Point – The Sensor indicates South polarity because it is detecting a south bubble that appears only with vertical detection.
FIG 21.2 - II: Horizontal Detection of the Same Point – The Sensor indicates North polarity because it is detecting a north bubble that appears only with horizontal detection.

After recreating and analyzing the shapes obtained through vertical and horizontal detection, we realize that the two sensors (FIG 21.2) are simultaneously engaged in detecting *two completely different figures*, both emitted by the *same magnet.*

In the background, we can see the 2D table readings, and in the corner, the complete 3D shapes.

Put simply: we are witnessing the *manifestation of the "superposition" property* of magnetic states—exhibited by a magnet—using forms that are perfectly consistent with those expected from a quantum system.

Infinite shapes, coexisting in the same space, that never merge or interfere with each other—of which we now have both awareness and access. **To me, *this* is the true Superposition!**

This phenomenon does not imply any transition or interference: the two shapes do not merge, do not collapse, but coexist stably.

New Definition – Geometric Superposition

Geometric Superposition is the real coexistence of multiple field geometries, each of which is accessible and detectable simultaneously from different angles.
It is an *emergent property* of the physical field, not a mathematical artifact, and represents the true multiplicity of state—where each observed geometry is revealed through a sequence of local, coherent, and deterministic collapses, all dependent on the angle of observation.

Philosophy of Form and Observer

The new physics proposed here shows that:

- **Collapse** is a *physical and reproducible* event, not a mysterious one
- **Complex shapes** do not arise from abstract mathematical sums, but from real field configurations
- **Superposition** is not a probabilistic paradox, but a *geometric coexistence* of activatable possibilities

Conclusion

This new interpretation grounds quantum behavior in *real and observable field dynamics*, and proposes that the duality between superposition and collapse is not contradictory, but rather part of the same distributed geometry—one that can be *traced point by point using physical instruments.*

Multiplicity is not an illusion.

It is structure.

And the observer's awareness is what brings it forth.

ENTAGLEMENT

Among the most surprising phenomena observed during the experimentation on magnetic orbitals, one in particular suggests a reinterpretation of quantum entanglement in a macroscopic and geometric framework: **the dynamic interaction between the magnetic field and the observer.**

During the angular detection of the field, it was observed that the structure of the field seems to “follow” the observer—that is, it deforms coherently with changes in the observation angle, as if the very act of observing alters the field’s preferred direction.

This variation is neither random nor static: it is proportional to the sensor’s angle and position, and it produces a measurable torsion of the field.

FIG. 21

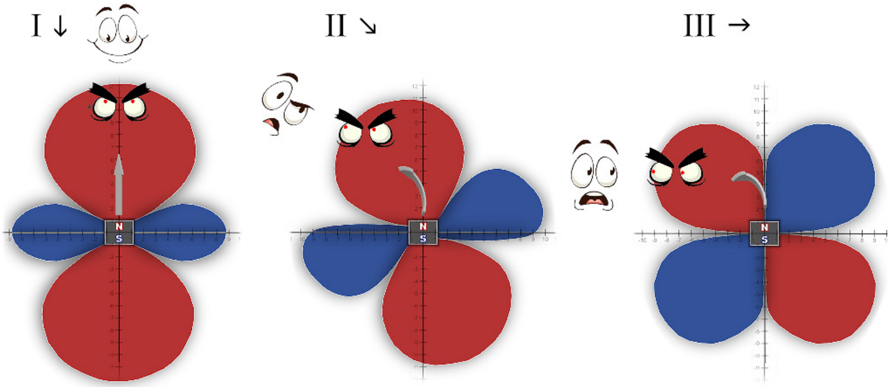


FIG 21.I: Vertical Detection – The Magnetic Field faces the happy observer
FIG 21.II: 45° Detection – The Magnetic Field follows the observer who is starting to worry
FIG 21.III: Horizontal Detection – The Magnetic Field keeps twisting to follow the now shocked observer

The magnetic field appears to always **orient itself toward the observer**, while the **lateral bubbles of opposite polarity** seem to follow the **mirror-like movements** of the main polarity's torsion.

And although these shapes differ, the **total volume** of the magnetic field's polarity bubbles seems to **remain constant**.

In other words, when dynamically examining one of the main polarity bubbles (*FIG 21.I - .II - .III*), we can observe that it always **stretches in the direction of the chosen detection angle**, even **forcing the field's shape to change**.

It's important to remember that these are **2D representations**, and what looks like simple angular torsion is, in reality, just a **cross-section**—magnetic fields extend through **three dimensions** and exhibit **completely different forms** (see chapter *3D EXPERIMENTAL RESULTS*).

This highlights the fact that **the observer truly changes everything**!

The experimental figures obtained (*FIG 21.I - .II - .III*) clearly show that:

- The magnetic field **stretches and curves toward the sensor**,
- The **opposite polarity bubbles twist symmetrically**,
- The **entire field structure is not fixed**, but **depends on the observer's point of view**.

Quantum Reflection

In quantum mechanics, *entanglement* refers to the instantaneous correlation between the properties of two particles—such that measuring one instantly defines the state of the other.

However, in this case, there are **no two particles**, but rather **a single coherent field** and **an observer interacting with it geometrically**.

The observed correlation, then, isn't between objects, but between **field shapes and observation points**.

This suggests a **new kind of entanglement**:

An entanglement between **field geometry and observer location**, where the state of the field is not predetermined, but is **dynamically shaped by the act of observation itself**. This leads to three radical conclusions:

- The magnetic field is **not separate** from observation, but actively **participates** in the observational process;
- The observing entity (the sensor) **determines where and how** the field manifests;
- The act of measurement **introduces curvature** into the geometry of the field-curvature that doesn't exist independently of the observer's interaction.

This view aligns closely with modern interpretations of QM, like Rovelli's **Relational Quantum Mechanics**, and offers a real, **macroscopic experimental basis** for the idea that **matter emerges through its relationship with the observer**.

Instantaneous Polarity Correlation: Spatial Entanglement of the Field

Another observation reinforcing the entangled nature of the magnetic field lies in the **predictable geometric relationship between opposite polarities**. At the moment a point in the field is detected as North polarity, and the associated orbital shape is known, one can identify with absolute certainty the **location—and especially the shape—of the corresponding South polarity**.

This **deterministic spatial correlation** between opposing poles of the same field structure is a form of **geometric entanglement**:

Knowing the state at one point (North) **immediately defines** the state at another point (South), even if not directly measured. This prediction doesn't stem from probabilistic computation, but from **visually coherent experimental geometry**.

It is thus a **topological and three-dimensional entanglement**, **not between particles**, but between **opposing polarities of a single, coherent spatial entity**. This property opens the door to a profound reinterpretation: The magnetic field may be seen as an **informational, indivisible structure**, whose configuration is **simultaneously encoded in every point**, much like how an entangled wavefunction's probability distribution behaves in quantum mechanics.

SPIN

SPIN AND ITS MANIFESTATION IN DETECTED MAGNETIC FIELDS

Spin is a fundamental quantum property of subatomic particles, often intuitively likened to a form of internal "rotation," although it does not represent a physical spinning motion in space. In quantum mechanics, spin determines the magnetic behavior of electrons and thus plays a key role in the formation of atomic orbitals and particle interactions.

FIG. 24

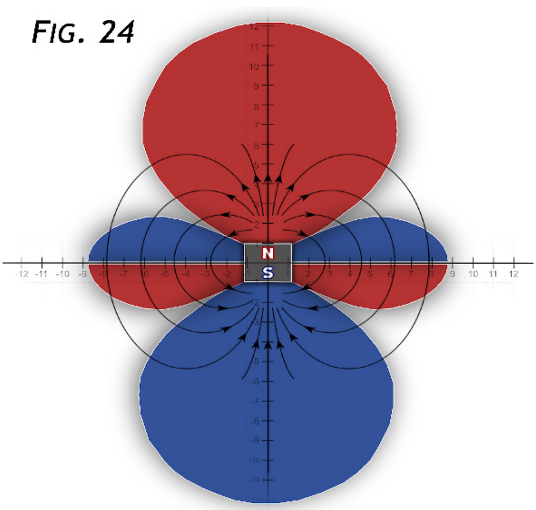


FIG 24: Overlay of Normal Field Lines with New Representation of the Probabilistic Magnetic Field (vertical)

In this research, using a Hall effect sensor and the dynamic angular method, we observed three-dimensional magnetic field structures that perfectly match the theoretical electronic orbitals. This coincidence suggests a profound analogy—and perhaps even a conceptual overlap—between microscopic quantum phenomena and the macroscopic magnetic structures that can be physically observed.

Spin Manifestation in the Magnetic Field

In the experiments, we observe:

1. **Orientation of Polarity Bubbles:**

   The magnetic “bubbles” change configuration and twist depending on the observation angle. This behavior recalls the concept of spin up and spin down — the two projective states of electron spin relative to a measurement axis. When the sensor is rotated, a mirror symmetry and polarity inversion are observed, just as in spin measurements along different axes. This reinforces the idea that the magnetic field exhibits quantized states based on orientation — that is, on the “act of measurement.”

2. **Angular Dependence and Quantized Behavior:**

   Just like spin can only assume discrete values (+½, -½), the detections in this method also take on discrete and coherent configurations, different depending on the angle but always reproducible. This behavior contradicts a continuous classical field but is fully compatible with a quantized field, where each orientation corresponds to a defined “state” of the system.

3. **Signal Inversion and Opposite Polarities:**

   The sensor returns oppositely polarized signals depending on the detection direction. This behavior directly recalls the concept of spin entanglement: if one state is spin-up, its entangled counterpart is spin-down. The ability to predict with certainty the position of the opposite polarity, given a partial detection, is a direct manifestation of spatial correlation, very similar to the concept of spin-entanglement.

Spin as a Carrier of Information

In the measurements, each magnetic bubble contains:

• a direction (vector)

• a polarity (sign)

• a curvature (geometry)

These three elements constitute a “quantum signature” very similar to a three-dimensional vectorial spin, which changes not only based on the magnetic field but also in relation to the observer.

The possibility of manipulating such magnetic configurations, through devices that respect the angle and sequence of points, could enable the macroscopic equivalent of spin manipulation — the basis of spintronics and quantum gates in quantum computers.

Implications and Perspectives

- The correspondence between observed structures and theoretical orbitals suggests that spin is not just a property of particles, but also an emergent field model under specific conditions.

- If confirmed, this vision would allow the simulation and manipulation of spin states through macroscopic magnetic field engineering — a kind of “macroscopic spin.”

Conclusion

In these experiments, spin does not manifest as an isolated quantum number but as an **emergent property of field geometry**, influenced by the observation angle, the sequence of detected points, and the internal structure of the magnet.

The behavior of polarity bubbles, their twisting, mirror symmetry, and the prediction of the opposite configuration suggest **a true functional analogy with quantum spin.** This perspective not only strengthens the hypothesis of this research but also offers a new experimental platform for the analysis and manipulation of spin in the macroscopic world.

OTHER QUANTUM PHENOMENA

The aim of this section is to explore a series of cornerstone phenomena in quantum mechanics that, although originating in the subatomic context, find in these experiments a clear and replicable manifestation at the macroscopic level.

These are empirical correspondences between fundamental concepts such as tunneling, quantization, interference, and decoherence, which reveal themselves through the geometry and behavior of the magnetic field measured with the dynamic angular method. Each paragraph delves into one of these parallels.

Magnetic Tunneling: Through Barriers

Quantum tunneling describes the seemingly paradoxical behavior of particles crossing energy barriers they should not be able to surpass according to classical physics.

In the experimental context presented here, the magnetic field shows an analogous characteristic: it penetrates solid materials without altering the shape of the observed magnetic orbital. It has been verified that the detection of the field structure remains unchanged even when the sensor is separated from the magnet by physical screens, provided these are not ferromagnetic.

This ability to preserve shape and polarity even through obstacles makes the magnetic field, in this system, a macroscopic example of tunneling-like behavior, where information about the field structure propagates beyond the barrier, remaining accessible to observation.

Field Quantization: Discrete Jumps in Measurements

In the quantum world, energy and other observable states assume only discrete values, defined by quantum numbers, not continuous ones. Similarly, this detection method is based on a sequence of discrete points in space, each providing a clear polarity datum (North or South) at a fixed angle.

These points do not form a continuous transition but a network of binary events which, aggregated, return the overall shape of the orbital. In this sense, one can speak of quantization of the detected magnetic field: information emerges only in discrete detection units, and each unit constitutes a physical “unit of measure” that contributes to the final geometry.

