INITIATING A HYPOTHETICAL UPGRADE TO MAGNECULES WITH TOPOLOGICAL DEFORMATION ORDER PARAMETERS FOR SPONTANEOUS SUPERFLUIDIC GAUGE SYMMETRY BREAKING

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Abstract

In this preliminary work, we propose a hypothesis and launch a procedural upgrade to magnecules by equipping these new iso-chemical creatures with topological deformation order parameters (OP) of fractional statistics to encode the spontaneous superfluidic gauge symmetry breaking (which we expect to be restored at the iso-topic level), correlated helices with long range order, and wave-packet wave-functions for the electron toroidal polarizations. For this initial "base case", we consider a single magnecular bond between dual inter-locked protium atoms in a magnecule. The results of this equipment support our hypothesis and are significant because the OP configuration arms us with an extra degree of freedom for encoding a magnecule's states and transitions; this may enable us to further decode and comprehend the underlying physical mechanisms and features associated with these state-of-the-art magnecular bonds for direct industrial application. Hence, these outcomes should be subjected to additional stringent examination and improvement.

Keywords: Geometry and topology; Topological deformations; Spontaneous gauge symmetry breaking; Superfluids; Magnecules; Exotic fuels; Alternative energy systems; Nuclear fusion and synthesis; Hadronic mechanics.

1 Introduction

The *total* impact of fossil fuel combustion on the planet and the organisms living on it has not yet been completely determined. Therefore, this complex, difficult topic must continue to be subjected to *rigorous* scrutiny and analysis via the *scientific method*. However, it is projected that global energy demands will increase in coming years and that, in general, the exhaust of conventional fossil fuels does contain toxic pollutants because the valence bond is so strong that it achieves only *partial combustion* [1, 2, 3]. Thus, in order to attack this problem and develop a truly sustainable source of fuel that achieves *full combustion* (with decreased or zero residual toxins), R.M. Santilli began searching for a different approach to bind together stable clusters of atoms (i.e. those comprising fossil fuels) with a *new bond* that satisfies the following three target conditions [1, 2, 3, 4, 5, 6, 7]:

- ***Bond Condition 1***: the new bond must be weaker than the valence bond in order to decrease pollutants (because less energy will be consumed in its rupture while the correspondingly lower thermal energy can be released in the combustion reaction) [1, 2, 3, 4, 5, 6, 7];
- ***Bond Condition 2***: the new, weaker bond should authorize the formulation of clusters that are stable at industrially used storage values of temperature and pressure (i.e. similar to methane, etc.) [1, 2, 3, 4, 5, 6, 7]; and
- ***Bond Condition 3***: the new, weaker, stable bond should decompose at a lower combustion temperature in order to optimize the energy released by the combustion [1, 2, 3, 4, 5, 6, 7].

In particular, a fuel that complies with the above conditions *will not* release uncombusted toxic components in the exhaust such as, for example, carbon monoxide and hydrocarbons [1, 2, 3], where the full effects of such emissions has not been fully determined and is still a subject of major scientific debate. Therefore, in order to design, implement, and harness a fuel with these advanced features, Santilli had to identify a state-of-the-art chemical species with a new atomic force field [1, 2, 3] that could be used for synthesis and combustion applications.

Remarkably, after many years of commitment and hard work, Santilli and his team made the groundbreaking discovery of *magnecules* [1, 2, 3, 4, 5, 6, 7, 8]—a cutting-edge species of chemical creatures that is characterized by a new, weaker, stable magnetic-based bond—namely a *magnecular bond*—that satisfies Bond Conditions 1–3 [1, 2, 3, 4, 5, 6, 7]. More specifically, a magnecule [1, 2, 3, 4, 5, 6, 7, 8] is defined as a cluster of individual atoms and/or molecules bonded together by the opposing magnetic polarities of:

1. *electron orbital toroidal polarizations*,
2. *electron spin polarizations*, and

3. *nuclear spin polarizations.*

Hence, such magnecular bonds of magnecules are much weaker than the conventional covalent bonds of molecules [1, 2, 3]: the magnecular bonds combust and disappear at a well-established Curie temperature, while the covalent bonds remain intact [1, 2, 3]. Consequently, the experimental-validation of magnecules presented extreme challenges largely because the analytic detection instruments employed at various laboratories would often over-power and actually destroy the very magnecular bonds to be detected [1, 2, 3]. But fortunately after extensive hard work and calibration, the magnecules were experimentally confirmed: first at McClellan Air Force Base on June 19, 1998 [1] and subsequently at additional laboratories [1, 2, 3, 4, 5, 6, 7, 8]. Thereafter, the further emergence and experimental-confirmation of magnecules [1, 2, 3, 4, 5, 6, 7, 8] have recently paved the way for additional innovation and development into the realm of clean, cost-efficient, sustainable, industrial-strength power sources such as *MagneGas* fuel [9, 10, 11, 12] and *Intermediate Controlled Nuclear Synthesis* [13, 14, 15, 16], which can be produced from *recycled* liquid waste and *do not* emit harmful toxins and/or radiation–a decisive outcome that favors the general protection of the planet.

