

A grounded/datadriven approach to Astrophysics and Quantum Mechanics Interpretation – A report to SEM 2024

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What is a grounded research in Astrophysics / QM Interpretation ?

- I understood that many of the audiences here are quite familiar of Weber electromagnetic theory, and what I would like to present today may cause or not cause a feeling of discomfort, that is okay. Because my starting point is rather different, that is a grounded-approach to Astrophysics and Quantum Mechanics Interpretation. We will recall for instance, a bit from low temperature physics and its connection to cosmology, and also solid state physics etc.
- With grounded-approach or data-driven research here is I tried to follow through what the data led us, for instance I would prefer quantization in planetary orbits in solar system, because such an approach allows us to do prediction of new orbits based on progression of integers, just as Titius-Bode formulae in the past. Later on that would led us to QM and low temperature physics connection.

Part A: Prologue to a story of grounded research in Astrophysics / QM Interpretation

- Allow me to start with gratitude and appreciation to invitation since 2019 by Prof Jan Rak, but at the time I felt not much that I can share with the audiences here.
- Then, for prologue to our little story, allow me to begin with remark on Prof A.K.T Assiss's presentation last October at first part of this SEM, where he mentioned that he once developed a new solar system model based on Weber electromagnetic theory.
- Neil and Prof Florentin are our close colleagues, but I'm not sure if Neil would agree with all things we're going to discuss here.
- ps: the three of us already published several articles together, including 2 articles at Prespacetime J. (2019, 2020), and several articles at IJNS

What is a grounded research in Astrophysics / QM Interpretation ?

There are some really interesting remarks that we can read from Hannes Alfvén's lecture in 1970. Among other things, he wrote that one should not infer the history of solar system just from the nature of planetary orbits (or deviations from that), and also not from other present astronomy data, because those present data may be of little value to reveal the past history of solar system. He also suggests a new term: "hetegony" which can be interpreted as description on how things are arranged or paired together.

In this context, in this paper we will discuss how we can rethink a data-driven approach in astrophysics. Brunton, Proctor & Kutz wrote to summarize how such an approach is of significance in science and engineering (PNAS).*

What is a grounded research in Astrophysics / QM Interpretation ?

Nonetheless, in the light of three problems which appear persistently even since Newton era, namely: Bentley's problem, Zwicky's dark matter, and accelerated expansion or more known as dark energy problem, and also from the data and improving Titius-Bode law, therefore we suggest to come up with a new hypothesis: "*quantum matter inside a Newtonian universe.*" In other words, we will discuss how quantum astrophysics emerge into the scene, more or less based on reading the data themselves, and also quantum geophysics too.

As we read from science books for elementary to graduate schools, Tycho Brahe at the time was a master of observation of celestial bodies by his new telescope. But later on he recruited a young assistant, Johannes Kepler. In 1609, Johannes Kepler revealed that the planet Mars moves in a circular circle. What sort of power makes a planet move in a circular way? What is the power law — the law that indicates how the power $F(r)$ relies upon the distance r between the Sun and the planet? This Kepler issue tested the regular rationalists of the seventeenth century.*

What is a grounded research in Astrophysics / QM Interpretation ?

Therefore, let us begin from a fresh starting point: Since 1700s, there were two scientists who suggested pattern of orbit distances, known as Titius-Bode's law. Albeit their method is different from Kepler's observation, but nonetheless these are also data which have value in themselves to be studied.

And many papers have been written on the physical meaning of Titius-Bode law, especially with respect to *Old Quantum Theory* of Bohr and Sommerfeld (before 1920s) and also to *New Wave Mechanics* of Schroedinger etc.

In other words, does it mean we shall begin to consider a *quantum version of astrophysics*? Or to speak more precisely: can we speak of a *quantum explanation* of planetary orbit distances?*

Definition of quantum astrophysics

Definition of quantum astrophysics: “The uses of quantum mechanical principles to describe astrophysical phenomena and processes.”

Question: Which quantum mechanical principles are applicable to large-scale astrophysical bodies?

Remark: With the above question, we intend to point out that there are several different approaches of QM, and even the meaning of quantum wave function in wave mechanics, remains a debatable issue among experts. And which interpretation of quantum wave function corresponds better to quantum phenomena, such as planetary orbit distances?

In this regards, allow us to tell a story of us. We will review the work and results during the past 17 years or so. The basic assumption here is that the Solar System’s planetary orbits are quantized. See also for instance, Tifft’s redshifts of large scale astrophysics quantization.*

Definition of quantum astrophysics

Actually this term is not really new, as McCrea has discussed quantum mechanical laws in astrophysics, back then around 1950s. See also for instance : Elena Muchikova, *Astrophysical Applications of Quantum Mechanics*, PhD dissertation to Caltech, 29th May 2018.