Interference: Generation of Nodes and Lobes via Interaction

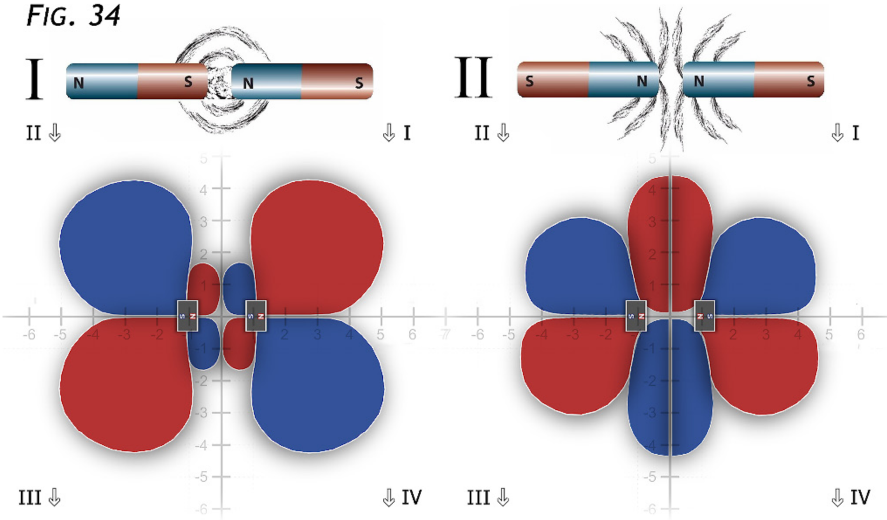
In the phenomenon of quantum interference, two waves combine to produce constructive or destructive superpositions, forming visible intensity fringes. In this case, when two or more magnets are used in combined configurations, profound modifications are observed in the field geometries, including:

• additional lobes or distortions

• blind zones (nodes) where detection is null

• folds of the field not present in isolated conditions

FIG. 34



These results (FIG 34 – taken from the chapter – magnet interactions) demonstrate true structural interference of the field, where different magnetic sources influence each other resulting in a combination of coherent shapes or geometric cancellations, entirely analogous to the interference fringes observed with light or matter waves.

Magnetic Decoherence: Deformations Due to the Environment

In the quantum domain, decoherence describes the loss of quantum properties of a system due to interaction with the environment, which breaks the coherence between superposed states.

In these experiments, the magnetic field shows evident sensitivity to the presence of external ferromagnetic objects. Devices, batteries, electronic circuits, or other magnetic objects can modify the field arrangement, altering the detected shapes and reducing the stability of polarity lobes.

These non-random disturbances reveal the existence of spatial coherence of the field, which can be broken by the surrounding environment. This is a clear case of geometric decoherence: the internal order of the field deteriorates under the influence of foreign elements, making the shape less defined and less reproducible.

QUANTUM MISUREMENT

Potential Solutions to the Problem of Quantum Measurement

The problem of quantum measurement is one of the most enigmatic in modern physics. It concerns the transition of a quantum system from a superposition of states (described by the wave function) to a definite and observable state. This collapse of the wave function occurs during the act of measurement, but the precise mechanism of this process remains uncertain.

1. Observation Creates the Orbital

- **Experiment:** Observing the magnetic field creates the magnetic orbital. Simply by turning on the sensor, I bring forth the shape of the orbital. Moreover, I must consider its magnetic field sensitivity and approach it appropriately. Similarly, it's only through interaction with another magnet at a precise angle that I can exploit the characteristics of these particular shapes. For instance, if I were analyzing a magnet and wanted to utilize the repulsiveness of the "D" orbital with n=3, l=2, mz=0 with another magnet, I would need to approach with my magnet's axis parallel to the axis of the magnet under analysis; otherwise, that shape wouldn't exist. (CHAPTER TABLES STUDY AND DYNAMICS)

- **Solution:** If observation itself creates the orbital, this implies that the wave function collapses into a specific defined state only at the moment of observation. This resolves the measurement problem by suggesting that quantum reality does not exist in a defined state until observed. **<u>The act of measurement is not just about detecting a value but creating a defined reality.</u>**

2. Observation Angle Determines the Shape of the Orbital

- **Experiment**: The angle from which the magnetic field is observed **determines** the shape of the orbital. All shapes we have seen so far are results of different observation angles. (CHAPTER GIANT QUANTUMS, etc...)

- **Solution**: This indicates that the shape of the wave function (and thus the orbital shape) is influenced by the measurement context. In terms of quantum mechanics, this could be seen as evidence that the measurement outcome depends on observation conditions, adding a level of relativity to the measurement itself. **<u>Measurement is not absolute but dependent on the observer's viewpoint.</u>**

3. Dynamic Observation Controls the Orbital Shape Change

- **Experiment**: Dynamic observations (in motion) alter the shape of the magnetic orbital. In Chapter Prime Characteristics, Figure 21 provides a clear sequence of the interaction between observer and magnetic field, varying with the observation angle; this sequence can easily be imagined dynamically also thanks to another magnet. If I gradually rotate my magnet on its axis near the magnet under analysis, I benefit from interactions with different orbital shapes based on the movement variation; at the same point, I could experience attraction or repulsion simply based on the tilt of my magnet (CHAPTER PRIME CHARACTERISTICS)

- **Solution**: This suggests that quantum states are not static but can be dynamically controlled by observation. In other words, the evolution of the wave function can be guided by continuous interaction with the observer. This could provide a model for manipulating quantum states in real time, partially resolving the issue of continuous measurement in quantum systems.

4. The Magnetic Field Always Turns Toward the Observer

- **Experiment**: The magnetic field always orients toward the observer. All constructed orbital shapes share a common feature: they all lean toward the observer. Each polarity bubble extends mainly towards observation, regardless of different and bizarre shapes. (CHAPTER PRIME CHARACTERISTICS - FIG 21)

- **Solution**: This phenomenon indicates a sort of interaction between the magnetic field and the observer, similar to the concept of quantum entanglement where the measurement of one particle immediately affects another. It can be seen as an indication that the observer has an intrinsic role in defining quantum reality. The field "chooses" its configuration in response to the observer, solving the measurement problem as a reciprocal interaction.

5. Two Simultaneous Observers Determine Two Simultaneous and Different Shapes of the Same Magnetic Field

- **Experiment**: Two observers simultaneously observe two different shapes of the same magnetic field. If I observe a magnet parallel to the magnetization axis, I will obtain the shape of a magnetic field with the shape and characteristics of the "D" orbital with n=3, l=2, mz=0; if at the same moment, with another sensor, I perform a perpendicular detection, the shape of the "D" orbital with n=3, l=2, mz=±1 will also appear (CHAPTER PRIME CHARACTERISTICS). Instead of sensors, if I use 2 magnets simultaneously, I can also exploit precise characteristics and different orbitals of the magnet under analysis in response to the 2 different angles interacted with.

- **Solution**: This result is particularly significant because it suggests that quantum reality can be perceived in different ways by different observers without contradictions. In quantum mechanics, this can be seen as confirming the principle of complementarity and the possibility of overlapping states that coexist until measured. It resolves the measurement problem by showing that there is not a single reality but multiple coherent realities depending on different observer viewpoints.

Summary

Key Point	Experimental Evidence	Implication
Observation Creates the Orbital	Observation of the magnetic field creates the orbital	Observation creates quantum reality
Observation Angle Determines the Shape of the Orbital	Observation angle determines the shape of the orbital	Measurement depends on the observer's viewpoint
Dynamic Observation Controls Orbital Shape Change	Dynamic observation alters the orbital shape	Quantum states can be dynamically controlled
Magnetic Field Always Orients Toward the Observer	Magnetic field orients toward the observer	The observer actively influences the magnetic field
Two Simultaneous Observers Determine Two Different Simultaneous Shapes of the Same Magnetic Field	Two observers see different shapes simultaneously	Quantum reality is subject to the principle of complementarity

Conclusion

Observations and experiments provide a new way of understanding the problem of quantum measurement. The act of observation is active within the system, creating quantum reality and influencing it.

Angles and dynamics of observation directly influence quantum states, and the interaction between observer and quantum system is bidirectional.

LINKING AND CONTROL THEORY

A New Magneto-Quantum Interpretation of the Field and Observation

This theory originates from extensive experimental and observational work conducted in the macroscopic world, where the behavior of the magnetic field was analyzed using precise, repeatable, and visualizable methods. The results obtained showed not only an extraordinary similarity to atomic orbitals described by quantum mechanics but also a series of dynamic properties that directly replicate phenomena previously considered exclusively subatomic.

All this leads to the formulation of a new physical hypothesis: there exists an operative and geometric link between the macroscopic magnetic field and the quantum structure of matter, in which observation plays an active role in defining the shape and state of the system.

Founding Principles of the Theory

This theoretical proposal is based on five observational pillars, experimentally highlighted:

1. **The shape of magnetic orbitals depends on the angle of observation** – **The angle** from which the measurement is performed with the Hall effect sensor is not a passive parameter, but **directly determines the geometric configuration of the magnetic orbital.** Unlike the quantum formalism where angles are part of the wave equation, here the physical and real angle of observation is what “creates” the detected figure.

2. **The intensity and complexity of the field determine the quantum level** – The controlled addition of one or more magnets, with calibrated orientations and distances, produces increasingly complex field configurations, analogous to higher energy orbitals. In this way, a macroscopic control of the system's energy levels is realized, replicating the structure of quantum numbers.

3. **The observer is a co-active element of the system** – The sensor, acting as an active dipole, interacts with the magnet not only by measuring but also by shaping the field's form. **A dynamic and continuous adaptation of the field is observed according to the observer's angle.** In other words, the act of observation coincides with a structural change in the observed physical system.

4. **The geometric manifestation of the field occurs through sequences of local collapses** – Each point-by-point detection produces a binary localization (North/South) which, aggregated angularly, generates coherent three-dimensional shapes. This is analogous to the sequence of wavefunction collapses in a quantum system, with the difference that here it is visually observable in the macroscopic world.

5. **The field–observer system manifests real superposition and interference** – Under multiple detection conditions, simultaneous, coherent but **different orbiting shapes are observed coexisting in the same space without merging**. This is a clear example of real, visible, and measurable geometric superposition that goes far beyond the concept of abstract probability. Moreover, interactions between multiple magnets produce interference phenomena, with nodes, blind spots, and additional lobes, perfectly consistent with quantum characteristics.

The Core of the Theory: The Observation Angle as an Operative Principle

This theory is founded on a redefinition of the observer's role. The observation angle, understood as the real orientation in three-dimensional space relative to the magnetic source, is the main generator of orbital configurations.

It is the element that establishes:

• the type of detected figure,

• the polarity direction (interaction),

• the dynamics of the shape in case of movement.

This property implies that observation is an active function, and that the observer is not an external subject to the system but a physical and geometric component of its very state.

Deducibility of Quantum Laws from the Field Geometry

The experiment suggests that phenomena such as entanglement, superposition, collapse, complementarity, spin, are not abstract properties or limited to subatomic particles, but geometric manifestations of deeper field structures, observable also at larger scales.

This idea proposes that quantum mechanics can be deduced from a coherent field geometry, governed by interactions between dipoles and observers.

Operational Implications: The Map of Matter

The most applied aspect of this theory lies in the possibility to:

• map all magnetic orbitals experimentally accessible in our macroscopic world,

• encode such maps as structural frequencies or "orbital remote controls,"

• use them to guide or recreate atomic phenomena.

This opens the way to the construction of a Magnetic Map of Matter, useful for:

• analog quantum computation,

• structural control of materials,

• manipulation of real quantum systems through macroscopic interfaces.

Philosophical and Interpretative Conclusion

The work presented here provides an observational basis for an important statement:

The observer does not merely measure the system: it structures it.

If this is true, then physical reality does not exist independently of interaction, but arises as the result of the relationship between a field and a point of observation. Practically:

If there were no consciousness, the world would not exist.

Something to ponder... Especially since, in support of Dr. John Archibald Wheeler, this identical interpretation of mine, this time, comes directly from a deductive reasoning based on the analysis of real results, measurements on macro-objects present in our world!

And what if all of us, unknowingly, obeyed the same rules? … Strange story!

The linking and control theory is not a mathematical speculation but a proposal founded on tangible experiments. It states that the microscopic universe can be understood, replicated, and guided through the rules that emerge from the geometry of real fields.

This theory represents a real convergence between classical and quantum mechanics, proposing a new path in which information, shape, and observation become operative tools for the construction and control of matter itself.

CONCLUSIONS

This research has proposed a new experimental interpretation of the magnetic field, capable of bridging the gap between classical physics and quantum mechanics. Through a direct, observational, and repeatable approach, the existence of macroscopic magnetic orbitals has been demonstrated, exhibiting all the geometric, dynamic, and behavioral properties of the atomic orbitals described in quantum theory.