Hence, in this introductory paper, we deploy the topological deformation OPs from the Inopin-Schmidt baryon topology [17] to ignite a hypothetical upgrade to magnecules [1, 2, 3, 4, 5, 6, 7, 8] because these creatures have proven their relevance and importance to alternative energy developments [9, 10, 11, 13, 14, 15, 16] with application in the industrial sector. More specifically, we propose and examine the following conjecture:

> ***Hypothesis:*** *the model of magnecules (including magnecular combustion and synthesis) [1, 2, 3, 4, 5, 6, 7, 8] may be upgraded with topological deformation OPs of fractional statistics [17] to encode spontaneous superfluidic gauge symmetry breaking (which we expect to be restored at the iso-topic level [18] because the exact reconstruction allows the precise identification of the iso-unit [19, 20, 21, 22, 23] that carries all symmetry-breaking terms), correlated polarization helices with long range order, and wave-packet wave-functions.*

We note that this hypothesis is similar to that of the iso-electronium OP upgrade hypothesis [24]. Therefore, in Section 2, we launch a procedure and thought experiment to systematically probe, quantify, illustrate, and formalize some fundamental features of our magnecule OP upgrade conjecture for the two-body base case. Thereafter, we conclude with Section 3 by recapitulating the obtained results, considering some possible implications, and suggesting future modes of inquiry and research.

2 Magnecule upgrade procedure and thought experiment

Here, we propose the following step-by-step construction with intent to examine, quantify, illustrate, formalize, and clarify the key aspects of the said hypothesis:

1. ***Initializing the base case.*** First, consider the magnecular base case and suppose there exists a magnecule in the 3D/triplex space Y [25, 26] at a temperature of

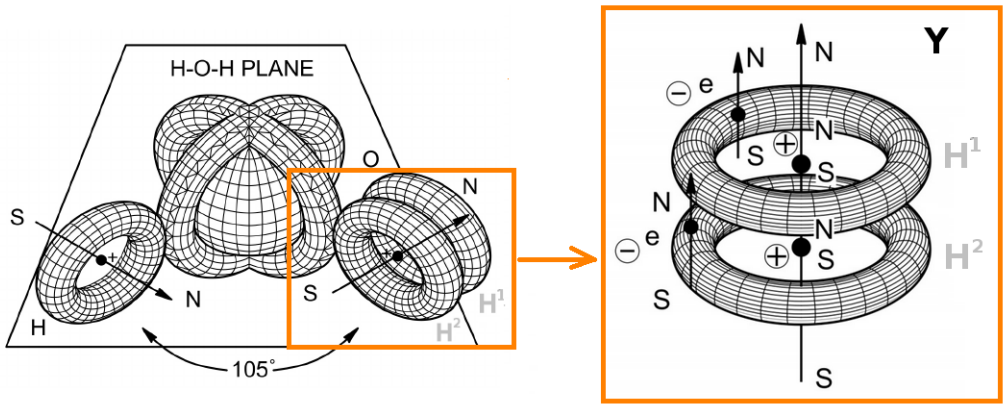

Fig. 1: The dual, individual, identical protium atoms H^1 and H^2 in a magnecule [1, 2, 3, 4, 5, 6, 7] are inter-locked with the magnecular bond $H^1 \times H^2$ from Ref. [8]. This illustrates the dominance of the attraction due to the opposing magnetic polarities of the electron orbital toroidal polarizations, the electron spin polarizations, and the nuclear spin polarizations over the repulsions due to opposing charges, such that H^1 and H^2 are assumed to have a null total charge [1, 2, 3, 4, 5, 6, 7, 8].

absolute zero degrees, where the magnecule possesses a magnecular bond $H^1 \times H^2$ from Ref. [8] between dual identical, individual protium atoms, such that H^1 and H^2 are the first and second atoms, respectively—see Figure 1 (which directly corresponds to Figure 1 of Ref. [8] and Figure 2 of Ref. [13]). Here, we are solely focused on H^1 and H^2, which are inter-locked together with a new, weak, stable magnecular bond $H^1 \times H^2$ that satisfies Bond Constraints 1–3 [1, 2, 3], such that the bond is characterized by the opposing magnetic polarities of the electron orbital toroidal polarizations, electron spin polarizations, and the nuclear spin polarizations [1, 2, 3, 4, 5, 6, 7, 8].

