Absolute Object Reality

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"The question of whether or not when you see something, you see only the light or you see the thing you're looking at, is one of those dopey philosophical things that an ordinary person has no difficulty with. Even the most profound philosopher, sitting eating his dinner, has many difficulties making out that what he looks at perhaps might only be the light from the steak but it still implies the existence of the steak which he is able to lift by the fork to his mouth. The philosophers that were unable to make that analysis and that idea have fallen by the wayside from hunger." Feynman, R. (1979) **1**

Absolute (complete) Object reality, counterfactual definiteness, the law of non-contradiction and context

It is the thought that as 'our' perception is definite, showing particular, singular identifiable states that is therefore what macroscopic reality is like, that is also a problem. Prior to observation, without an observer's reference frame applied and no specification of when or where a measurement is to be made the object is in an absolute unmeasured state. That is being all that it is, not any partial aspect: The whole truth. For to be assigned a definite state, observer viewpoint relative to the object, and/ or measurement protocol is needed. Examples of absolute states without contradiction include both clockwise and anticlockwise spin; a surface that is simultaneously both concave and convex; a state of both heads and tails, simultaneously spinning up and spinning down.

Any viewpoint of a source object gives a representation of a part of the topology of the 3D source object not the whole of the source object. Manifestations of objects have limited fixed states determined by measurement/ observation, and are partial representations of absolute Objects. The state observed by any singular observer is limited as the sensory data obtained from which the reality is fabricated is a limited sub set of all data available in the environment. Also, measurements condense data into a limited number of detectable outcomes. A coin's state at measurement can only be seen as heads or tails.

The measurement protocol provides only one of those two outcomes nothing else. A spinning object's state only as clockwise or anti-clockwise spin. The counter factual is eliminated by the process of forming the Image reality, selecting potential sensory data or making a measurement. This macroscopic Image reality is an impoverished representation of external source reality.

Consider: A concave/ convex cup is, in absolute truth, in Object reality both simultaneously. It is when observation is made, that a particular frame of reference is imposed and, it 'becomes' one or the other. It, the observed manifestation, is not the same 'it' as the material source or the sensory data information from which it is fabricated. It, the observed manifestation, is truly just one state, concave or convex, because the information to form the contradictory state cannot be received simultaneously. It is not and so does not form a part of the observer's emergent reality.

The emergent reality does not contain the counter factually definite. That makes it partial truth formed from incomplete information. In contrast to the absolute truth contained within Object reality. This is a switching from thinking about the world in one way, including all possible outcomes to looking at it in one particular way. A cup unseen in absolute space is both concave and convex, the potential sensory data in the environment encodes both concave and convex topology and a wave function of the superposition of states for the cup must allow for the two contradictory outcomes. Thus, emergent space time experienced reality of any singular observer, like any singular measurement, excludes the counter factually definite.

The counter factual possibilities are not within space-time exterior to the observer. The counter factual possibilities are unseen within the potential sensory data distributed in space and possibly still part of the Object source of the data, both belonging to the Object reality facet of reality, the source side of the reality interface.

An unobserved spinning coin in free fall *does not have* a recognizable state of orientation relative to the observer but can be thought of as of all states, until the measurement protocol produces a fixed observable. The flux of a spinning coin in free fall, how, the way in which, it is moving in relation to its environmental context is inseparable from the substantial object. *That is its true nature, how it relates to the*

Object universe, in contrast to any singular state assigned to it from a singular measurement or observer viewpoint and reference frame.

That 'picture' of what is occurring is pertinent to the question of why systems can be probabilistic rather than fixed and certain prior to measurement.

Consider the unobserved free falling spinning coin object again. The object is in all indirectly observable states because *there is no reference* frame-making all frames equally valid. It is also in flux altering what would be observed from each reference frame, if applied, as time passes.

Although the evolution of its relations to the external environment is deterministic, if all variables are considered, without choosing and applying the observer's reference frame and selecting the potential sensory data that will give a known designated starting state, relative to the observer, the outcome of any later measurement cannot be predicted. There is no observation context for a singular determination. However, there is an alternative to choosing a starting state as seen by a particular observer. That is considering the environmental context of the phenomenon. That is the relations to external surroundings that gives a context whereby all orientations and changes of orientation due to intrinsic motion are valid.

Material objects cannot be said to have orientation of being, or orientation of motion without regard to other external things such as other objects, or forces, or an observer that provide a context. This means that *properties of relative position, orientation and relative motion and rotation are contextual and not merely inherent aspects of objects and particles alone*. This seems unusual because we are used to seeing limited fixed state manifestations with definite relative attributes and not used to considering the myriad of other ways in which a manifestation of the same source object might be perceived.

By considering all the information not received/ measurements not made, we have a collection of other possible states. All possible states could perhaps be thought of as like quantum physics eigenstates. That are reduced to the to one output seen. *As information not received forms no part of the manifestation seen*. This makes macroscopic physics a little less different from quantum physics.