Our answer can be summarized as follows:

Navier-Stokes equations --> superfluid quantized vortices --> Bohr's quantization rule (1)

Our predictive model based on that scheme has yielded some interesting results which may be comparable with the observed orbits of planetoids beyond Pluto, including what then was dubbed as Sedna. And it seems that the proposed model is slightly better compared to Nottale-Schumacher's gravitational Schrödinger model and also Titius-Bode's empirical law.*

More on quantum astrophysics

Provided the above interpretation of planetary orbit distances can be accepted (based on assumption of Bohr-type quantization to improve Titius-Bode law), then we can deduce a number of interesting implications, which are discussed more fully in our forthcoming paper.

Although it is known that “One of the cornerstones of inflationary cosmology is that primordial density fluctuations have a quantum mechanical origin,” as Kanno & Soda wrote, however, most physicists consider that such *quantum mechanical effects disappear* in CMB data due to decoherence. At this point, we can ask: Is that really so?.*

More on quantum astrophysics

We have discussed before that cosmological entanglement has been observed, which in turn it can be attributed to superfluid turbulent interstellar medium.

Now, there is a recent striking report by Charlotte Olsen *et al.*, suggesting that 36 galaxies seem to have “coordinated” in a such way that they appear to give synchronized stars formation. From Olsen et al.’s paper, they don’t give a possible theoretical explanation.

However, by hypothesizing such a spin supercurrent mechanism also can happen at galactic scale because of superfluid interstellar medium, we can come up with a ‘possible’ explanation, that such a coherent star formation is due to some kind of “*galactic synchronicity*.”

We are aware that such a term is not available yet in present cosmological vocabularies, but we can foresee that time for that term will come too, as there is also a book, suggesting that synchronicity is likely to appear universally in Cosmos.*

Quantum astrophysics: plausible explanation for Pluto-Charon pairing

In the meantime, while it can be shown that such a galactic synchronicity may be associated to *cosmological-scale entanglement*, it remains to be seen if we need to modify macrodescription of electromagnetic phenomena towards cosmic electromagnetic theories. See for instance: Hoyle & Narlikar, and also Hannes Alfvén.*

Source: V. Christianto, BPAS Physics 2021, <https://bpasjournals.com/admin/upload/dynamic2/6.BPAS-D-142-2021P98-105.pdf>

Quantum astrophysics: plausible explanation for Pluto-Charon pairing

According to Stern et al.: “ ... Most famously Kuiper (1951) suggesting Pluto was the harbinger of a huge "trans-Neptunian" population of comets and larger bodies. ... This drove to a number of telescopic searches for that cohort populace, which was finally detected by the discovery of the primary Kuiper Belt (KB) Object (Jewitt & Luu1993).

There are extensive studies on Pluto-Charon pair system, see for instance [19-22]. For example, it is known that there are a number of satellites orbiting such a binary system, as Showalter and Hamilton wrote: “Four small moons—Styx, Nix, Kerberos and Hydra—follow near-circular, *

Quantum astrophysics: plausible explanation for Pluto-Charon pairing

... equatorial orbits around the central “*binary planet*” comprising Pluto and its large moon, Charon. New observational details of the system have emerged following the discoveries of Kerberos and Styx. Styx, Nix and Hydra are tied together by a three-body resonance, which is reminiscent of the Laplace resonance linking Jupiter’s moons Io, Europa and Ganymede.”*

Source: V. Christianto, BPAS Physics 2021, <https://bpasjournals.com/admin/upload/dynamic2/6.BPAS-D-142-2021P98-105.pdf>

Quantum astrophysics: plausible explanation for Pluto-Charon pairing

Regarding the origin of Pluto-Charon binary system, there is a suggestion of giant collision. While such a possibility should not be excluded, we argue in a previous published paper, that there could be a far more interesting possible explanation, provided we accept the aforementioned quantum explanation of orbital distances, that the Pluto-Charon pairing is an indicator of “*planetary equivalent*” to Cooper pairing in the outer solar system. As we wrote: “Pairing of Pluto-Charon and other TNOs/KBOs seem to be attributed to the BCS/BdG pairing condition pointing to low temperature physics model of Solar System.”

Quantum astrophysics: with respect to Quantum Mechanics Interpretation

With respect to Quantum Mechanics Interpretation, while we agree with quantization of planetary orbits, our approach is different from Nottale's approach in 1996-1997, where he described starting from generalized Schroedinger equation.