2. ***Calibrating the topology and geometry.*** Second, we orient the axes and "slice" the 3D space Y to identify two distinct 2D spaces $X_1 \subset Y$ and $X_2 \subset Y$ for the H^1 ("top") and H^2 ("bottom") atomic bodies of the magnecule bond $H_1 \times H_2$, respectively—see Figure 2. Similarly to [17], complex numbers are used to encode the 2D coordinate locations on X_1 and X_2. For the H^1 atom, let $p_1 \in X_1$ be the nucleic center-of-mass location (H^1's origin reference frame), let $E_1 \subset X_1$ be the 1-sphere electron orbit state that is iso-metrically embedded in X_1, and let $e_1 \in E_1$ be the electron location in the orbit E_1 of the top toroidal polarization: with respect to H^1's center-of-mass origin p_1, $|e_1| \in [0, \infty)$ is H^1's electron amplitude-radius ("modulus") and $\langle e_1 \rangle \in [0, 2\pi]$ is H^1's electron azimuthal-phase ("angle" or "direction"). For the H^2 atom, let $p_2 \in X_2$ be the nucleic center-of-mass location (H^2's origin reference frame), let $E_2 \subset X_2$ be the 1-sphere electron orbit state that

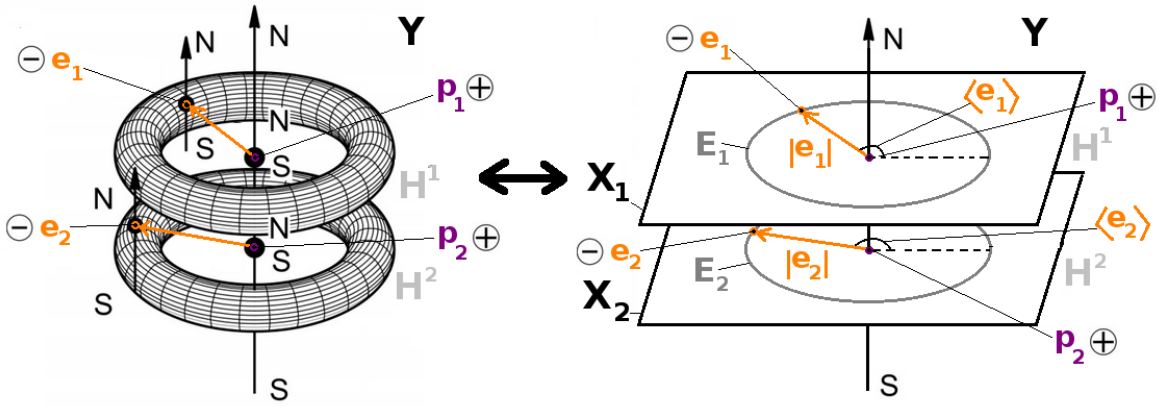

Fig. 2: The two distinct 2D spaces $X_1 \subset Y$ and $X_2 \subset Y$ contain the encoded complex locations for the dual nucleic center-of-masses ($p_1 \in X_1$ and $p_2 \in X_2$) and dual electrons ($e_1 \in E_1 \subset X_1$ and $e_2 \in E_2 \subset X_2$) for the $H_1 \times H_2$ magnecular bond from Ref. [8] in the 3D space Y.

is iso-metrically embedded in X_2, and let $e_2 \in E_2$ be the electron location in the orbit E_2 of the bottom toroidal polarization: with respect to H^2's center-of-mass origin p_2, $|e_2| \in [0, \infty)$ is H^2's electron amplitude-radius and $\langle e_2 \rangle \in [0, 2\pi]$ is H^2's electron azimuthal-phase. Next, we will show that E_1 and E_2 are essential building blocks for the toroidal polarizations and the fluidic structure of $H_1 \times H_2$.

3. ***Defining and configuring the OPs, and constructing the wave-packet wave-functions for the electrons.*** Third, to further quantify and characterize the toroidal polarizations and the fluidic structure associated with $H_1 \times H_2$, we assign topological deformation OPs of fractional statistics [17] to key locations of H^1 and H^2, where the OPs encode spontaneous superfluidic gauge symmetry breaking (which we expect to be restored at the iso-topic level [18]) for the inter-connected, "Cooper paired" magnetic alignments and toroidal polarizations of $H_1 \times H_2$ and their preliminary wave-packet wave-functions—see Figure 3. For this, we employ the three distinct *complex-valued* OPs from Ref. [17]:

   (a) the **orbital angular momentum OP** ψ_L, where $|\psi_L| \in [0, \infty)$ is the amplitude-radius and $\langle \psi_L \rangle \in [0, 2\pi]$ is the azimuthal-phase;

   (b) the **spin angular momentum OP** ψ_S, where $|\psi_S| \in [0, \infty)$ is the amplitude-radius and $\langle \psi_S \rangle \in [0, 2\pi]$ is the azimuthal-phase; and