The law of non -contradiction states: Contradictory statements cannot both be true, in the same sense, at the same time. The observer's Image reality is impoverished and *does* comply with the Law of non-contradiction. An unseen substantial object in Object reality and a theoretical superposition in a quantum probability space are conditions in which the law of classical logic called the Law of non-contradiction does not apply.

There has traditionally been the idea of a divide between the sub atomic and macroscopic scales, which seems to be the result of the different ways in which we must interact with them. Primarily interacting with the macroscopic scale via our sense of sight and hence with the limited, fixed, definite state output of that sensory processing. Object reality exists at all scales including the astronomic and sub atomic. There is another divide which is between Object reality and Image reality.

Object reality is what exists preceding all observed present representations of it. This can be said because experienced presents are fabricated from received data that has been emitted from objects and then processed, which takes time, (iterations of the Object universe). The time taken may be *extremely small* when objects are in close proximity nevertheless the speed of light is finite.

Within the Object reality is the potential sensory data to form image realities of former things and events. This is data spread within uni-temporal space it is not space-time. It is meaningless information until received and processed. Nor is it the space-time continuum as it can only be processed into Image reality outputs not substantial objects and events. It does not include any potential data from events that have not yet occurred in substantial material reality.

True, absolute relations V relations within space-time images

The question of whether there are spatial relations between objects at different times presumes that there can be Objects at different times. That is so for a space-time model such as Block time. A uni-temporal Object universe precludes that possibility. There is only one extant time, Uni-temporal Now, in which objects wholly exist. That does not mean that Objects cannot be affected by the former action of other objects, and

calculations made. Such as a boat rocked now by the wake of a passing of a boat then. The true, absolute relations are those between substantial I.e. material things within the same configuration of the Object universe.

The question also requires differentiation of Image from Object reality because there can be apparent spatial relations between parts of an image that pertain to different times. The distances shown in the image could then be measured 'on the ground', giving a concrete measurement of an Image reality or could be estimated for astronomic images, giving the distance between corresponding source Objects; even though the EM radiation from which the different parts of the image is formed was not produced during the same configuration of the Object universe, I.e. not at the same time. The image is real but also a distorted representation of what has existed. The measurement even if concrete only pertains to the Image reality in such circumstances.

Any experiment involving observation (using the sense of sight or sound or a device to be proxy for that visual or auditory system such as a camera) is using the output of sensory data collection and processing. That might be emergent sound or images in the case of an organism being the observer or some other output in the case of a device collecting the sensory data. There may be awareness of or evidence of apparent interactions of those images (which is not the same phenomenon as interaction of material objects).