The key interpretative element of this theory is the introduction of the operational concept of the observation angle as a determining parameter. In this new model, observation is not merely a measurement but an act that defines, structures, and modifies the state of the field itself, making the observer a co-active element of the system rather than a simple external entity.

Under the described experimental conditions, the magnetic field clearly and directly manifests:

• **Three-dimensional coherent shapes** identical to theoretical atomic orbitals;

• **Geometric and dynamic dependence on the detection angle**, which determines the entire field structure;

• **Evidence of quantum phenomena**, including superposition, entanglement, spin, wavefunction collapse, interference, and decoherence;

• **A clear analogy between quantum numbers and the material and geometric parameters of the system**: energy (number of magnets), shape (angle and polarity), orientation (measurement plane), binary polarity (spin).

Based on these observations, it has been possible to define and articulate the principles of a new experimental theory called the **"Linking and Control Theory,"** which suggests that the behavior of quantum matter can not only be described but also **guided and replicated through field structures in the macroscopic world.**

Summary of the main results

1. A new viewpoint has been introduced on the **relationship between two dipoles,** as an observational analogy between magnetism and atomic behavior.
2. **An innovative angular detection method** has been developed and validated, capable of accurately reconstructing the internal geometry of the magnetic field, making its quantum components visible.

3. **The variability of the magnetic field as a function of the observer's angle and configuration has been experimentally demonstrated**, highlighting a deep symmetry with the concept of quantum measurement.

4. **All families of atomic orbitals have been experimentally reconstructed**, confirming the theoretical geometry through tangible magnetic detections.

5. Phenomena of real magnetic interference and superposition have been observed and mapped, visible and replicable through the combination of multiple magnets or simultaneous detections at different angles.

6. The construction of a **"Map of Matter"** has been proposed, based on three-dimensional magnetic configurations that exactly reflect the shapes and properties of atomic orbitals.

7. **The role of the observer as an active agent,** equipped with a fundamental tool—the angle—has been highlighted. This discovery offers a potential contribution to the quantum measurement problem, showing how observation can shape the physical system's configuration in real time.

8. The possibility of **new technological applications** has emerged, where these results can serve as an operational basis for matter control systems, analog quantum computing, intelligent field generation, and much more.

Final reflection

This research suggests that **all the rules of quantum mechanics can be observed, replicated, and directly exploited in our macroscopic world through real magnetic fields.**

The entire system is based on accessible, low-cost tools that anyone can build and use, making this revelation **democratic, replicable, and verifiable by anyone willing to engage with it.**

It is not a theory based on abstract mathematics but on observed reality. It is born not from equations but from **experiments, measurement tables, and logical deductions.**

For this reason, a new era of understanding magnetism opens up, where the field is no longer just an invisible force acting between poles but a **quantum geometric structure that can be manipulated and read.**

And perhaps, in this new paradigm, **the difference between classical and quantum is no longer a dividing line but a point of convergence.**

LIMITS AND OPEN QUESTIONS

The set of experimental observations obtained in this research suggests a profound reconsideration of current models describing the relationship between the magnetic field, atomic orbitals, and quantum phenomena.

The formal and behavioral similarity between the detected magnetic field configurations and the solutions of the Schrödinger equation cannot be dismissed as mere coincidence.

On the contrary, these convergences raise a series of fundamental questions that deserve more advanced theoretical and experimental exploration.

I – Absence of internal structure in atomic orbitals

In traditional quantum mechanics models, orbitals are represented as probability density functions, without explicitly showing **an internal connecting structure between the “lobes” of the orbital**. Conversely, magnetic field detections via Hall effect sensors reveal a coherent structure linking the lobes of the field, **with clear and symmetrical radial paths relative to the magnetic source.**

Is it possible that the shape of orbitals is only partially represented in current models?

Experimental evidence suggests that internal magnetic channels—potentially passing through the nucleus—may exist, connecting the lobes of the orbitals. This opens a new question:

Could the electron traverse or orbit near the nucleus following magnetic paths not yet described by current equations?

II – Observation angles never represented in theoretical orbitals

Scientific literature on atomic orbitals generally represents them in idealized and symmetric configurations, limited to orthogonal Cartesian planes.

However, the experimental experience documented here demonstrates that the real observation angle directly influences the shape of the measured magnetic field, especially in oblique configurations (such as detections at 45°).

FIG. 19

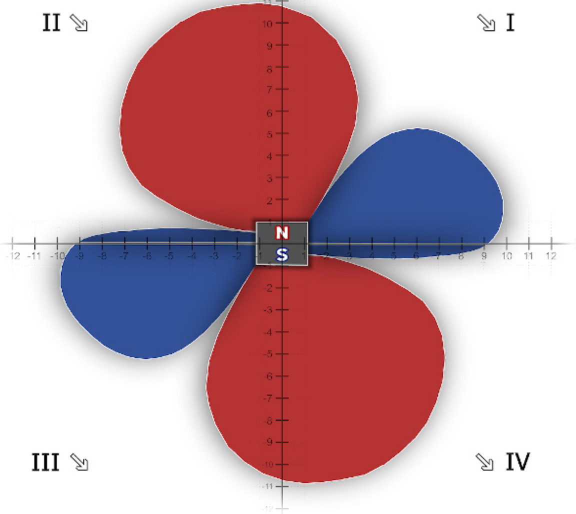


FIG 19: Detection at 45° (Relative to the magnet) – Continuous measurement

Why are these angles not considered in orbital models? Could real angular torsions of the orbitals exist relative to the nuclear axis, undetectable in current models simply because they've never been observed at such close range?

III – Scale discrepancy between atomic orbitals and macroscopic magnetic fields

A simple scale comparison highlights a significant discrepancy between the extent of atomic orbitals (in theoretical representation) and that of the magnetic field produced by a macroscopic magnet. By applying a direct proportion between the size of the "nucleus" and the outer shape (as between an atom and a magnet), **one would obtain atomic orbitals of macroscopic dimensions.**

This difference suggests a possible scale anomaly:

Is it possible that our theoretical representations of orbitals are underestimated, or that magnets represent a proportionally miniaturized version of orbital structures?

IV – Perfect symmetry vs. irregular angular geometries

The canonical solutions of atomic orbitals produce geometrically symmetric shapes. However, in these experiments, the angular interaction between two or more magnets generates asymmetric, distorted, or torsional structures, while still maintaining stability and coherence.

FIG. 32

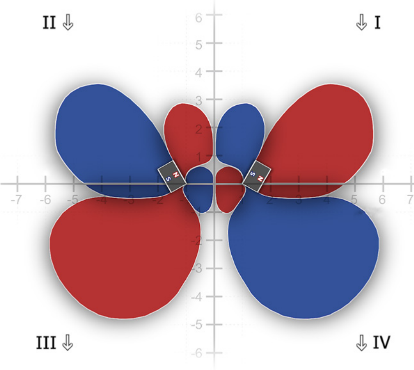


FIG. 33

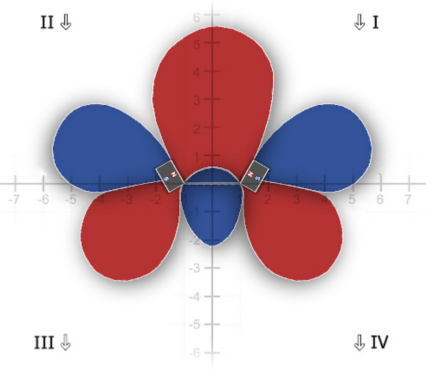


FIG 32: Dynamic Table – 2 Magnets in ATTRACTION at a distance of 2 cm, with a 60° angle relative to their axis – Short side view of Rectangular Neodymium N35 Magnets 30(length) x 10(width) x 5(thickness)
FIG 33: Dynamic Table – Same magnets and conditions but in REPULSION

Why do these irregular forms not emerge from the standard equations? Could there be an intrinsic limitation in the mathematical solutions adopted so far?

Is it possible that irregular quantum states are not excluded by nature, but have simply never been observed due to measurement methods or idealized modeling assumptions?

V – Magnetic Fields and Quantum Computing

If the magnetic field exhibits geometric entanglement, superposition, collapse, and interference, then it is reasonable to hypothesize that it could be used as a physical medium for quantum information.

Is it possible to build a computational system that uses macroscopic magnetic orbitals as spatial qubits?

Could the stable, repeatable, and controllable field shapes function as quantum logic states, easily readable via sensors or lasers?

VI – Toward a Unified Theory: the Magnetic Field as Keystone

The behavior of the magnetic field in these experiments suggests that it may not be a secondary effect of electron motion, but rather a primary, geometric structure—co-founder of quantum dynamics.

Could the magnetic field, in synergy with gravity, be a manifestation of an as-yet unexplored unifying principle?

Might this approach offer a concrete pathway toward formulating a new physics—one in which form is information, and the geometry of the field is the language of matter?

HYPOTHESES AND QUESTIONS

I. From Earth to Cosmos: the Quantum Shape of the Planetary Field

The striking analogies between the morphology of atomic orbitals and the geometry of the macroscopic magnetic field raise an ambitious question: could such a "quantum" structure also emerge at planetary scales? The possibility of mapping Earth's magnetic field using an array of Hall effect sensors placed on satellites, oriented at precise angles, would represent a first step toward exploring a "planetary magneto-quantum map." However, the presence of ferromagnetic materials in Earth's core and environmental interference would be critical variables. If the shapes truly reflected those seen in the experiments, Earth could be seen not only as a “quantum magnet” but also as a generator of geometries coherent with a “cosmic orbitalism.”

II. Toward Force Unification: Magnetism as a Scalar Bridge

If the macroscopic magnetic field manifests quantum rules (superposition, entanglement, apparent spin), then it may not be just “one force among others,” but rather a different manifestation of a single unifying structure. The hypothesis is that there exists a foundational force whose expressions vary according to scale and geometry—subatomic, molecular, biological, planetary. Thanks to its scalability and detectability, magnetism could be the experimental key to this unification.

III. Wave-Particle Duality Recast as “Shape Duality”

In the experiments, the observer's change in angle causes a dynamic and reversible transition in the field’s shape, suggesting a new interpretation of wave-particle duality. Here, the quantum element is not the nature of the particle, but the “shape” it assumes based on its interaction with the observer. Wave-like behavior may emerge as a manifestation of variable field geometry, in analogy with the probability distribution in quantum mechanics.

IV. Entanglement as Geometric-Directional Correlation

This work shows that a single polarity detection allows one to predict with certainty the behavior of the opposite polarity in the orbital configuration. This mirrors the concept of directional entanglement: two regions of the magnetic field, though not directly connected, are correlated in their geometric and dynamic behavior. This effect could also be studied in spatially separated experiments, offering a parallel with EPR (Einstein-Podolsky-Rosen) experiments.

V. Revisiting the Uncertainty Principle

Heisenberg’s principle states that one cannot know both the position and momentum of a particle precisely. However, in this method, the combination of static angular data generates a complete and coherent figure. This suggests that uncertainty might not be an intrinsic property, but a consequence of observational geometry and the method of detection. The idea of “multi-collapse detection” reinforces this: distributed but precise knowledge.

VI. Schrödinger’s Paradox in Angular Terms

The result of the experiment depends on the angle from which the box is opened. Quantum information is not static but dynamically accessible. Observability itself can function as the collapse, in an analog yet visible way, with different outcomes for each angle of interaction.

So:

If I open the box from the front, the cat may be alive.

If I open it from the back, it may already be dead.

If I open it from the side, we might still be able to save it.

VII. Many-Worlds Theory: Reality as a Function of Observation

If the angle of observation determines which shape of the field emerges, then each angle may represent a branching of perceived reality. This challenges the multiverse interpretation as real parallel universes, proposing instead a vision in which consciousness selects the observable state from many available “geometric layers.”

VIII. Qumag: Macroscopic Superposition as a Computational Alternative

The idea that a magnetic system can assume superposed, dynamically selectable geometric states opens the possibility of using the magnetic field as a computational system. Compared to qubits, “Qumags” could operate at room temperature, have more robust physical representations, and offer greater intuitiveness in programming. This “map of matter” could become the foundation for a field-geometry-based computational logic.

IX. Magnetic Field of a "Current-Carrying Wire"

For completeness, I wanted to include the measurements of a simple wire carrying current (hence, I position this hypothesis at this point in the research, rather than together with the others at the end).

However, upon examining it with a Hall effect sensor, I couldn't identify distinct polarities. The good news, however, is that we now have other information that can assist us, and we'll leverage it immediately.