   (c) the **total angular momentum OP** ψ_J for the spin-orbit coupling $\psi_J = \psi_L + \psi_S$, where $|\psi_J| \in [0, \infty)$ is the amplitude-radius and $\langle \psi_J \rangle \in [0, 2\pi]$ is the azimuthal-phase,

such that ψ_J is identical to the "B_{SO}-vector" in Ref. [27]. In particular, we wish to properly assign ψ_L, ψ_S, and ψ_J to key locations of H^1 and H^2 to identify and define the inter-locking alignments of the e_1, e_2, p_1, and p_2 for the magnecule model that permit the physical existence of $H_1 \times H_2$ [1, 2, 3, 4, 5, 6, 7, 8]. Here, the OPs ψ_S and ψ_L are *orthogonal* and "Cooper paired" for the well known electric-magnetic symmetry so the phase between them is always *constant* and serves as a wave-function constraint: ψ_S and ψ_L exhibit *long range order* and are orthogonally-correlated with *Leggett's superfluid B phase* [17, 28] so they can simply be added together to yield ψ_J. Moreover, we will show that ψ_L, ψ_S, and ψ_J can be assigned to $e_1 \in E_1$ and $e_2 \in E_2$ to thereby enable us to *replace the $H_1 \times H_2$'s toroidal polarization with a new toroidal polarization helix.*

- H^1's proton center-of-mass location p_1 is assigned two distinct OPs: $\psi_L(p_1)$ for *H^1's proton orbital angular momentum OP* and $\psi_S(p_1)$ for *H^1's proton spin angular momentum OP*, such that H^1's electron position $e_1 = p_1 + \psi_S(p_1)$ is a function of both p_1 and $\psi_S(p_1)$, where Leggett's superfluid B phase [17, 28] between $\psi_L(p_1)$ and $\psi_S(p_1)$ gives the orthogonality property for the electric-magnetic symmetry and the spin-orbit coupling [17, 27]. Also, H^1's electron location e_1 is assigned two distinct OPs: $\psi_L(e_1)$ for *H^1's electron orbital angular momentum OP* and $\psi_S(e_1)$ for *H^1's electron spin angular momentum OP*, such that $\psi_J(e_1) = \psi_S(e_1) + \psi_L(e_1)$ is *H^1's electron total angular momentum OP* for the spin-orbit coupling [17, 27] of H^1's electron toroidal polarization, where the orthogonal angle between $\psi_S(e_1)$ and $\psi_L(e_1)$ is Leggett's superfluid B phase [17, 28]. As p_1 spins $\psi_S(p_1)$ rotates ($\Delta\langle\psi_S(p_1)\rangle$) and aligns to the precise direction of e_1 (the azimuthal-phase $\langle e_1\rangle = \langle\psi_S(p_1)\rangle$), where e_1 is a *massless* point-particle that synchronously circulates at the speed-of-light along its orbit E_1 while $\psi_J(e_1)$ also simultaneously rotates ($\Delta\langle\psi_J(e_1)\rangle$) and oscillates ($\Delta|\psi_J(e_1)|$) to spontaneously generate the *effective mass* fractional statistics [17] of H^1's electron toroidal polarization helix that acquires a *geometric phase*. All of this operates in accordance to the magnecule model and characterizes the underlying superfluidic properties and mechanisms of the $H_1 \times H_2$ bond [1, 2, 3, 4, 5, 6, 7, 8]. Thus, similarly to the iso-electronium case of eq. (4) in Ref. [24], we hypothesize that *H^1's full electron wave-packet wave-function* may be defined (in complex form) as

$$H^1: \ \Psi_{E_1} \equiv \Psi_{total}(e_1) \equiv \Psi(e_1) \equiv \psi_J(e_1) \times e_1 \tag{1}$$

  for E_1's toroidal polarization helix. Here, we emphasize that the proposed wave-function of eq. (1) comprises the underlying ψ_L and ψ_S OPs, which are orthogonally-constrained by Leggett's superfluid B phase [17, 28] and spin-orbit coupling [17, 27].

- H^2's proton center-of-mass location p_2 is assigned two distinct OPs: $\psi_L(p_2)$ for *H^2's proton orbital angular momentum OP* and $\psi_S(p_2)$ for *H^2's proton*