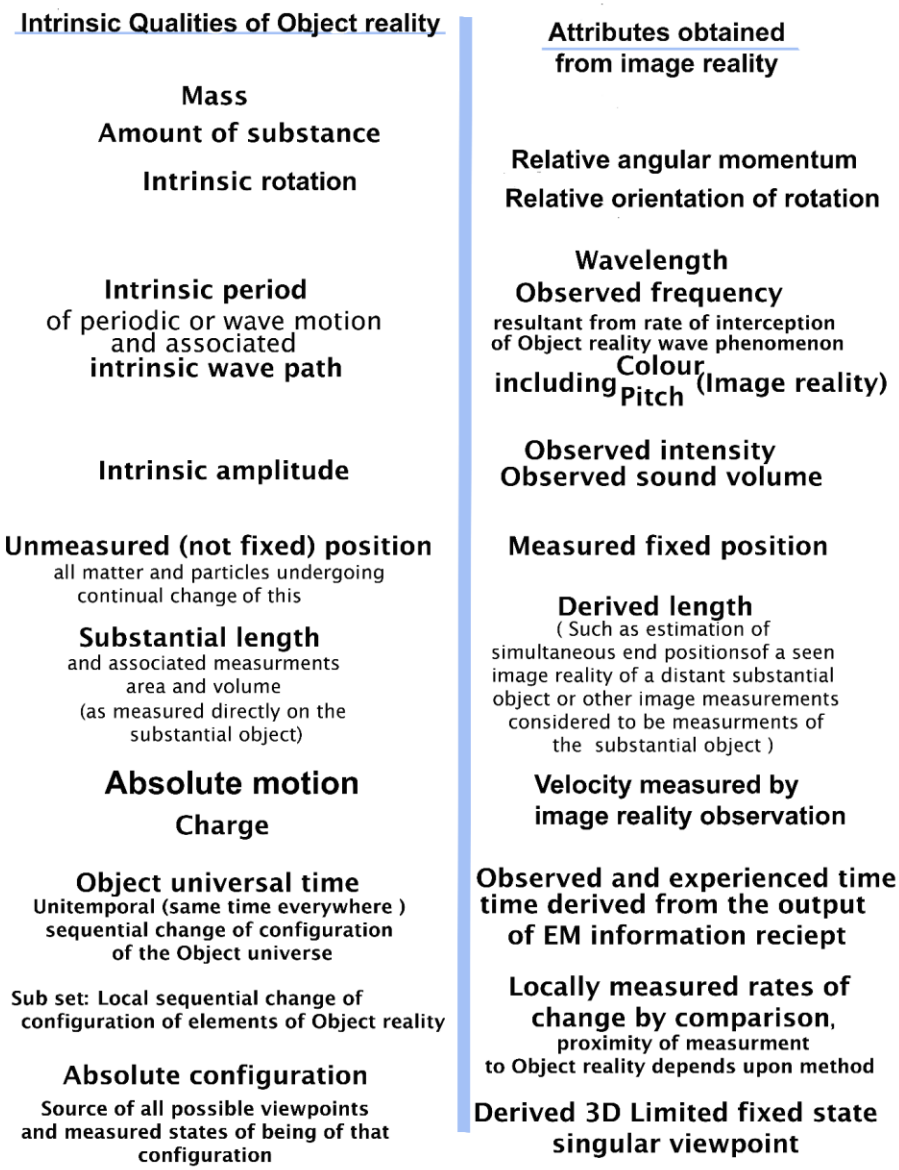
About Properties in physics

It can now be appreciated that not all *properties* used in physics are qualities of material bodies but some represent attributes sourced from image manifestations. So, what have been regarded as properties need to be differentiated into Object reality ‘Qualities’ (that Newton calls ‘true quantities’) and Image reality (sourced) ‘Attributes’ (that Newton calls ‘relative measures’), and the measurements used in physics with their nature in mind.

Of interest and pertinent to the differentiation of Properties into Qualities and Attributes are Newtons thoughts on the matter; “Newton devotes the bulk of the Scholium to arguing that the distinction between the true quantities and their relative measures is necessary and justified.

It is evident from these characterizations that, according to Newton:

1. space is something distinct from body and exists independently of the existence of bodies,
2. there is a fact of the matter whether a given body moves and what its true quantity of motion is, and
3. the true motion of a body does not consist of, or cannot be defined in terms of, its motion relative to other bodies." Rynasiewicz, R., (2014) **2**



The Object universe

Having a differentiation between Object and Image reality it is possible to say that the 'O*bservable* universe' is referring to Image realities obtained from observation and potential image realities (that might be obtained because of accessibility of the information). The term 'Visible universe' seems to have been superseded by 'Observable universe, perhaps because what is observable via technology extends beyond the visible spectrum. Made into seeable and intelligible images by use of technology, patience and artistry. These are not the Object universe but products of received information and its processing.

The Object universe contains material objects, fermion particles and photon particles within an environmental context. It is not directly knowable, as it is known via receipt and processing of sensory information. It has a uni-temporal (same time everywhere) configuration in which objects and particles wholly exist, there being no other extant foundational time in which they could also exist. Forces act and motion occurs across the sequence of configurations.

Within each configuration properties and relations such as scales, masses, separations, relative orientations and gradients that accommodate the forces that will act; to allow, constrain or prevent change to give the next arrangement, in a continual sequence. Each material configuration (and new set of associated relations) output, is the next input upon which the laws of physics, and biology act.

Everything is in (absolute) motion so the Object universe is continually changing, some relations between objects will persist within Uni-temporal Now and others be extinguished. Relations within the configuration at Uni-temporal Now are extant, true relations. The forces that act within each new configuration lead to another new universal configuration and cannot lead back to the former universal configuration. The whole Object universe cannot be put into reverse. Applying Newton's first law, the Law of inertia, and the conservation of energy; An Object universe in motion continues in motion unless acted upon by a universe stopping force.

The 'double slit experiment' problem

Are there only particles and waves in foundational reality? Maybe there *is* experimental evidence that the void or empty space is not empty, but an environmental context that can be influenced and exert influence, even in a vacuum.

A foreman is not just a man found in a location on the factory floor or moving with momentum across the factory. He has *an influence* that is discernible *by the output of the workforce.*

Seeing the buildup of a banded film in a double slit experiment it is not essential to consider the electrons, photons or other particles to be merely the isolated objects, identified by a snap shot detection of position or momentum. Rather, the results seem to indicate they are something interacting with and altering its environment. Giving a cumulative manifestation resulting from the entirety of behaviour and its effect.

As a particle changes position in space it is interacting with its environment in unseen Object reality; causing an environmental effect, wave like disturbance, that may also feedback on the behavior of the particle. Consider a medium that can be disturbed by movement within it. The movement of an electron through it could set up sympathetic vibration as well as any wave motion resulting from vibration the apparatus components. In the double slit experiment upon reaching the double slits the wave disturbance of the medium will pass though leading to interference of the waves giving an interference pattern. There would then be feedback from the interference of the medium to the movement of the particle, affecting the electron particle position that is detected. This would explain why electrons fired individually through the apparatus will build up a wave interference pattern built from the detected positions of the individual electrons. The electron itself is not a wave, but environmental feedback onto momentum and final detected position results in perception of a wave like phenomenon in perceived image reality. This experiment provides experiential evidence for a medium of transmission of sub atomic particles and light in an unobserved Object reality.

The medium itself is undetectable, it cannot be observed because it is inert, does not reflect EM radiation or sound waves or have an odour or taste and so does not provide

information about itself for detection by the senses and inclusion in Image reality. Being unseen does not mean that it is not there. Its existence is implied by the experiment.