So, if I bring a magnet near a wire, it won't attach to either face of the two main polarities, but rather to its diameter (axial magnetization), perpendicular to the wire's length. This leads us to suppose that there is a concentric magnetic field extending from the wire.

However, if we were to reverse-engineer the information acquired from the magnetic field of magnets to find the complete magnetic field of the wire, we could go by exclusion, listing even the most improbable conditions.

FIG. 47

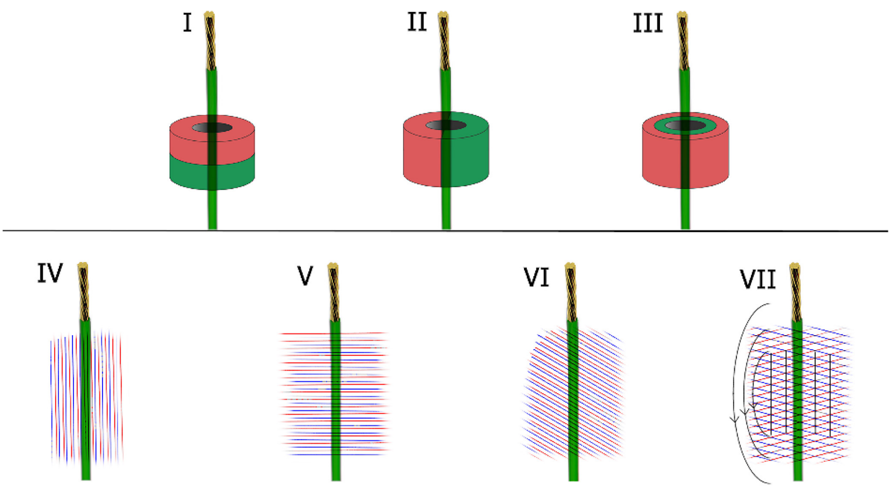


FIG 47: Unlikely Hypotheses of Polarity Representations of a Current-Carrying Wire

- FIG 47.I - the wire does not have axial magnetization because it does not exhibit polarity above or below.

- FIG 47.II - the wire does not have diametrical magnetization because we cannot attach a magnet face-to-face from any side.

- FIG 47.III - the wire does not have radial magnetization because it would otherwise create a magnetic field, consisting of lines perpendicular to the wire, and because it would exhibit a single external polarity, yet we cannot attach a magnet face-to-face.

Having ruled out the main types of magnetizations, let's consider the probabilities that could lead iron to arrange concentrically on a plane, assuming a mechanism similar to that of magnets, where iron simply indicates the shortest path between the two polarities, like a short circuit.

Let's imagine how the field lines could be arranged to achieve that result:

- FIG 47.IV - .V - .VI unlikely conditions, because if the polarities alternated only, they would cancel each other out, not creating an apparent direction, and a magnet would not be able to attach even with its diameter, as it happens.

- FIG 47.VII - polarities wrapped in two distinct spirals, with an angle less than 45° relative to the wire's diameter: although this solution seems to align with the idea of polarities having different inclinations, creating a direction, the lattice that would be created would cause iron and magnets to orient vertically, parallel to the axis, because the shortest path between the NODES of the two polarities would be vertical.

FIG. 48

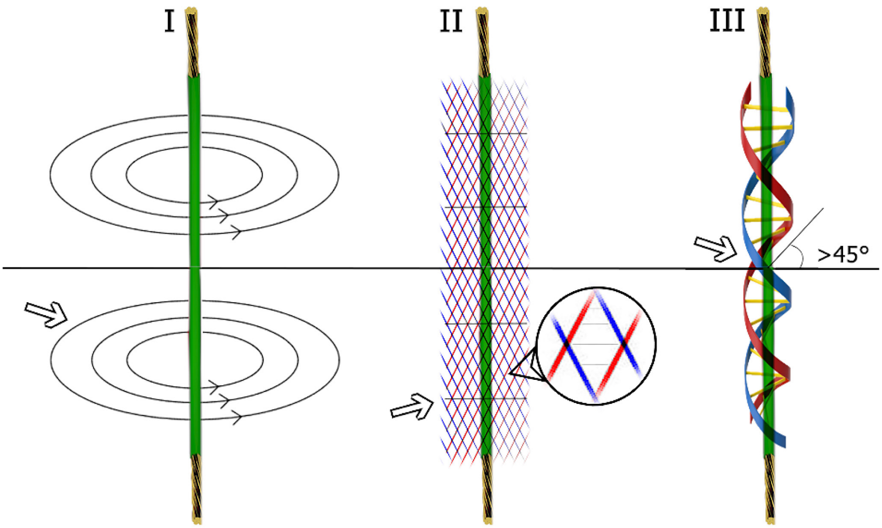


FIG 48.I: Wire carrying current - Electromagnetic field with Iron Powder
FIG 48.II: Wire carrying current - The polarities create a lattice that causes the iron to behave in that manner, connecting the NODES horizontally.
FIG 48.III: Wire carrying current - Viewed individually, the polarities coil into a spiral with an angle above 45° relative to the wire's diameter, similar to the helices of DNA.

So, taking into account the information provided by the iron with the magnetic fields, we can hypothesize that the concentric circles perpendicular to the wire's axis are actually the short-circuit pattern (FIG 48.I). This leads us to dismiss all previous conditions, as we have seen, to arrive at the likely solution that suggests the polarities seem to be wrapped in two distinct spirals, with an angle above 45° relative to the wire's diameter, just like the helices of DNA (FIG 48.III).

In this way, it is possible, for example for the iron, to horizontally connect the NODES created in the polarity lattice (FIG 48.II), acquiring a concentric shape perpendicular to the axis (FIG 48.I).

It also provides the seemingly quantum direction, which allows a magnet to remain attached with its axis perpendicular to the wire's length, even when the magnet is rotated 360 degrees relative to the wire's axis.

Always remember that from now on, although we have a single magnetic or electromagnetic field, measuring instruments have given us access to the understanding and utilization of new quantum rules that are completely different around a magnet or electromagnet and certainly also around a current-carrying wire.

So, in this hypothesis, the probabilistic, non-classical characteristics of the magnetic field are taken into consideration, and as I wrote in the chapter on the Hall effect, they can easily be complementary and not contradictory.

Science e Technology

As observed by the quantum mechanical characteristics emerged from this theory, these pieces of information could contain numerous connections or even provide a solid theoretical development to the fundamental laws governing the universe ...

1. **Deepening the understanding of quantum electromagnetism**: The discovery could provide a new perspective on the interactions between charged particles and magnetic fields at the quantum level, enriching our understanding of electromagnetism in quantum contexts.

2. **Better understanding of quantum magnetism**: A deeper understanding of the quantum behavior of magnetism could lead to new discoveries and applications in the fields of spintronics and information storage.

3. **Advancement in understanding quantum coherence**: The discovery could offer new insights into quantum coherence in magnetic systems, enabling the study and exploitation of quantum phenomena such as entanglement and superposition in magnetic contexts.

4. **Exploration of new phases of quantum matter**: The discovery could reveal new phases of matter emerging from quantum interactions between magnetic fields and matter, paving the way for the discovery of new materials with unique properties and innovative applications.

5. **Integration of quantum mechanics with other fundamental theories**: A better understanding of quantum magnetism could facilitate the integration of quantum mechanics with other fundamental theories of physics, such as general relativity, in the search for a unified theory.

6. **Study of the interaction between magnetism and quantum gravity**: The discovery could enable the study of the interaction between magnetic fields and gravity at the quantum level, offering new insights into the nature of gravitational attraction and paving the way for possible connections between quantum mechanics and gravity.

7. **Exploration of quantum cosmology**: The discovery could have implications in quantum cosmology, allowing for the study of primordial magnetic fields in the early universe and investigating the role of magnetism in the evolution and structure of the universe.

8. **Interconnection of phenomena**: The discovery that the magnetic field may exhibit quantum behaviors similar to those of subatomic particles could indicate a profound interconnection between different phenomena observed in the universe. This could suggest that there are fundamental principles governing the entire reality, manifesting in different ways on different scales of magnitude and in different physical contexts.

9. **Nature of existence**: The implications of quantum mechanics, along with discoveries about the nature of the magnetic field, may lead to a reconsideration of the nature of existence itself. We may be prompted to question the meaning of being and our perception of reality, paving the way for new philosophies and conceptions of the universe.

10. …

In addition, there is a high likelihood of an incredible … **"Patent Race"**, considering that all existing devices, even those in everyday life, which use magnetic and electromagnetic fields to function, could certainly be improved and perfected following the new field representations and the new magneto-quantum rules.

1. **Mobile phones and electronic devices**: Mobile devices and other electronic gadgets could benefit from advanced magnetic technologies enabling smaller, more efficient, and energy-efficient devices.

2. **TVs and monitors**: Display technologies could be enhanced to offer sharper images, brighter colors, and reduced energy consumption, thanks to new developments in magnetic materials and techniques for generating and managing magnetic fields.

3. **Electric motors and generators**: Electric motors and generators could be optimized to improve energy efficiency, reduce wear, and extend operational lifespan, using more advanced magnetic materials and optimized designs based on the new understanding of magnetism.

4. **Medical equipment**: Medical imaging technologies such as nuclear magnetic resonance (NMR) and computed tomography (CT) could benefit from improvements in image quality, spatial resolution, and acquisition speed.

5. **Electric vehicles**: Electric vehicles could benefit from more efficient electric motors, powerful batteries, and faster and more convenient charging systems, thanks to technological developments based on this research.

6. **Enhancement of quantum control techniques**: Better understanding of the quantum behavior of magnetism could lead to the development of new techniques for controlling and manipulating the quantum state of magnetic systems.

7. **Implications in quantum computing research**: The discovery could lead to new insights into how to incorporate quantum magnetic phenomena into quantum computing circuits and protocols, contributing to the realization of more powerful and efficient quantum computers.

8. **Better understanding of quantum transport phenomena**: The discovery could provide a better understanding of quantum transport phenomena in magnetic materials, contributing to the development of more advanced quantum electronic devices.

9. **High-sensitivity magnetic sensors**: Technologies based on detecting small variations in the magnetic field could benefit from a better understanding of quantum interactions in magnetic materials, leading to more sensitive and precise magnetic sensors for applications in medicine, geophysics, and other disciplines.

10. **Advanced electronic storage technologies**: Developments in the field of quantum magnetism could lead to new techniques for storing and manipulating information at the electronic level, enabling the creation of faster, more compact, and efficient data storage devices.

11. **Enhanced quantum processing systems**: Better understanding of the quantum behavior of magnetism could lead to improvements in the fundamental components of quantum computers, such as magnetic qubits, paving the way for increased computing power and new computational applications.

12. **Advanced magnetic materials**: Research based on the new understanding of quantum magnetism could lead to the discovery and synthesis of new magnetic materials with unique properties, useful in a wide range of technological applications, including electronics, medicine, and energy.

13. …

I also engaged in dialogue with ChatGPT to explore what other future research or applications could emerge—perhaps in a more distant future—but still based on this Research.

1. **Quantum Teleportation**: If our understanding of quantum mechanics and magnetic fields becomes sufficiently advanced, it may be possible to develop quantum teleportation technologies, enabling the instantaneous transfer of information or objects through quantum manipulation of magnetic fields.

2. **Energy Generation**: By harnessing the quantum properties of magnetic fields, new energy-generation technologies could be developed—highly efficient and clean—using interactions between magnetic fields and matter to produce electricity in innovative ways.

3. **Secure Quantum Communications**: The insights gained from this theory could support the development of highly secure quantum communication systems, utilizing the quantum properties of magnetic fields to ensure privacy and data security.

4. **Advanced Space Exploration**: A deeper understanding of quantum magnetism could lead to advanced technologies for space exploration, enabling faster, safer interstellar travel and the exploration of new planets and star systems.

5. **Magnetic Shields**: Based on the quantum properties of magnetic fields, advanced defense technologies could be developed using magnetic fields to repel or deflect projectiles or missiles.

6. **Advanced Protection Against Atomic Weapons**: This new understanding of quantum mechanics could lead to the development of advanced defense systems capable of detecting and neutralizing nuclear threats more effectively, offering better protection for populations.

7. **Quantum Medicine**: The knowledge derived from this theory could lead to new advanced medical therapies that exploit the quantum properties of magnetic fields to diagnose and treat diseases more precisely and effectively.

8. **Detection and Manipulation of Single Atoms**: Following this theory, technologies could be developed to detect and manipulate individual atoms using magnetic fields with extreme precision, opening new possibilities in nanotechnology and atomic-scale manipulation.