spin angular momentum OP, such that H^2's electron position $e_2 = p_2 + \psi_S(p_2)$ is a function of both p_2 and $\psi_S(p_2)$, where Leggett's superfluid B phase [17, 28] between $\psi_L(p_2)$ and $\psi_S(p_2)$ gives the orthogonality property for the electric-magnetic symmetry and the spin-orbit coupling [17, 27]. Also, H^2's electron location e_2 is assigned two distinct OPs: $\psi_L(e_2)$ for *H^2's electron orbital angular momentum OP* and $\psi_S(e_2)$ for *H^2's electron spin angular momentum OP*, such that $\psi_J(e_2) = \psi_S(e_2) + \psi_L(e_2)$ is *H^2's electron total angular momentum OP* for the spin-orbit coupling [17, 27] of H^2's electron toroidal polarization, where the orthogonal angle between $\psi_S(e_2)$ and $\psi_L(e_2)$ is Leggett's superfluid B phase [17, 28]. As p_2 spins $\psi_S(p_2)$ rotates $(\Delta\langle\psi_S(p_2)\rangle)$ and aligns to the precise direction of e_2 (the azimuthal-phase $\langle e_2\rangle = \langle\psi_S(p_2)\rangle$), where e_2 is a massless point-particle that synchronously circulates at the speed-of-light along its orbit E_2 while $\psi_J(e_2)$ also simultaneously rotates $(\Delta\langle\psi_J(e_2)\rangle)$ and oscillates $(\Delta|\psi_J(e_2)|)$ to spontaneously generate the effective mass fractional statistics [17] of H^2's electron toroidal polarization helix that acquires a geometric phase. All of this operates in accordance to the magnecule model and characterizes the underlying superfluidic properties and mechanisms of the $H_1 \times H_2$ bond [1, 2, 3, 4, 5, 6, 7, 8]. Thus, similarly to H^1's eq. (1), we hypothesize that *H^2's full electron wave-packet wave-function* may be defined as

$$H^2 : \ \Psi_{E_2} \equiv \Psi_{total}(e_2) \equiv \Psi(e_2) \equiv \psi_J(e_2) \times e_2 \tag{2}$$

for E_2's toroidal polarization helix. We suspect that a more advanced electromagnetic manipulation of eqs. (1–2) in the laboratory could permit one to synthesize more complex "hybrid beasts" or "anomalous species" [8] with *both* magnecular and molecular bonds for improved energy utilization and more advanced structural applications. Here, we suggest that it may also be significant to evaluate the feasibility of replacing the 2D/complex-valued representation of eqs. (1–2) with a 3D/triplex-valued representation (i.e. modified 3D spherical coordinate-vectors with addition and multiplication) [25, 26], but further work must be done on this to rigorously define and apply such a 3D coordinate-vector algebra that complies with the maximum load of numeric field axioms.

4. ***Encoding the proton's hadronic horizons in 3D space.*** In the iso-electronium OP upgrade [24], a proton's state is encoded in the 3D space Y by mapping a generalized *red-green-blue triangular lattice* (RGB-TL) of three distinct locations [17] to its hadronic horizon. Therefore, we follow a similar approach to [17, 24] and apply the relevant features to $H_1 \times H_2$ [8]. Thus, for H^1's proton, let $P_1 \subset X_1$ be the 1-sphere Inopin Holographic Ring (IHR) [17] for the hadronic horizon that is centered on $p_1 \in X_1$ with the proton radius R_{proton}, where P_1 is iso-metrically embedded in X_1, such that $r_1, g_1, b_1 \in P_1$ are the three distinct locations for H^1's proton RGB-TL. Similarly, for H^2's proton, let $P_2 \subset X_1$ be the 1-sphere IHR [17] for the hadronic horizon that is centered on $p_2 \in X_2$ with the proton radius R_{proton},