The wave formed in the medium is not merely a hypothetical wave function of probabilities or giving many possible paths in different universes. Such a mathematical hypothetical construct on its own has no concrete realism and no ability to influence an actual spatial position of a particle. An actual wave within a medium can feed back into the momentum of the carried object and influence the position of the particle when detected or the pattern observed. This explains why even electrons fired singly will build up a banded interference pattern.

Such a medium also allows electric and magnetic fields to be understood, as specific sub atomic environmental disturbances caused by the aligned movements of many electrons

The reality that is observed is made up from processing of selected data that it was possible to detect and encode, given the properties and sensitivities of available detectors or receptors. Not the full spectrum, range of intensity and variety of data existing in external reality.

If the minimum change acknowledged is merely the limit of measuring or detection capability, then the digital units created are not conclusive evidence of an *entirely* digital foundational reality.

Some thoughts on Object reality

Though simple, Stephen Wolfram's cellular automata show that complexity can arise from certain inputs and certain sets of rules, reiterated upon the output (Wolfram, S. 1986) **3**, as occurs in Object reality. Patterns and objects in different iterations cannot interact. Also, a small change to the input to a cellular automaton can give a large change in output. This is also seen in fractal generation and in nature. For example - small molecular change to the FGFR3 gene causes detrimental alteration of a growth factor receptor, leading to dwarfism of the affected human individual. A small change at the atomic scale leads to a large change in phenotype at the macroscopic scale.9.

Some rules governing change only operate at larger scales, but affect what exists at smaller scales. Phenotypes from genetic and epigenetic variance (expressed structure and function) result from 1) DNA molecule sequence, 2) DNA molecule folding. This is pattern control at a molecular rather than atomic or sub atomic scale. Natural selection is pattern control at the whole organism scale.

Though all processes might be reduced to events at the smallest scales, for large scale selection of pattern that kind of reductionism has lesser not greater explanatory power. Rather than being surprised at the existence of patterns, we could regard them as the equilibrium between maximum simplicity and maximum complexity, which approaches simplicity. (To demonstrate this idea stir a pot of two unmixed paint colours while watching the increase in complexity of the pattern until a uniform mixture is produced.)

The relations of everything allow the Object universe to function and become, rather than just exist. The relations are integral to the arrangement of the constituents, being the variables and parameters that produce force for change or the potential for change. Mathematical rules and pattern generation control lead to organization. Abstract representation or verbal description of the rules and controls are not required for their expression in Nature.

The Object universe is the actively participating omnipotent, omnipresent creator, preserver and destroyer of all structures and patterns. This framework brings physics closer to a number of theological ideas and overcomes several philosophical/ theological problems. It is more akin to Heraclitus' river than Plato's perfect realm. *It is the patterns and all of the processes that are occurring, including the continual generation of potential sensory data.*

Complete determinism

Complete determinism as is dictated by a Block time or space-time continuum model is at odds with; concepts of choice, free will, evolution of the ability to think and make decisions and choices, functional morality, altruism and selection through competition.

As it implies that all responses and outcomes are predetermined. Therefore, fully automatic and inevitable, despite the strong feeling that this is not so.

Yet millions of people who experience addictions or obsessive or compulsive behaviours will identify that their behavior is not entirely the outcome of expressed free will. Illusionist, Derren Brown, reveals how the information a person receives sub consciously or with little conscious attention can later be regarded by that person as original creative thought. The advertising executives are taken on a taxi ride during which they are exposed to certain visual experiences, such as sight of a lyre and ornate zoo gates, that are later used by them to fulfil an advertising brief for a chain of taxidermy stores. Knowing the visual input the executives have been given, their creative output can be, and is predicted by Brown. (Brown, D., 2012) **4**.

This might tie in with Daniel Kahnman's observation that there are two modes of thinking, fast and slow. One being automatic and sub conscious and the other being conscious deliberation of matters requiring more careful analysis. Quote "In the current view of how associative memory works, a great deal happens at once. An idea that has been activates does not merely evoke one other idea. It activates many ideas, which in turn activate others. Furthermore, only a few of the activated ideas will register in consciousness; most of the work of associative thinking is silent hidden from our conscious selves." (Kahnman, D., 2011. Chapter 3. p 52.) **5**.

Perhaps top down free will acts despite the micro deterministic world of things.

When I took the microfiber cloth and wiped the wall with kinesthetic pleasure, it was only remotely related to the high tech. microstructure of its material. Instead I had picked it up because of its apparent yellowness, that was like a ray of sunshine in the gloom. That made me smile.....

Though we make causal stories there are so many relations involved in causality (that are overlooked), that the attribution of definite cause might just be rationalization. That does not take account of the automation of many actions by the sub conscious mind.

Though I had not found the cloth by choice. My subconscious, aware of low blood sugar, had somnambulated my body to the kitchen cupboard in search of the last cookie.