Our approach comes from low-temperature physics correspondence to cosmology, for example starting from W. Zurek, who considers topological defect to be observed in large scale systems. Furthermore, we consider an old book by Nozieres & D. Pines, on *superfluid Bose liquid*. In other words, superfluid quantization becomes Bohr quantization.*

*V. Christianto, <https://bpasjournals.com/admin/upload/dynamic2/8.BPAS-D-143-2021P121-128.pdf>

Quantum astrophysics: plausible evidence of negative matter

This astrophysics-QM correspondence led us to further thought, matter-antimatter symmetric cosmology known as Dirac-Milne cosmology model. We already presented an article at Octagon Mathematics Magazine, 2022.

While only recently the experimental vindication of existence of negative mass particles are reported (see Nature Communication, 2021), actually it can be traced back to an eminent physicist from MSU, Yakov Terletsy, and also the late F. Winterberg (from University of Nevada).*

*V. Christianto, BPAS Physics, 2022, <https://online.bpasjournals.com/product/how-violation-of-newtons-third-law-can-pave-way-to-new-space-propulsion-mechanism-via-optical-diametric-drive-experiment/>

Quantum astrophysics: plausible evidence of negative matter

Despite normally we think that action-reaction law is given, actually in some cases it can be violated, just like violation of Pauli principle (voPp), perhaps we can call it with term: violation of Newton 3rd law (voN3l). In stating Newton's Third Law, we have assumed tacitly that

(a) All forces are two-body forces, i.e. they act between a specified pair of objects and are not influenced by the presence of other objects; and

(b) The net force on object *i* is the vector sum of the individual forces acting on it from all the other objects in the universe.*

*V. Christianito, BPAS Physics, 2022,
<https://online.bpasjournals.com/product/how-violation-of-newtons-third-law-can-pave-way-to-new-space-propulsion-mechanism-via-optical-diametric-drive-experiment/>

Quantum astrophysics: optical diametric prospect (new experiment)

Isaac Newton in his *Principia* expressed that for any activity there is an equivalent and inverse response. The consequences of this law of movement are presently being rethought by a group of specialists from the University of Central Florida and Germany who as of late completed an optical test that one day might help lead to new impetus frameworks.

"This strange interaction, which includes the idea of negative mass, imitates the conduct of a polar drive," said Professor Demetrios Christodoulides of UCF's College of Optics and Photonics. "Despite the fact that thoughts of this sort have been around for a long time, they have never been effectively sought after on the grounds that mass in nature is consistently a positive amount." Diametric drive alludes to the chance of an independent, space-impetus motor that works without the requirement for any outside fuel.*

*V. Christianto, BPAS Physics, 2022, <https://online.bpasjournals.com/product/how-violation-of-newtons-third-law-can-pave-way-to-new-space-propulsion-mechanism-via-optical-diametric-drive-experiment/>

Quantum astrophysics: optical diametric prospect (new experiment)

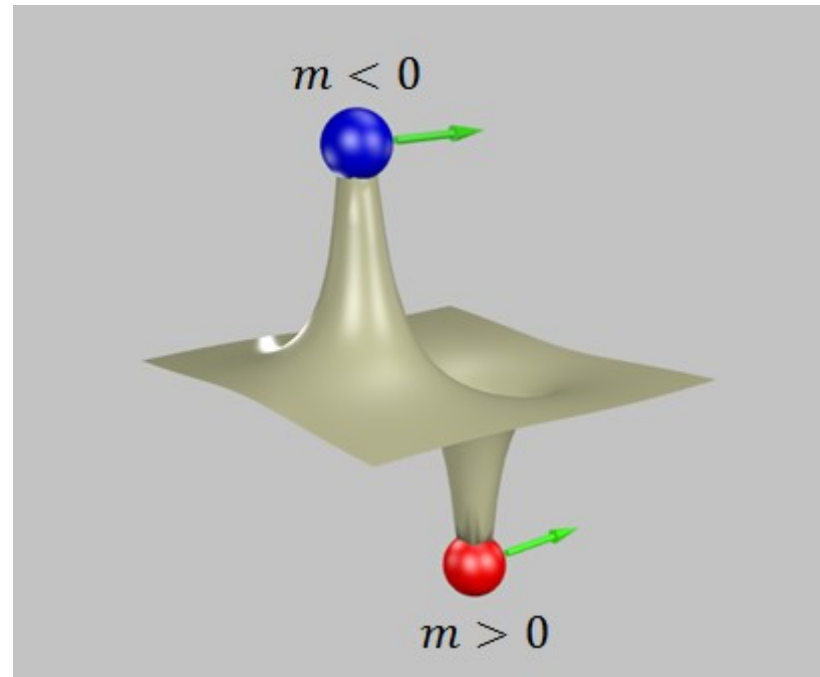


Figure 1. Diametric drive illustration*

*V. Christianto, BPAS Physics, 2022, <https://online.bpasjournals.com/product/how-violation-of-newtons-third-law-can-pave-way-to-new-space-propulsion-mechanism-via-optical-diametric-drive-experiment/>

Quantum astrophysics: optical diametric prospect (new experiment)

The review "Optical polar drive speed increase by means of activity response balance breaking" as of late distributed on the site of *Nature Physics* and was important for a venture with other accomplice colleges. Mohammad-Ali Miri, a UCF graduate understudy in the Center for Research and Education in Optics and Lasers (CREOL), likewise took part in this work.