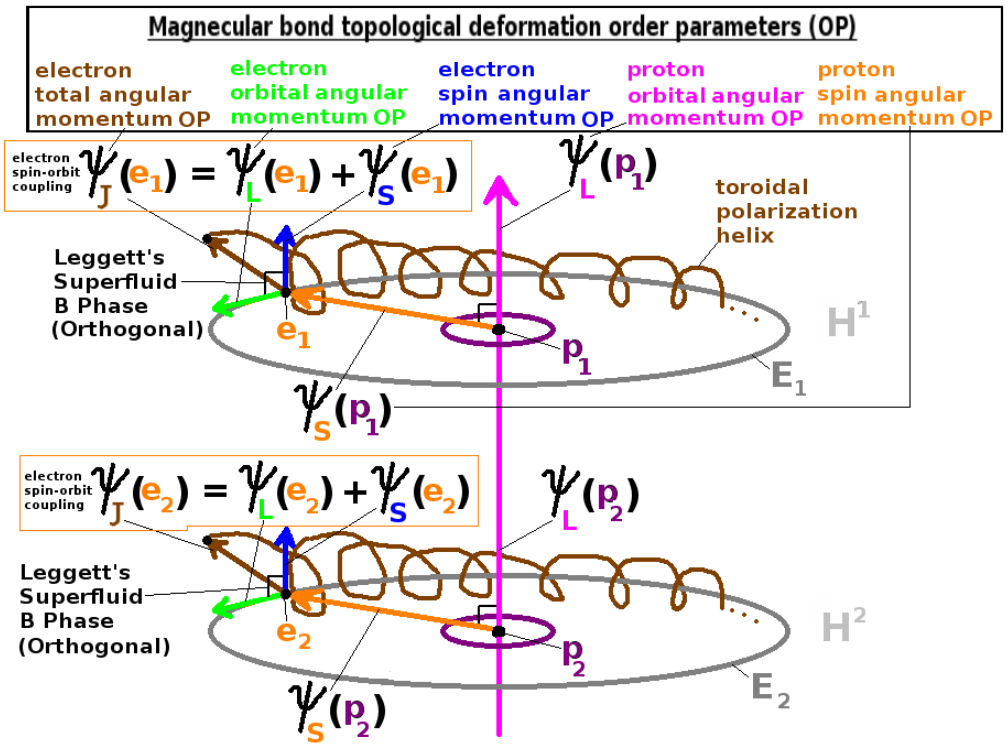

Fig. 3: The individual, identical, dual protium atoms H^1 and H^2 of the $H^1 \times H^2$ magnecular bond [8] are equipped with the topological deformation OPs [17] that implement the spin-orbit coupling [17, 27] for the inter-locking of the electrons and nuclei, which are orthogonally correlated with Leggett's superfluid B phases [17, 28] and spin-orbit coupling [17, 27] for Santilli's magnecule model [1, 2, 3, 4, 5, 6, 7, 8].

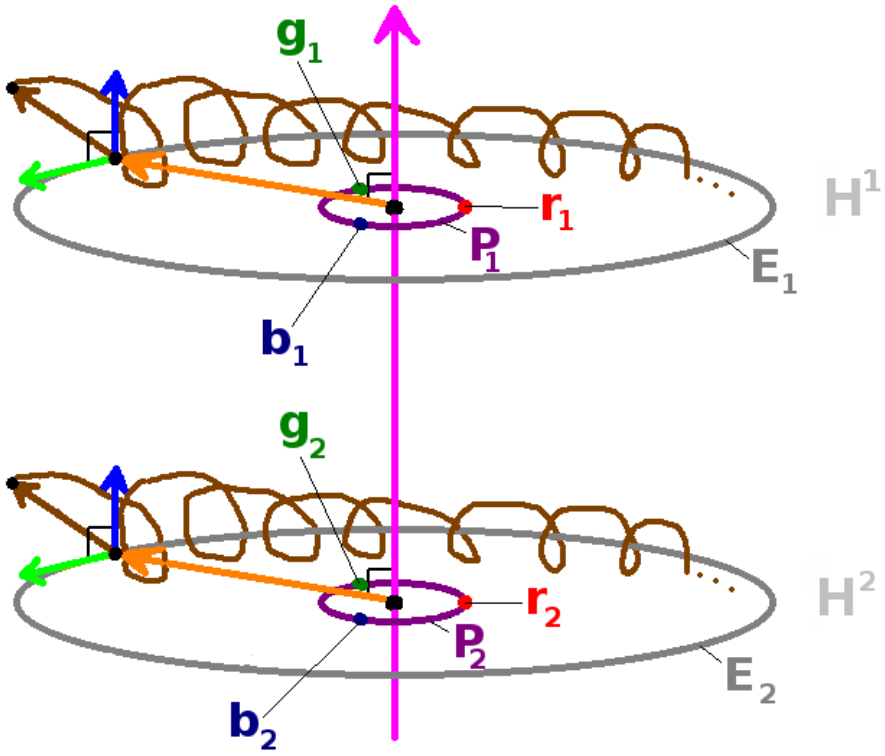

Fig. 4: To account for physical properties of the 3D space Y in a method similar to [17, 24], H^1's proton RGB-TL hadronic horizon locations are $r_1, g_1, b_1 \in P_1$ along the 1-sphere IHR $P_1 \subset X_1$, while H^2's proton RGB-TL hadronic horizon locations are $r_2, g_2, b_2 \in P_2$ along the 1-sphere IHR $P_2 \subset X_2$.

where P_2 is iso-metrically embedded in X_2, such that $r_2, g_2, b_2 \in P_2$ are the three distinct locations for H^2's proton RGB-TL—see Figure 4.

5. ***Constructing the wave-packet wave-functions for the protons.*** Finally, we use the established OP configurations to introduce and define preliminary wave-packet wave-functions for H^1 and H^2 (in an approach similar to that of the iso-electronium [17, 24]). Hence, the RGB-TL locations of P_1 and P_2 are equipped with ψ_J and additionally

   (a) the **iso-spin OP** ψ_I, where $|\psi_I| \in [0, \infty)$ is the amplitude-radius and $\langle \psi_I \rangle \in [0, 2\pi]$ is the azimuthal-phase; and