There is hope. Some calculations have more than one outcome value, positive and negative, and algorithms can sometimes produce more than one possible solution. If this happens in the Object universe only one solution would be actualized as there is not the matter to have more than one outcome. Conservation of energy prevents replication of matter ex nihilo. These possibilities allow there to be real choices between alternatives.

Stephen wolfram and others share their hope in the self-generated autoplectic (emergent 'pseudo randomness') of highly complex emergent patterns that belie their micro deterministic origin. Quote "Despite the simplicity of their construction, cellular automata are found to be capable of diverse and complex behaviour. ..... There are nevertheless class 3 cellular automata which yield complex patterns, even from simple initial states. Their evolution can intrinsically produce apparent randomness, without external input of random initial conditions. It is such "autoplectic" systems [11] which seem most promising for explaining randomness in nature, or for use as practical random sequence generation procedures. Many class 3 cellular automata seem to perform very complicated transformations on their initial conditions. (Wolfram, S. 1986) **3**

'The only way to predict the system's behavior is to perform step by step all the micro-computations. In this "separation between the underlying rules for the system and its overall behavior" (Wolfram 2002, p. 751) lies the secret of free will, since it seems that we attribute free will to a system just when "we cannot readily make predictions about the behavior of the system" (Wolfram 2002, p. 751). 'By observing CA, we can understand how something with simple and definite micro-rules, like those governing our neurons, can produce a behavior free of obvious rules: "the crucial point is that this happens just through the intrinsic evolution of the system—without the need for any additional input from outside or from any sort of explicit source of randomness" (Wolfram 2002, p. 752). Berto, F and Tagliabue, J. 2012. **6**

Uni-temporalism posits an Object universe that does not contain a material future and so what happens in material reality is ***open*** *to possibilities* unlike a block time or space-time continuum.

That Open future allows some freedom for free will, (whatever it is found to be), to operate together with deterministic physics.

Do the highly accurate predictions of quantum physics models mean that QM is an accurate model of reality?

The 2013 conference on Quantum physics without observers is available as a series of YouTube videos. Watching the summary [**7**], the problem the participants have been wrestling with, namely lack of an ontology, a background in which QM fits with classical physics and experience is made strikingly clear. Richard Feynman [**8**] too puzzles over why QM works so well. He explains very well that the mathematics works as a tool for getting the right answer and the procedures can be simply explained, like bean counting getting the same results as abstract arithmetic rules. He makes clear that however it is done it doesn't explain why it works. Putting how the mathematics is calculated into English leads to weird descriptions.

Interaction of light with the environment of a glass block: The relation of amplitudes at top and bottom surfaces is correlated with the relation of wavelength and the number of them that will fit the depth of the glass. Which does not require communication between photons at top and bottom surfaces to explain changes in amounts of reflection. Full number of wavelengths depth maximizing reflection and a half number minimizing it.

Re. the double slit experiment: Seeing that there is a wave phenomenon does not necessarily mean the wave motion is inherent to the particle by itself. An object is not isolated from the environment that surrounds it. I am proposing that it is the influence of the environment that causes the wave motion to be adopted. The particle is needed for the wave motion to be manifest (through the interference pattern) on the detector; built up even with single particles.

However, the production of that pattern implying a wave has gone through both slits could be indicating that the waves are not an inherent property but an external phenomenon and influence. Waves travelling out from the particles location can meet the slits causing an interference pattern that then affects where the particles travels onwards.

Taking the idea that not all measurements are of intrinsic properties but some are provocation of a response (Considering the Stern Gerlach apparatus to 'measure' electron spin here), such measurements are not in the same category as measurements of pre-existing properties.

There are at least 3 different kinds of interaction with elements of physical reality that are thought of as measurements or observations:

1. With Measuring instruments: (that do not provoke responses) between what is unseen/unknown and what is seen or known. Using a device or measuring instrument that merely gives a limited fixed state output that pertains to the intrinsic state of the object at measurement. (*Though may still cause the observer effect by disturbing what is observed in the act of measurement*.) The information within the material reality is used to form a related intermediate output reality. That measurement can then be used to form knowledge about the object or be used in calculations.

2. With Reality interfaces: An interface between aspects of the underlying (source) reality and perception, that gives a limited fixed state output that pertains to the information input but is not that information. The information is changed in some way such as change of distribution by a lens and/or change of type such as digital output of a camera from photon information input. Also in this category are organisms' sensory systems that take information from the environment (could be thought of as sampling) and generate a related representation. A computer obtaining and processing input from a sensor or sensors also falls into this category. These measurements are of objective information but not the material sources of the information. An observer can comprehend the output of the receipt and processing of information. Observers and reality interfaces are going beyond mere measurement that fixes (what might be varying

values in the underlying reality) they are generating a new output reality from input information with definite differences from the source external reality.

3.With Provocation devices: The instruments that provoke responses that can then be mistaken for pre-existing intrinsic properties.

What all the 3 categories have in common is imposing orientation and reference frame. That is the first step in going from an underlying reality without orientation or reference frame to a relative (output) reality.

In no way can the 3 categories be considered equivalent and so ought to be differentiated with different names.