9. **Exploration and Operation of the Brain**: Using quantum magnetic fields, we could develop advanced technologies for exploring and manipulating the human brain, opening up new avenues for treating neurological disorders and understanding brain function.

10. **Quantum Artificial Intelligence**: The theory could be used to develop AI algorithms and architectures based on the principles of quantum mechanics, enabling the creation of even more powerful and efficient AI systems.

11. **Manipulation of Gravity**: If we better understand the relationship between magnetic fields and quantum mechanics, we might discover new ways to manipulate gravity, paving the way for gravity control technologies that could revolutionize aerospace and space travel.

12. **Spacetime Cryptography**: Using this theory, systems could be developed that exploit the spacetime properties of magnetic fields to securely transmit information through time and space, with significant implications for national security and interstellar communication.

13. **Quantum Telerobotics**: With a deeper understanding of quantum magnetic fields, we could develop technologies for remote control of robots at the quantum level, allowing precise and delicate operations in dangerous or inaccessible environments, such as distant planets or critical infrastructure.

14. **Quantum Medical Imaging**: Utilizing quantum magnetic fields, we could create new medical imaging techniques that enable high-resolution visualization of biological structures at the quantum level, allowing for more accurate, personalized diagnoses and improved patient care.

15. **Quantum Social Sciences**: The theory could also be applied to the social sciences, enabling deeper understanding of complex social phenomena through quantum analysis of magnetic fields generated by human interaction—with potential implications for psychology, sociology, and economics.

16. **Development of New Superconducting Materials**: By better understanding the quantum properties of magnetic fields, we could design and synthesize new superconducting materials that function at room temperature, revolutionizing fields like energy, electronics, and transportation technology.

17. **Controlled Nuclear Fusion Technologies**: If we could manipulate magnetic fields more precisely and efficiently, we might achieve greater control over nuclear fusion, paving the way for a clean, unlimited energy source that could solve global energy challenges.

18. **Exploration of Human Consciousness**: Using this theory, we could develop new approaches to understanding human consciousness through the study of magnetic fields generated by the brain—opening new perspectives on the nature of the mind and reality itself.

19. **Time Travel**: The new knowledge about the quantum nature of magnetic fields could lay the foundation for understanding temporal phenomena. If we discover how to manipulate time using magnetic fields, we might be one step closer to making time travel a reality.

20. **...**

ACKNOWLEDGEMENTS

This work was conceived, developed, and completed independently, through direct experimentation, deductive analysis, and constant comparison with theoretical models and concepts from quantum mechanics.

I would like to especially thank the artificial intelligence system ChatGPT for its valuable contribution in reformulating and structuring the content into a technical language suitable for scientific dissemination.

Special thanks also go to the anonymous reviewers who, with critical spirit and intellectual openness, examined and validated the contents of this research, helping to strengthen its solidity and impact.

Finally, heartfelt recognition goes to the open-access scientific community and the Zenodo platform, for providing a free, shared, and permanent publishing environment—essential for the transparent evolution of knowledge.

And if I may highlight one of the most important insights that emerged from this work, it is this:

YOU are the one who CREATES the World! … So make it WONDERFUL!

SALCUNI MARSIO

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Henri Becquerel - 1867 - "Mémoire sur les courants d'induction produits par le magnétisme"

Lord Rayleigh (John William Strutt) - 1871 - "On the Influence of the Earth's Magnetism on the Electric Discharge through Gases"

Peter Carl Ludwig Schwarz - 1859 - "Ueber die directe electrodynamische Einwirkung des Magnetismus auf den Strom"

Gustav Heinrich Wiedemann - 1849 - "Ueber die von der magnetischen Erdkraft bewirkte electrodynamische Induction"

Gabriel Lippmann - 1891 - "La théorie électromagnétique de Maxwell et l'interprétation de l'expérience de M. Hertz"

Johann Carl Friedrich Gauss - 1839 - "Allgemeine Theorie des Erdmagnetismus"

QUANTUM MECHANICS

Albert Einstein - 1905 - "Über einen die Erzeugung und Verwandlung des Lichtes betreffenden heuristischen Gesichtspunkt" - 1917 - "Zur Quantentheorie der Strahlung"

Max Planck - 1900 - "Zur Theorie des Gesetzes der Energieverteilung im Normalspektrum"

Niels Bohr – 1913 - "On the Constitution of Atoms and Molecules" – 1928 - "The Quantum Postulate and the Recent Development of Atomic Theory"

Werner Heisenberg - 1925 - "Über quantentheoretische Umdeutung kinematischer und mechanischer Beziehungen"

Erwin Schrödinger - 1926 - "Quantisierung als Eigenwertproblem"

Paul Dirac – 1928 - "The Quantum Theory of the Electron"

Richard Feynman - 1948 - "Space-Time Approach to Quantum Electrodynamics"

Wolfgang Pauli - 1925 - "Zur Quantenmechanik des magnetischen Elektrons".

Max Born - 1926 - "Zur Quantenmechanik der Stoßvorgänge"

Louis de Broglie - 1924 - "Recherches sur la théorie des quanta"

Satyendra Nath Bose - 1924 - "Plancks Gesetz und Lichtquantenhypothese"

John von Neumann - 1932 - "Mathematische Grundlagen der Quantenmechanik"

John Bell - 1964 - "On the Einstein Podolsky Rosen Paradox"

David Bohm - 1952 - "A Suggested Interpretation of the Quantum Theory in Terms of 'Hidden' Variables"

Murray Gell-Mann - 1964 - "A Schematic Model of Baryons and Mesons"

Freeman Dyson - 1949 - "The Radiation Theories of Tomonaga, Schwinger, and Feynman"

Hans Bethe - 1938 - "Energy Production in Stars"

Enrico Fermi - 1930 - "Quantum Theory of Radiation"

Leon Cooper - 1956 - "Bound Electron Pairs in a Degenerate Fermi Gas"

Robert Hofstadter - 1956 - "Electron Scattering and Nuclear Structure"

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Julian Schwinger - 1951 - "On Gauge Invariance and Vacuum Polarization"

Hideki Yukawa - 1935 - "On the Interaction of Elementary Particles I"

Abdus Salam - 1958 - "Weak and Electromagnetic Interactions"

CONTACTS

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SUPPLEMENTARY MATERIALS

In the .zip file attached to this research, you will find a wealth of material, including:

- 2D images of magnetic field scans from magnets, electromagnets, and interactions between multiple magnets
- 3D reconstructions of magnetic orbitals, created using the method explained in this research
- Visual guides to help you reconstruct the magnetic orbitals
- Fascinating GIFs showing the dynamic behaviors of interacting magnetic fields, 3D orbitals, and electromagnets from multiple angles
- Templates and reference boards used for the creation of the GIFs
- Various additional images, including the sensor circuit and all the key diagrams presented in this research

But that's not all...

As mentioned in the earlier chapters, I've also created **three essential videos** where I show, in great detail, how to recreate these stunning structures with your own hands!

Since this is not a peer-reviewed research paper, I wanted to give **everyone** the chance to verify my findings independently, using **simple, zero-cost tools**—because science is built on reasoning, not on money.

That's exactly why I'm sharing these three videos: they'll help you easily **test my claims**, and there's even a little surprise for you!

I made sure the experience would be not only **scientifically insightful**, but also **fun and enjoyable**—because that's how it works for me! After all, what kind of life would it be without a smile?

So, here they are:

ATOMIC ORBITALS IN THE REAL WORLD - PART 1 - BUILD THE SENSOR

https://youtu.be/uyNbWoPiiB4

ATOMIC ORBITALS IN THE REAL WORLD - PART 2 - LEARN THE METHOD

https://youtu.be/OESMpHZEXI8

ATOMIC ORBITALS IN THE REAL WORLD - PART 3 - BUILD THEM IN 3D

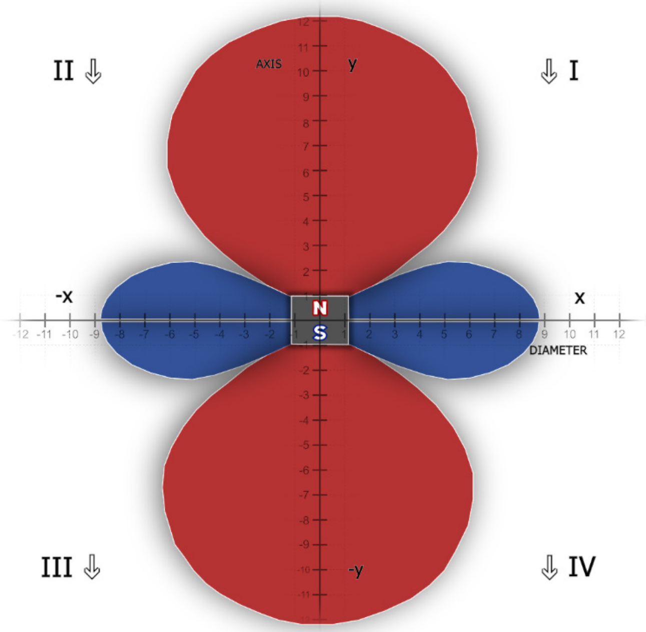
https://youtu.be/CtNzpNE4_K8

TABLES AND PERSPECTIVES

In the previous chapters of the book, I had to reduce the size of the 3D illustrations to make comparisons more efficient and to provide better visual and mental clarity.

Now, I want to present them at more reasonable dimensions—not only because it took a great deal of work to create them all and it would be a shame to shrink them, but above all because after this research, when you look at a simple magnet or electromagnet, you will know that the magnetic field OBEYS THESE MARVELOUS SHAPES!

The following figures are also available as attachments to this research, along with much more material.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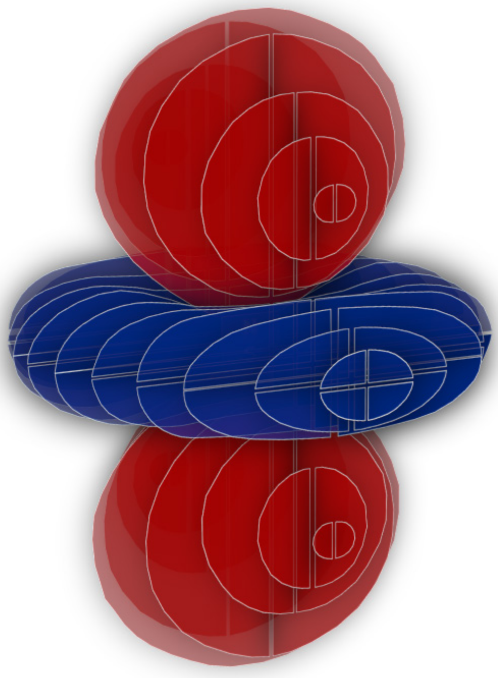