   (b) the **color charge OP** ψ_C, where $|\psi_C| \in [0, \infty)$ is the amplitude-radius and $\langle \psi_C \rangle \in [0, 2\pi]$ is the azimuthal-phase

from eq. (26) of Ref. [17], which are the three "Cooper paired" *strongly conserved* OPs for baryons [17, 24]. So for $H^1 \times H^2$, in accordance to eqs. (32–36) of Ref. [17], we hypothesize that the *full proton wave-packet wave-function states* of H^1 and H^2 may be defined as

$$\begin{array}{rcccl} H^1: & \Psi_{P_1} & \equiv & \Psi_{total}(r_1, g_1, b_1) & \equiv & \Psi(r_1) \times \Psi(g_1) \times \Psi(b_1) \\ H^2: & \Psi_{P_2} & \equiv & \Psi_{total}(r_2, g_2, b_2) & \equiv & \Psi(r_2) \times \Psi(g_2) \times \Psi(b_2), \end{array} \tag{3}$$

respectively, where the comprising *RGB-TL wave-function states for* P_1 are

$$\begin{array}{rcl} & \Psi(r_1) & \equiv \quad \psi_J(r_1) \times \psi_I(r_1) \times \psi_C(r_1) \times r_1 \\ H^1: & \Psi(g_1) & \equiv \quad \psi_J(g_1) \times \psi_I(g_1) \times \psi_C(g_1) \times g_1 \\ & \Psi(b_1) & \equiv \quad \psi_J(b_1) \times \psi_I(b_1) \times \psi_C(b_1) \times b_1 \end{array} \tag{4}$$

and the comprising *RGB-TL wave-function states for* P_2 are

$$\begin{array}{rcl} & \Psi(r_2) & \equiv \quad \psi_J(r_2) \times \psi_I(r_2) \times \psi_C(r_2) \times r_2 \\ H^2: & \Psi(g_2) & \equiv \quad \psi_J(g_2) \times \psi_I(g_2) \times \psi_C(g_2) \times g_2 \\ & \Psi(b_2) & \equiv \quad \psi_J(b_2) \times \psi_I(b_2) \times \psi_C(b_2) \times b_2. \end{array} \tag{5}$$

Therefore, eqs. (3–5) identify the wave-packet wave-functions for encoding the hadronic horizons of $P_1 \subset X_1 \subset Y$ and $P_2 \subset X_2 \subset Y$ for $H_1 \times H_2$ [1, 2, 3, 4, 5, 6, 7, 8], where P_1 and P_2 are surrounded by toroidal polarizations [24]. Therefore, the hadronic horizons P_1 and P_2 circulate at the speed-of-light and simultaneously acquire geometric phases while the ψ_J, ψ_C, and ψ_I OPs spontaneously generate effective mass for the simultaneous breaking of multiple gauge symmetries [17, 24]; the OPs rotate freely in 2D and/or 3D space with long range order to form superfluidic toroidal polarization helices of fractional statistics along P_1 and P_2, such that Leggett's superfluid B phase [17, 28] (the azimuthal-phase specific to the RGB-TL locations) between them remains constant and serves as an additional wavepacket wavefunction constraint [17, 24]. Moreover, for eqs. (3–5), the *azimuthal-phase variations* correspond to *pseudo-scalar phase-excitations*, while the *amplitude-radius variations* in the underlying order parameters correspond to *scalar amplitude-excitations* [17], which is reminiscent of the preceding iso-electronium case [24]. Furthermore, the orbiton, holon, and spinon excitations of eqs. (3–5) are spontaneously generated and confined to P_1 and P_2, which both simultaneously acquire geometric phases, where such disturbances are propagated across the *micro space branes* (the superluminal and non-local zones that are "inside" of P_1 and P_2, and correspond to Santilli's interior dynamical systems) and the *macro space brane* (the non-superluminal and local zone that is "outside" of both P_1 and P_2, and corresponds to Santilli's exterior dynamical system) in topological accordance to [17, 25, 26, 29]—see Figure 5.

At this point, we've completed the initial step for our topological deformation OP [17] upgrade of the magnecule model [1, 2, 3, 4, 5, 6, 7] for the dual protium atoms H^1