Both quantum physics (excluding Bohmian mechanics) and relativity do not take account of an underlying material reality, a reality consisting of Beables, that I have been calling Object reality. They are models that are formed from information. As relativity is generally understood the output from received electromagnetic radiation is taken to be the external reality. This has happened because of a category error.

Measurements of seen images are muddled with measurements of material objects. The 'information' derived universe is taken to be THE reality. The category error is also the cause of the paradoxes associated with relativity. QM produces very good predictions. Not sufficient to consider the 'picture of quantum reality' produced from descriptions of what is being done mathematically, to be complete reality. That mistake would be a bit like taking the Harry Beck's London underground map to be complete reality for accurately predicting the order of stations and line exchanges only occurring at marked junctions. Even though the spatial journey of a passenger on the material train does not correspond to the spatial changes shown on the map. (Harry Beck's Tube map: **9**)

Bohmian mechanics is an attempt to incorporate beables to make something more 'realistic', reconnecting with the material world and not relying only on structures formed from information. However, trying to combine beables and the informational model creates a chimera of dubious nature. It would be better to keep them separate and acknowledge what they are and are not. The informational 'domain ' can be populated by what is knowable (including appropriate mathematical manipulation of that) and

what is known from measurements and outputs from received information. The beables domain consists of what is real but not directly knowable and is the source of what is knowable and known. The beables are the sources of information, the material apparatus and the observers. So, the informational models; QM, relativity and perception absolutely require beables to also exist, appended to those models to make sense of them and complete them. Outline of the explanatory framework including the ontological background necessary for 'non-spooky" QM, dispelling of the paradoxes of relativity and for the non-contradiction of QM and relativity

Constituents: Space-time output of electromagnetic information receipt and processing, and underlying unseen (source) material beables (fermion particles, atoms, ions and objects consisting of configurations of some or all of those previously mentioned particles), and photon particles that transmit frequency and intensity information.

Structure and function: The underlying foundational reality changes from configuration to configuration according to the relations within each existent configuration. Only the youngest configuration exists, having been formed from what preceded. Therefore, the underlying reality has no time dimension only a history that can be imagined along a time line. It is uni-temporal, the same time everywhere. It has no single observer reference frame or orientation. That ontological description (Object reality) provides the background in which the 'informational models', Relativity and QM and human perception, are occurring.

The time dimension is emergent because of the mix of temporal origins of the electromagnetic information within the material, foundational reality. That mix of electromagnetic information permits different observers to receive different information from which their own observed reality is produced. (A model constructed using received information.) That product is a relative reality, with time dimension Reference frame co-ordinates and orientation are to do with observation relative to an observer or measuring device and so not inherent to the foundational object or particle. *Perception of an observer is formed from the information received with a particular reference frame and orientation and so that context is inherent to the product.*

The term "beable" comes from “The theory of local beables” by J. S. Bell and Alain Aspect. Beables are those things that are 'be able' rather than merely 'know able'. It includes; the sources of information, material apparatus and observers. It also includes things that are formed from configurations of beables such as the position of dials on the material apparatus. (This is discussed in the 1979 Interview with David Bohm [**10**]) So they are the actual constituents of the material world itself, rather than he constructs formed from information.

The provocation problem

MIT 8.04 Quantum Physics I, Spring 2013 First lecture on Superposition by Allan Adams [**11**]: Allan Adams is asked by a student -how do we know that the measurement apparatus is giving a correct answer? Paraphrasing Allan Adams he replies -how do you know my name is Allan? You ask "what's your name" and I say "Allan" and so that's my name. *(The precise words used can be found in the references section.)* Fair point, however use of the electron spin detector is more like asking -” How do you behave under these particular circumstances?

Allan is put into a box with a lion?” Now he cannot run away so there are two behaviours possible. Freeze inhibiting the prey response or rage intimidating the predator. On finding the result Allan can be categorized as a 'Freezer' or a 'Rager', neither of which are usual 'Allan-ness' properties. The Lion box is not simply a measurement device but a provocation device.

No disrespect is intended. He is a marvelous teacher. During his lecture simplifications are used to help understanding of the subject and it seems in some instances illustrate the current state of understanding of it within physics. *The way in which names are assigned (and then assumed to be properties) as shown in the conversation*. There is also mention that it really doesn't matter how a 'colour box' works, referring to the Stern Gerlach apparatus. (As he says in the referenced video, it could be a hyper-intelligent monkey inside, it doesn't matter). It isn't that physicists don't know the workings of the apparatus. They do and the precise way the apparatus functions is not needed to consider the outputs. Other mechanisms/means could hypothetically do the same. So, the monkey suggestion is not wrong. However, what is interesting and significant is that

by dismissing how the apparatus functions there isn't philosophical consideration of what is happening when a particle interacts with the machine. Is it sorting pre-existent differences or creating them? That gets sidestepped but will be discussed here.

It will be shown that experimental results are indicating that the provocation device is *not an observer of existing reality but measure-er of the created response it provoked*. A kind of *untrustworthy reality interface*. (Reality interface: An interface between the underlying (source) reality and perception. Imposing orientation and relative reference frame. It gives a limited fixed state output, that pertains to the information input from the environment. That information having been changed in type, or in some other way).