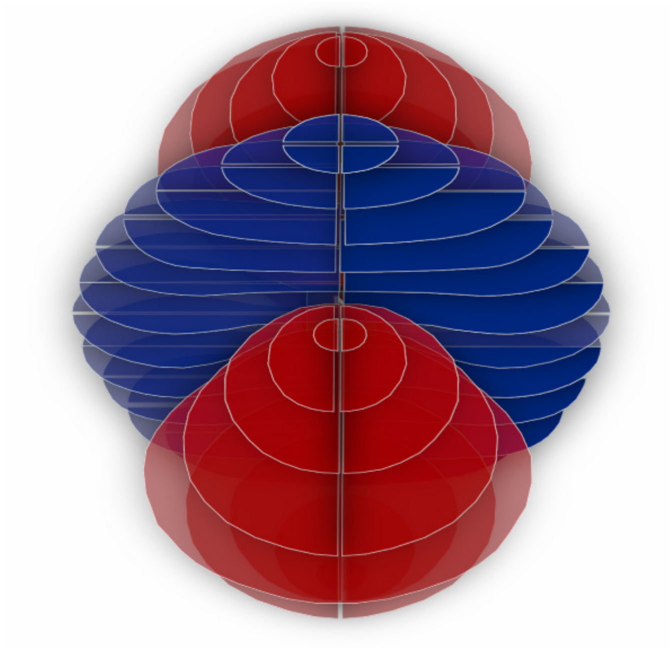

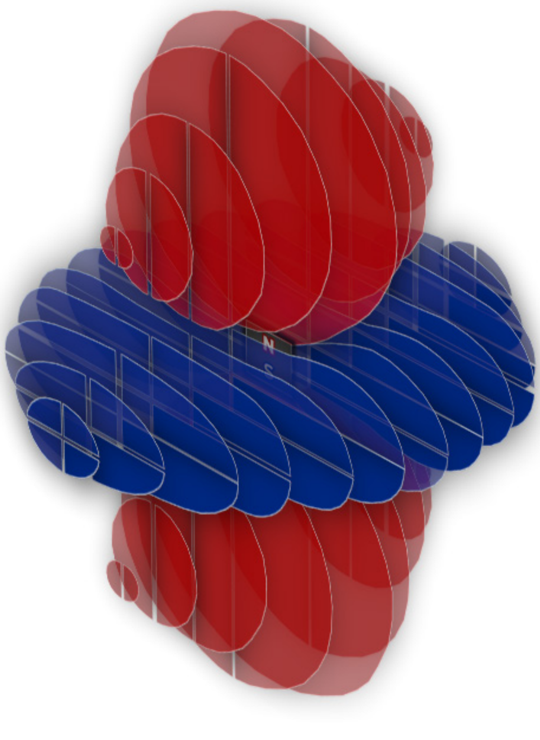

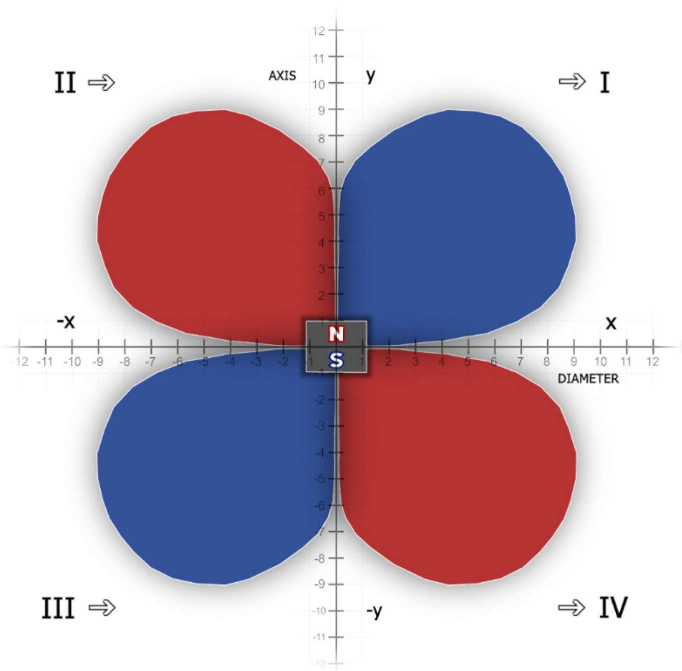
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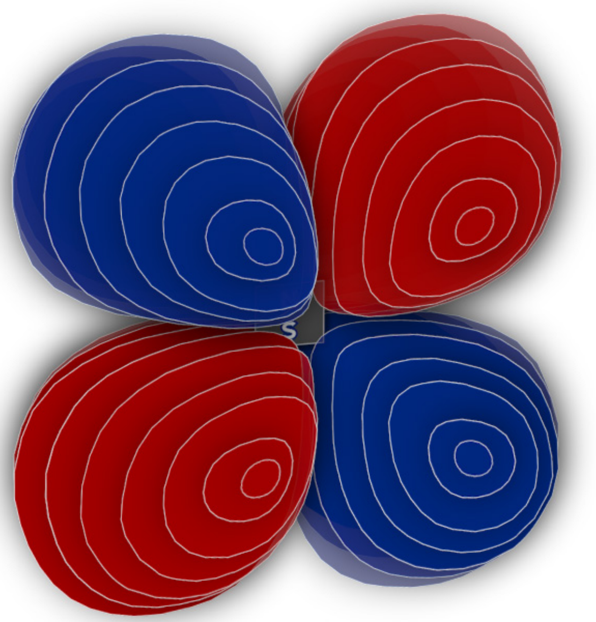

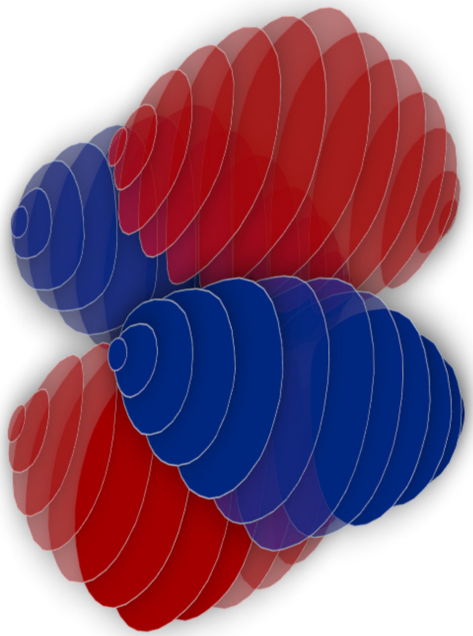

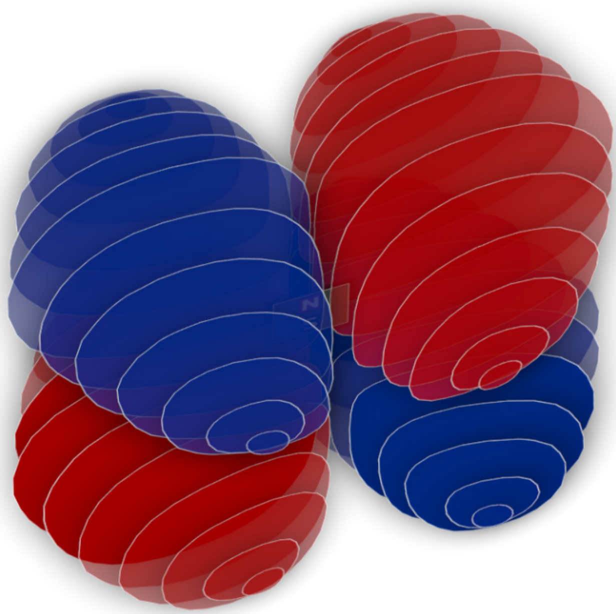

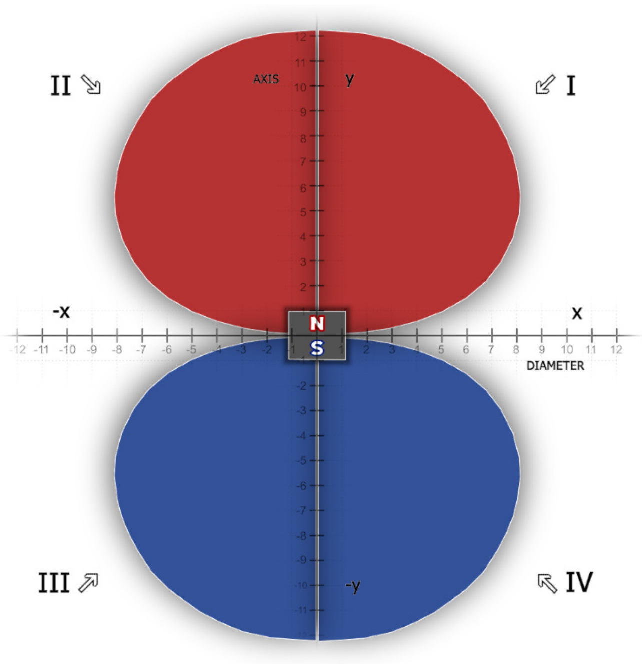
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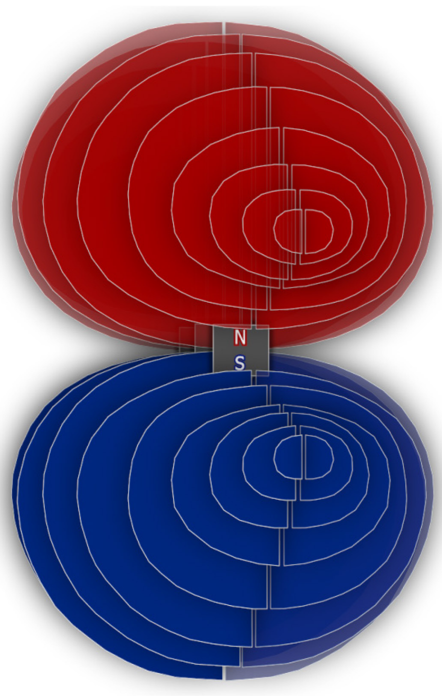
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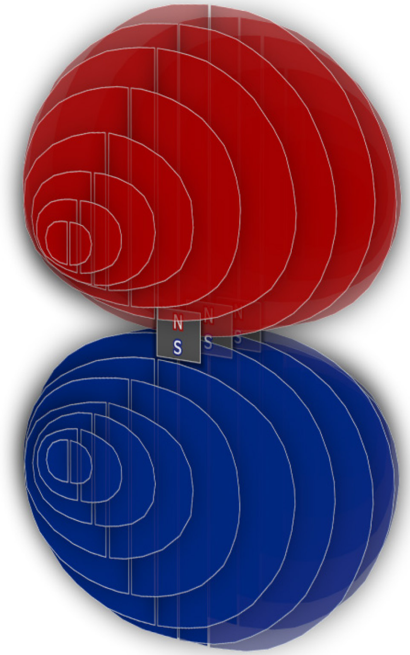
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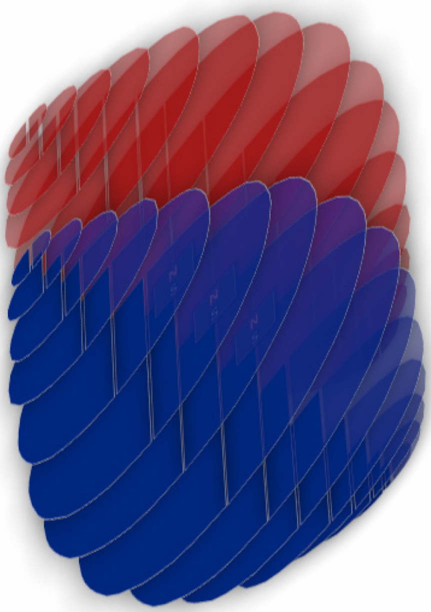

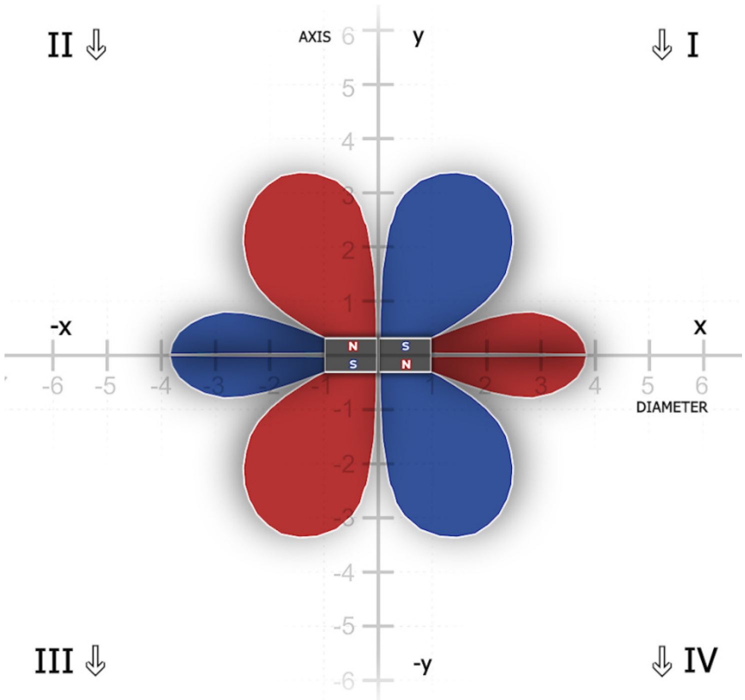
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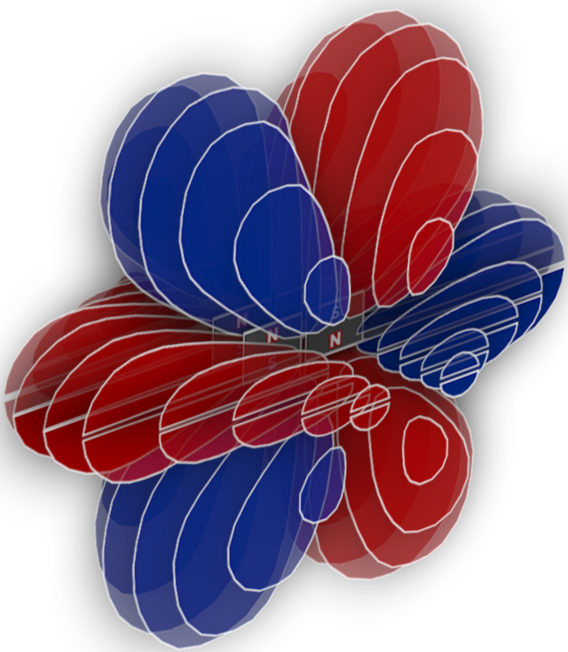