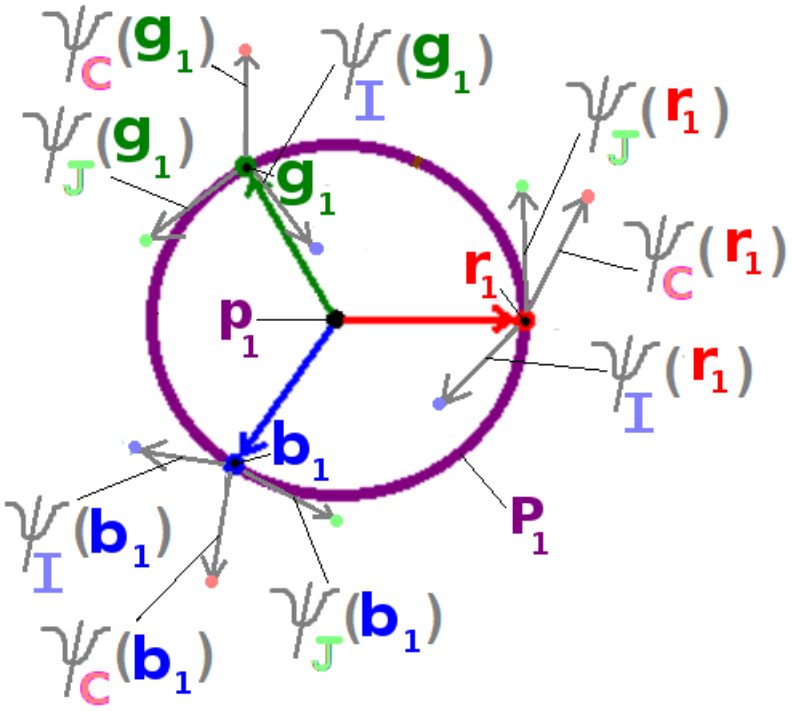

Fig. 5: For the $H_1 \times H_2$ magnecular bond in the 3D space Y, H^1's RGB-TL locations $r_1, b_1, g_1 \in P_1 \subset X_1 \subset Y$ and H^2's RGB-TL locations $r_2, b_2, g_2 \in P_2 \subset X_2 \subset Y$ are assigned the three "Cooper paired" strongly conserved OPs ψ_J, ψ_C, and ψ_I from Refs. [17, 24]. Note: for the sake of illustration simplicity, only H^1 is shown.

and H^2 that are inter-locked with the $H^1 \times H^2$ magnecular bond [8], which is consistent with our hypothesis and the limited scope of this paper. Consequently, we will use these preliminary outcomes as a platform to launch subsequent papers that aim to further revise, scrutinize, develop, and improve this emerging model.

3 Conclusion and discussion

It is crucial to focus on the development of magnecules [1, 2, 3, 4, 5, 6, 7] so we can gain additional insight into the underlying physical mechanisms of the new magnecular bond [8] and advance the frontiers of, for example, clean, cost-efficient, sustainable, industrial-strength energy systems such as MagneGas fuel [9, 10, 11, 12] and Intermediate Controlled Nuclear Synthesis [13, 14, 15, 16]. Moreover, in our opinion, the fact that such magnecular bonds do exist [13, 14, 15, 16] in conjunction with the conventional bonds of chemistry will almost certainly have a *profound impact* on all of science, engineering, technology, and medicine, starting with the particular facets of physics, chemistry, biology, and computation. Thus, it should be highly beneficial to rigorously and creatively engage the scientific method to systematically examine and improve any and all aspects of Santilli's revolutionary magnecular [1, 2, 3, 4, 5, 6, 7] constructs to promote inquiry, explore this frontier, and maximize application.

With that said, the primary objective of this paper was to move along this research trajectory and propose a hypothetical upgrade to the magnecule model [1, 2, 3, 4, 5, 6, 7] by extracting and applying the pertinent aspects and features from the Inopin-Schmidt baryon topology [17]. More precisely, we deployed the relevant topological deformation OPs [17] to initiate an encoding framework for the superfluidic gauge symmetry breaking (and iso-topic restoration), superfluid B phase [17, 28] orthogonally-correlated toroidal polarization helices, and wave-packet wave-functions associated with a magnecular bond [8]. For this enhancement, we considered the base case of dual, individual, identical protium atoms that were inter-locked with such a magnetic-based bond, where we assigned spin-orbit coupled OPs [17, 27] to key point-particle locations within the dual atoms in the step-by-step thought experiment of Section 2. The preparatory results obtained via this procedure support our hypothesis and may provide further understanding regarding the underlying physical mechanisms that characterize magnecules [1, 2, 3, 4, 5, 6, 7, 8].

If our hypothesis is correct, then one of the most significant outcomes of this work may be the OP configuration that inter-connects the opposing magnetic polarities of the electron orbital toroidal polarizations, electron spin polarizations, and nuclear spin polarizations of the dual atoms in the magnecular bond [8]. Why? Because this equipment may yield a cutting-edge toolbox that extends the prediction horizon and authorizes the manipulation of magnecular-based structures [1, 2, 3, 4, 5, 6, 7, 8] with a *greater* degree of precision, thereby solidifying the foundation for more advanced and potentially useful constructions. This claim is furthermore supported by the replacement of the electron toroidal polarizations with the electron toroidal polarization *helices*, where the states and transitions associated with the electron orbits are expressed with OPs of fractional statistics [17] that vary as this system iteratively acquires geometric phases.

Thus, in upcoming future research, we suggest that the next step should be to further examine and assess the applicability and implications of this emerging hypothetical model—conceptually, theoretically, and experimentally. For instance, mathematical and physical induction should be applied to generalize this base case to encompass more complex hybrid structures with both magnecular and molecular bonds. Hence, this hypothesis must be subjected to additional rigorous scrutiny via the scientific method and experimental validation, which is surely necessary in order to compel the general advancement of these models and systems.

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