Evidence for provocation is given in the descriptions of experiments in Introduction to Superposition MIT 8.04 Quantum Physics I [**11**] If y-axis spin is produced then x-axis spin is potentially lost. Fitting the evidence from experiments where x-axis spin is tested first and then, one output (let's say up), is y-axis tested, and then a repeat x-axis test is conducted. Former x-axis spin 'supposed identity' has been lost by half of the particles undergoing the re-test (the spin has become 50:50 random). However, if only half have changed it would be necessary to explain why only half the particles lose their x-axis spin, and why them in particular, rather than all being affected the same way. A better proposition is: If y-axis spin is produced then x-axis spin is lost, as the particles re-tested along the x-axis behave as if they have never been previously tested in that way.

This means quantum spin isn't an identity or inherent property but a response to what a particle has 'experienced'. Therefore, the output of a provocation of a partner particle, not carried out on the other, cannot be used to know about the one not tested in that way. If the apparatus is a provocation device, like the Lion box mentioned previously, it isn't possible to know for example both x and y spin for one member of a pair of entangled particles; y from 'measurement' and x from knowing the spin of the entangled partner. Just investigating spins with that kind of apparatus: The response to a provocation not carried out does not exist. Each test with the apparatus is a different provocation producing a new response and there is no correlation between the responses for each axis.

The above premise suggests that the Bell's inequalities argument is a red herring, as Bell's argument requires the assumption that all measurements are of pre-existing intrinsic properties. Also, the explanatory framework providing the necessary ontology for dispelling the paradoxes or relativity and allowing QM and relativity to exist without contradiction is not the space-time continuum. The argument that the quantum experiment results must be pre-existent in the space-time continuum is incompatible with the necessary (as will be explained) alternative ontological framework. Description of the explanatory framework including the underlying ontology can be found at the end of this article. The quantum experiment results are products of the interactions of beables with their local environment in the underlying material reality.

It was already known when Bell developed his inequalities argument that second measurements of a particle do not show the entanglement. Measurement along a different spin axis after first measurement negates the value of the first axis spin that was measured. As at repeat testing of the first the outcome is 50.50 random and not 100% as it would be without the second different spin axis measurement in-between. There is no correlation between x-axis spin and y-axis spin.

If x and y are uncorrelated the y measurement of one of the particles shouldn't alter the x measurements of the other particles.

Analogy to demonstrate why change of provocation matters: If the Lion box is rotated so that the lion is above Alan rather than on the same horizontal plane it is a different provocation eliciting a different response, attempting to burrow or climb the bars perhaps. Better still, since here the analogy is to show a lack of correlation the second box could be another different provocation such as a Water box. Now the freeze/rage responses *must* be lost or Allan drowns. Now he can tread water or swim around the walls. Going from Lion box to another Lion box (same orientation) there is no change. However, Lion box, Water box, Lion box there is because the water response has no correlation to the lion response and the earlier lion response is lost. He can't be frozen and treading water or swimming, and he can't be raging uncontrolled while doing controlled swimming or treading water. Alluding to the idea that there can't be both x and y spin of the same particle at the same time.

Thinking about entanglement Particles A. and B. are prepared in such a way that they are anti-correlated. If that is regarded as a response to the preparation procedure it can then be thought of as persisting in the same way that a spin axis detection response is retained; so that a repeat testing produces the same outcome. If the anti-correlated pair undergo the same spin axis test they are undergoing the same provocation and the responses are anti-correlated as expected. It does not matter which same test. Anti-correlation can only be found if the test is the same. If instead A. has an x-axis spin test and B. has a y-axis spin test, the response has no relevance to the formerly anti-correlated partner. A. does not have a y-axis spin inherent property and nor has it been provoked into responding with y-axis spin, B. does not have x-axis spin as an inherent property and has not been provoked into an x-axis spin response. It has been shown that there is no correlation between the different kinds of spin axis spins, which seems to imply they are *not inherent properties held concurrently*. Thus, having two different spin axis outcomes provides no extra information about the nature of the particle itself than two same spins. As the non-matched spins are only relevant to the particle when tested in each particular way.

To be clear. If the test is a provocation causing a response: Test of the first partner of an entangled pair does not immediately cause the expected state of the distant partner because a test must be carried out on that partner too to provoke the response. So, there isn't faster than light communication happening. The "connection between" the entangled particles is a symmetry established at preparation. Formed by the opposite influence they have experienced, producing opposite behavior when the provocation of the ‘measuring’ apparatus is encountered. It is a relation between the two particles rather than something that can be possessed by just one of the partners, or both individually without regard to the other. The symmetry requires both in a relation. It can be sustained over large spatial separations and shows up when same measurements are performed on the separated partners. Giving results that meet with expectation, being anti correlated, or correlated, to how the particles were prepared.