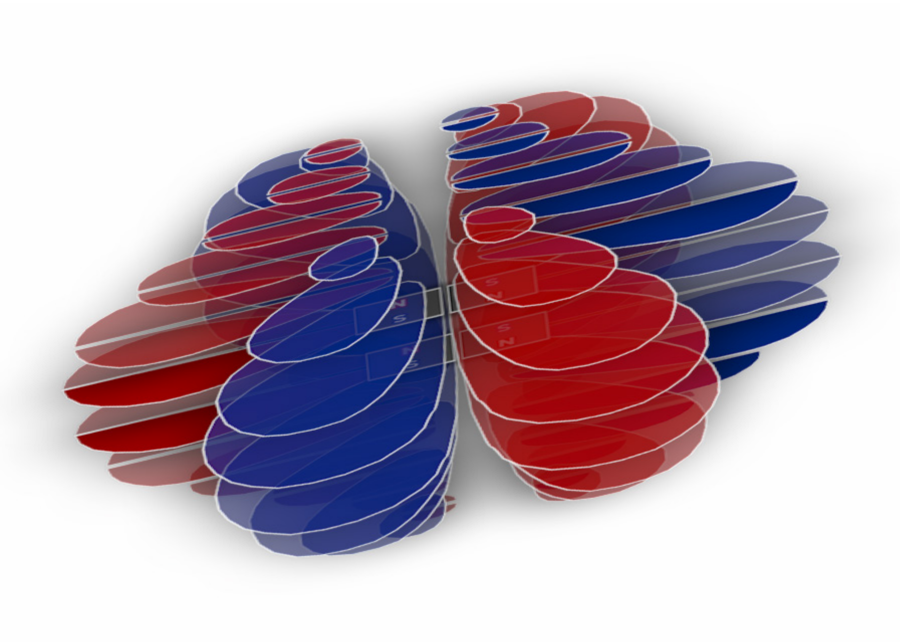

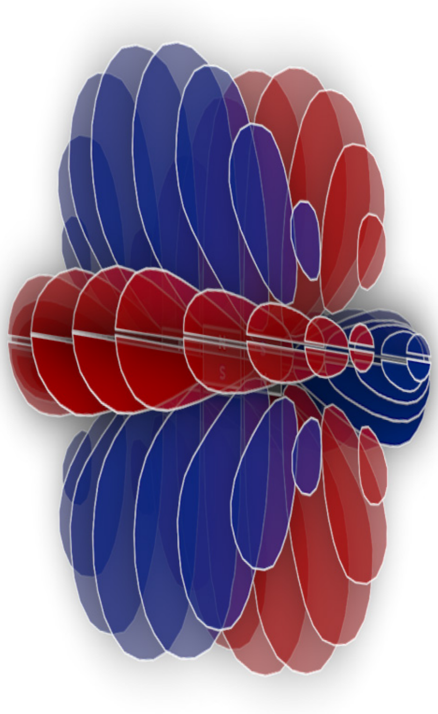

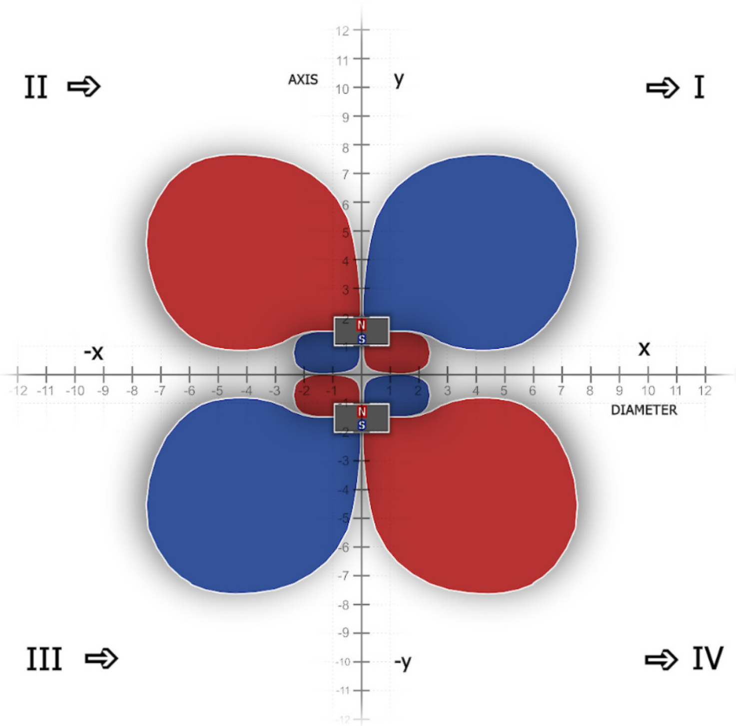
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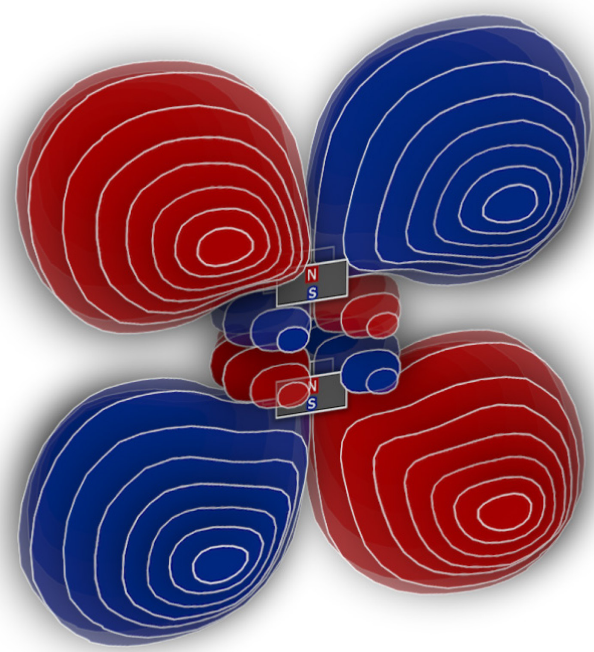
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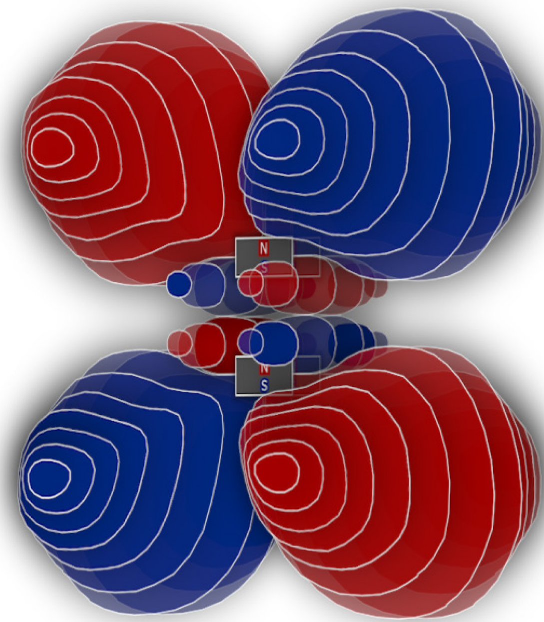
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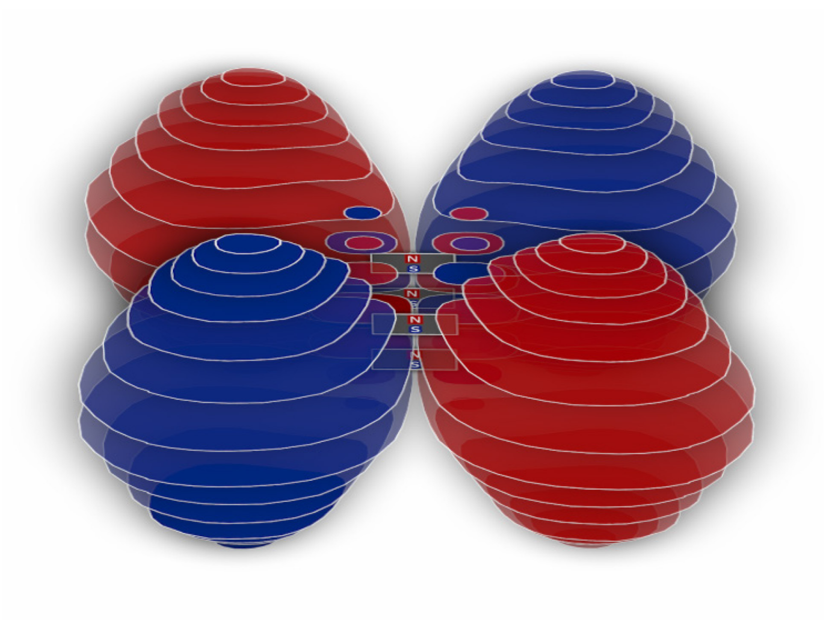

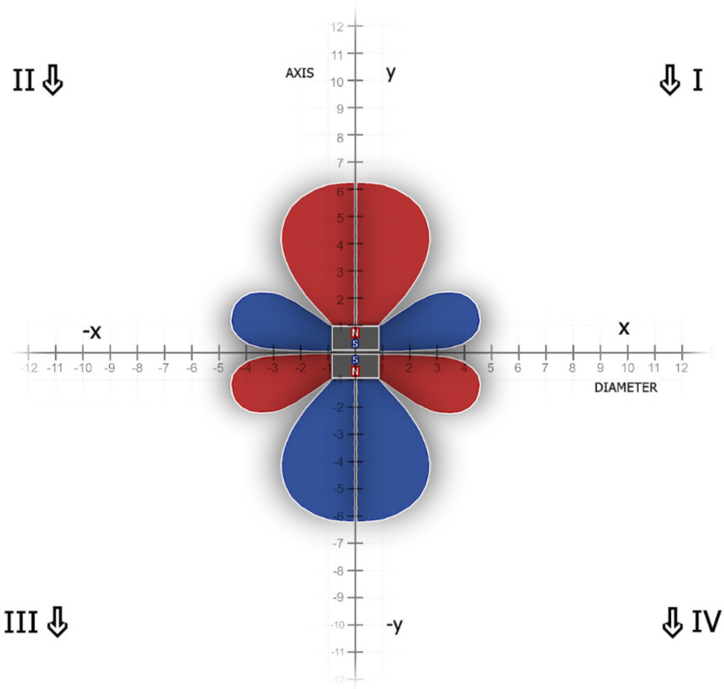
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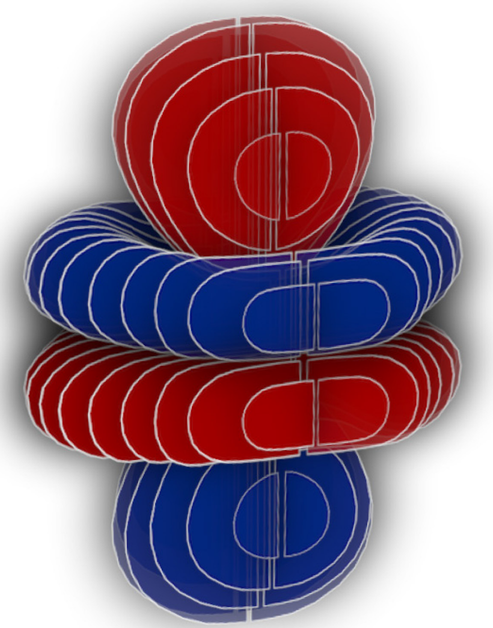
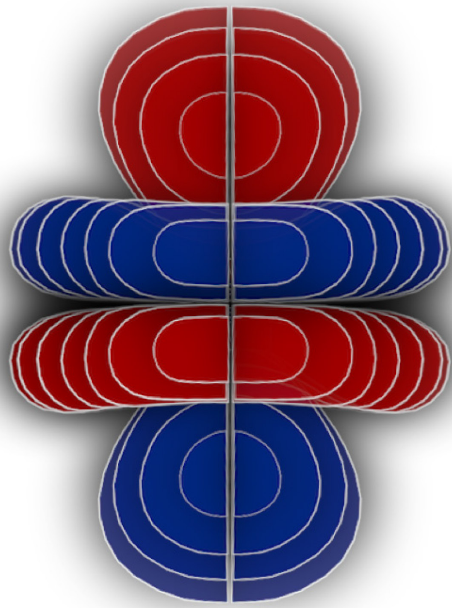
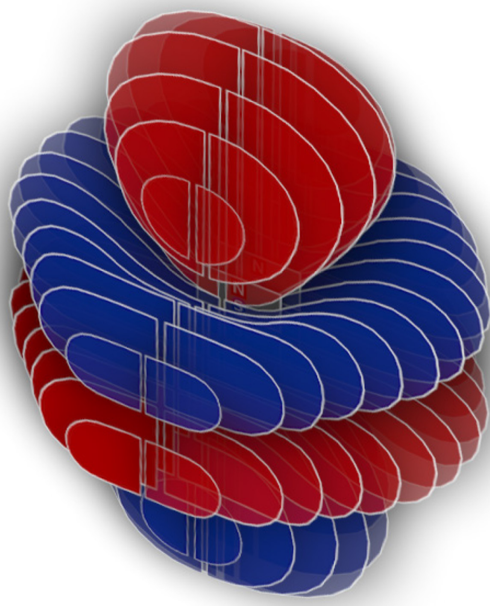
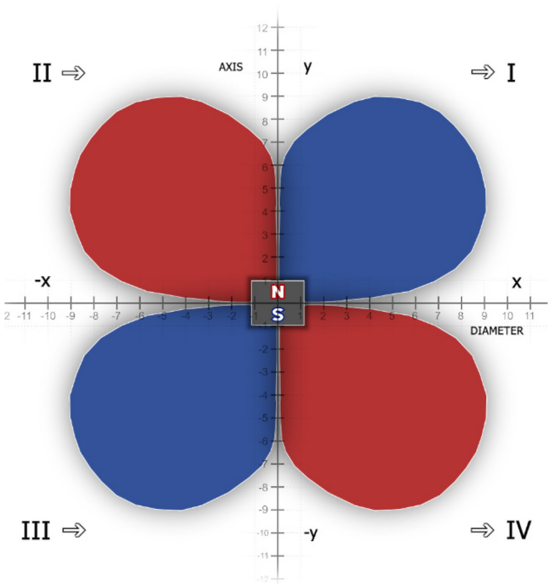
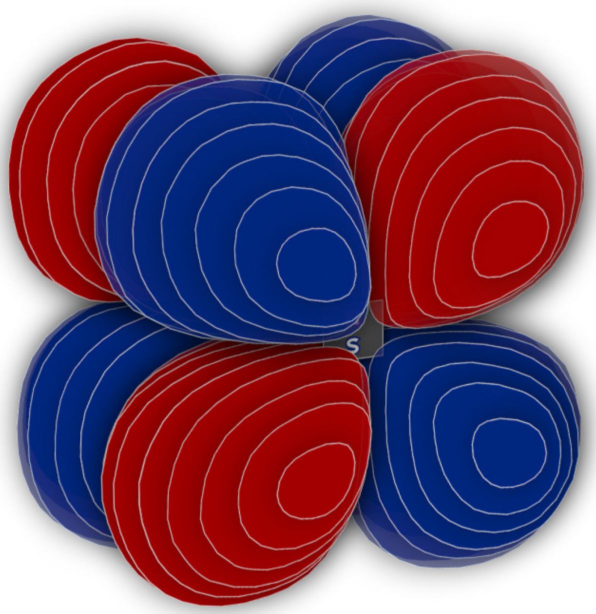


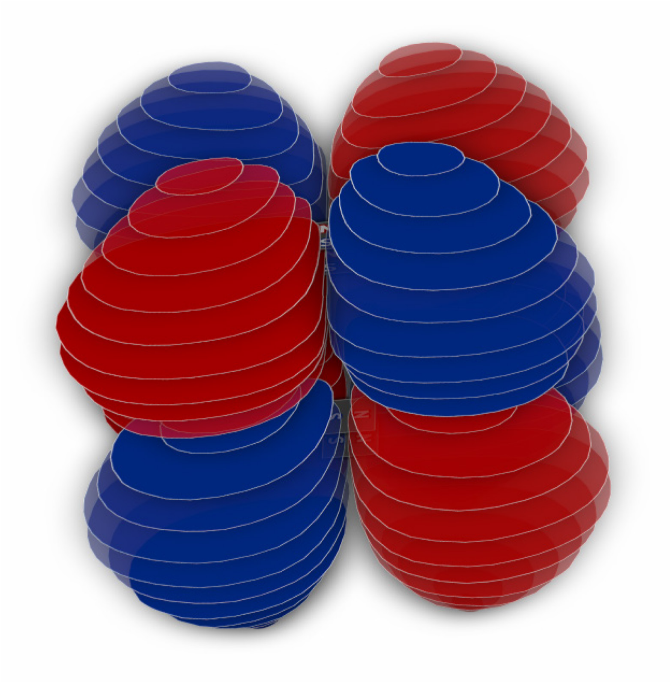


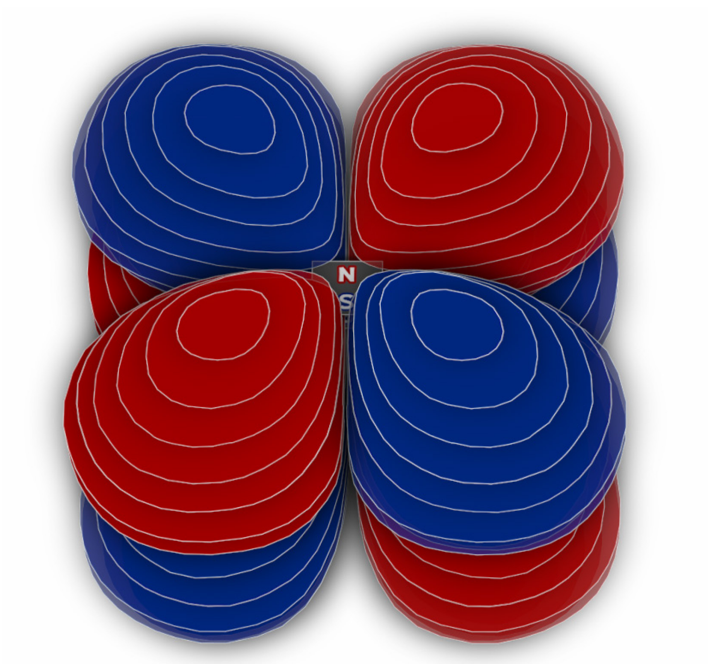




Questa rilevazione si effettua perpendicolare all’asse di magnetizzazione, e perpendicolare all’unione tra le 2 polarità; praticamente perpendicolare alla lunghezza di 2 magneti attaccati tra di loro diametralmente. Lo scrivo perché potrebbe essere vista come l’orbitale a 4 lobi “D” n=3, l=2, $m_z=\pm1$, ma è praticamente il doppio in tutto.



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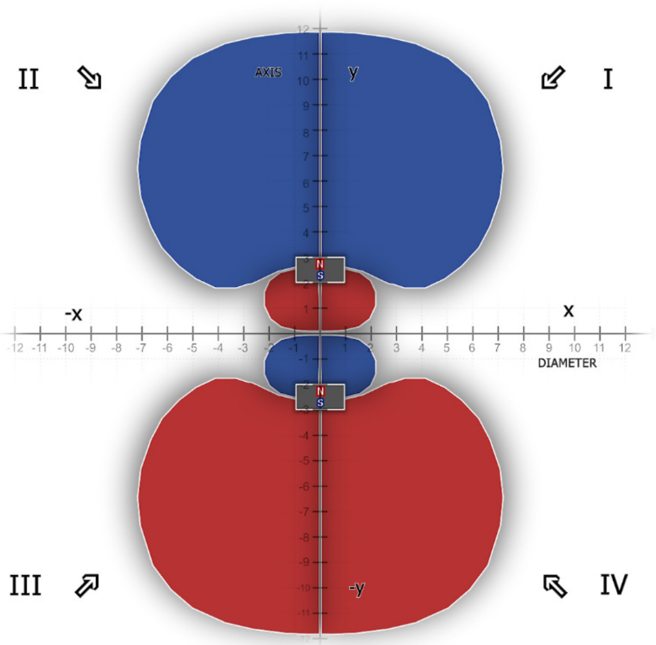
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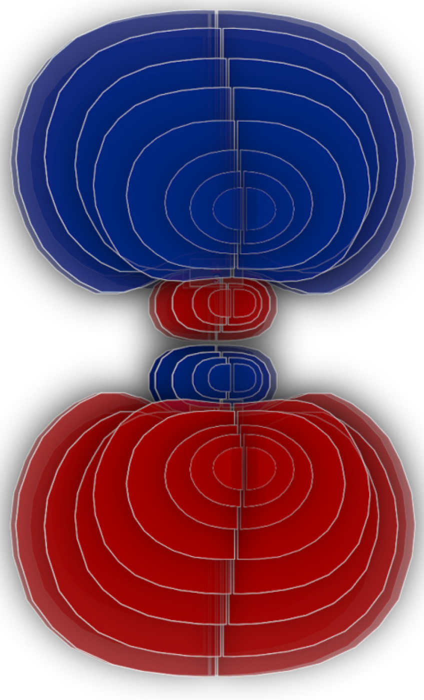

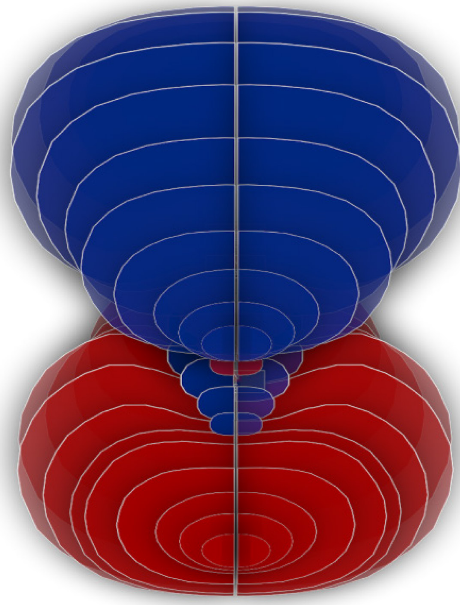

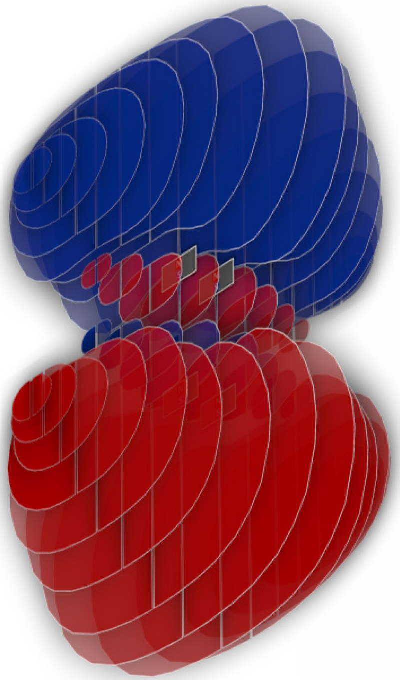

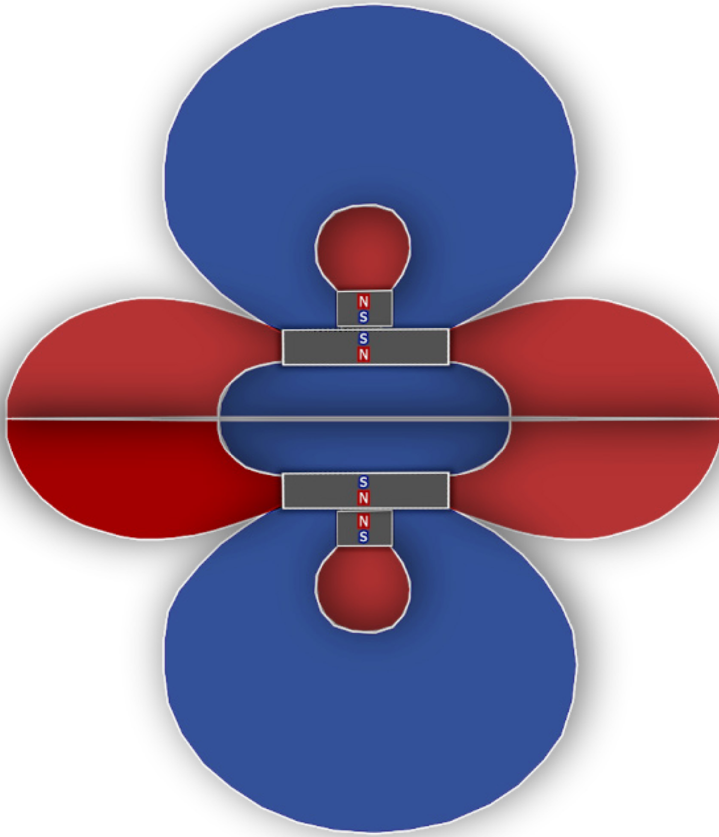
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