There is no need for each particle to carry a complete set of outcomes for every test that *could be* carried out so that the partners can co-ordinate their results. That just happens because of the symmetry, whichever same test. There is no faster than light

communication. When a measurement is carried out on one the result, from the same test (measurement), that will be obtained from the other can be known. However, that result does not already exist, it hasn't come into being with the test of the first particle. Only when the test is carried out on the partner does the expected measured state happen as it is a response to the provocation. Mismatched tests do not provide more information about the particles. If a test hasn't been carried out on a particle the (would be) result of that test has no relevance. It isn't a property of the particle and it is not a behaviour expressed because of the test provocation because the test hasn't happened. “Spooky action at a distance”, as Einstein called it, isn't faster than light communication going on or hidden variables but what is (it seems to me) another category error. Responses to 'provocations' being wrongly identified and treated as inherent properties.

An argument has been set out: that measurement in these quantum experiments is not merely asking for an introduction i.e., asking for a pre-existent inherent property but is provoking a response, that is a behaviour that is not there without the provocation. Allan Adams explains to his student that measuring electron spin is like asking someone’s name. An answer is given and then that is deemed to be what it (the questioned thing) is. Here though it has been argued that the measurement apparatus is more like a Lion box. When Allan is put in the box he is not asked his name but responds to the lion. His response is not what we would normally regard as an inherent property of Allan. There is no guarantee that he will always respond the same way. This is a departure from the idea of strict determinism of pre-existent properties of the measured particles.

Summary

This paper was focused in the underlying foundational Object reality. It has shown that when that underlying reality is considered physics is not so strange as mathematics, used within classical and quantum physics models, would seem to imply. Some philosophical implications regarding; true relations and the appearance of relations, qualities and attributes rather than properties, and the law of non-contradiction have been considered. The double slit experiment problem, and the problem of provocation have been discussed. The Harry Beck’s Tube map [**9**] analogy shows how something

highly accurate in certain respects and able to produce reliable predictions can also *not* be an accurate representation of reality.

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3 Wolfram, S. 1986 Random Sequence Generation by Cellular Automata http://www.stephenwolfram.com/publications/cellular-automata-complexity/pdfs/random-sequence-generation-cellular-automata

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5 Kahnman, D., 2011. Thinking fast and slow. London. Penguin.

6 Berto, Francesco and Tagliabue, Jacopo, "Cellular Automata", *The Stanford Encyclopedia of Philosophy* (Summer 2012 Edition), Edward N. Zalta (ed.). https://plato.stanford.edu/archives/sum2012/entries/cellular-automata/ Re. (Wolfram 2002, A New Kind of Science, Champaign, IL: Wolfram Media. p.751- 752).

7 Sheldon Goldstein - Retrospective and perspective in quantum theory without observers https://www.youtube.com/watch?v=jO81pBEac8E This is a talk held at the conference "Quantum Theory without Observers III" (ZiF, Bielefeld, 22.04.-26.04.2013). There are also interviews with several of the participants available. Published on Jun 25, 2013

8 QED: Fits of Reflection and Transmission -- Quantum Behaviour -- Richard Feynman (2/4) Published on Mar 14, 2012

9 Harry Beck's Tube map 1933- Transport for London. https://tfl.gov.uk/corporate/about-tfl/culture-and-heritage/art-and-design/harry-becks-tube-map Retrieved 5th Jan 2017

10 The Sir Douglas Robb Lectures, University of Auckland, 1979 Interview with David Bohm Uploaded on Dec 24, 2011 Interview with David Bohm at the Nils Bohr Institute in Copenhagen, 1989. Introduction shown below video on You Tube page "I would say that in my scientific and philosophical work, my main concern has been with understanding the nature of reality in general and of consciousness in particular as a coherent whole, which is never static or complete but which is an unending process of movement and unfoldment...." (David Bohm: Wholeness and the Implicate Order)

11 MIT 8.04 Quantum Physics I, Spring 2013 First lecture on Superposition by Allan Adams Published on Jun 18, 2014 Retrieved from https://www.youtube.com/watch?v=lZ3bPUKo5zc

Actual words spoken on video: Introduction to Superposition MIT 8.04 Quantum Physics I [11]

Quotes. Student questions: " How do you know the boxes work?" and later: "You can't (inaudible) you know which one is White."

Allan Adams: "Its like how do you know my name is Allan? You say 'Allan' and I say 'What?'- right? But you're like 'that's not a test of whether I'm Allan'. But that's what it means to say the electron is white. Its like well 'what's the test?'- 'What's your name?' 'I'm Allan'. 'Oh great that's your name'."

[Allan is using White to represent one of the binary outputs of X axis spin detection]

Some other sources of inspiration and encouragement

YotaSpace YouTube video YESLecturesYota https://www.youtube.com/watch?v=Wj1rPy4bCpk 3 Dec 2010

Max Tegmark, Shut up and calculate, arXiv:0709.4024v1 [physics.pop-ph] 25 Sep. 2007

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E= Einstein, His Life, His thoughts and His influence on our Culture, Sterling publishing Inc., New York, London 2006: Quote from Part one p.34

Einstein's Reply to Criticisms Albert Einstein: Philosopher-Scientist, Vol. II, Paul Arthur