Another experiments, as reported by Pei *et al.*: “optical self-accelerating state driven by nonlinear coherent interaction of its constituting components with opposite “mass-sign”. The coherent propulsion, highly immune to initial phase conditions, is surprisingly enhanced comparing to its incoherent counterpart.”.*

*V. Christianto, BPAS Physics, 2022, <https://online.bpasjournals.com/product/how-violation-of-newtons-third-law-can-pave-way-to-new-space-propulsion-mechanism-via-optical-diametric-drive-experiment/>

Quantum astrophysics: Summary

To summarize, I believe that the proposed quantum astrophysics and quantum geophysics are more feasible and achievable, compared to quantum gravity which so far remains an elusive goal; *especially with respect to evidence-based physics and evidence-based mathematics* principles.

Nonetheless, we admit that for now and may be until a few years later, conventional readers are likely to consider such a suggestion a bit weird. However, we are more than sure that given more data will be available in the coming years, our hypothesis of quantum astrophysics will be confirmed eventually.*

Part B - “*Resonance is everything*” – relation to human consciousness etc.

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***This short presentation is prepared for Scalar Electromagnetic conference, to be held on April 2024

Prologue

- Okay, let me begin to say outright :
- “Everything is frequency. Therefore it implies everything is resonance”
- and more than that : “we were born of the Light, and we’re going toward the Light.”

To begin with....

- Let me quote one of favorite translation of the Gospel of Thomas, one of hidden Gospels known to modern Christianity. In Logion 50, Yeshua told Didimus Tomas:
- “If they ask you from where you come, say:
- **We were born of the Light,**
- there were Light is born of Light. ...”*
- *an account of the full conversation, see www.orthodoxinfo.com

more than that...

- according to a translation of The 1945 Constitution of the Republic of Indonesia Article 33 paragraph (3), the book reads
- "Earth, **water** and the wealth contained therein is controlled by the state and used as much as possible for the prosperity of the people."
- which seems to me also meant that "**each water molecule** inside shall be utilized as much as possible for the prosperity of the people..."

For simplicity ...

- in this small talk, I will put several of our previous writings, articles etc, into a number of slides concerning how quantum mechanical wave equation actually corresponds to classical wave equation, not to Schroedinger equation per se,
- and also... in second part, we also consider how light, i.e. low intensity laser pen interact with iced water, especially iced water with a beryl crystal in it (beryl stones that I used here are “emerald” and “aqua marine”).
- and last but not least, we shall also discuss basic principles how crystal can also be viewed in terms of wave model (according to George Shpenkov)

Correspondence between quantum wave and classical wave equations*

- What I'd like to discuss is Ward & Volkmer's derivation of Schrödinger equation from wave equation:
- "...it seems possible to find theoretical correspondence between classical electromagnetic wave equation and Schrödinger equation. Such a correspondence has been discussed by David Ward & Sabine Volkmer ...
- They give a simple derivation of the Schrödinger equation, which requires only knowledge of the electromagnetic wave equation and the basics of Einstein's special theory of relativity."
- *cf. V. Christianto, *Prespacetime Journal* | April 2014 | Volume 5 | Issue 5 | pp. 378-391

- They begin with electromagnetic wave equation in one dimensional case:

$$\frac{\partial^2 E}{\partial x^2} - \frac{1}{c^2} \frac{\partial^2 E}{\partial t^2} = 0$$

- This equation is satisfied by plane wave solution:

$$E(x, t) = E_0 e^{i(kx - \omega t)}$$

- Where k and ω are the spatial and temporal frequencies, respectively.

- Substituting the latter equation into the first, we arrive at:

$$\left(k^2 - \frac{\omega^2}{c^2}\right) E_0 e^{i(kx - \omega t)} = 0$$

- Solving the wave vector, we arrive at dispersion relation for light in free space:

$$k = \frac{\omega}{c}$$

- Then, recall from Einstein and Compton that the energy of a photon is

$$\mathcal{E} = h\nu = \hbar\omega$$

- and the momentum of a photon is

$$p = \frac{h}{\lambda} = \hbar k$$

- We now assume with de Broglie that frequency and energy, and wavelength and momentum, are related in the same way for classical particles as for photons, and consider a wave equation for non-zero rest mass particles.

$$\left(\nabla^2 - \frac{m^2 c^2}{\hbar^2} \right) \Psi = \frac{1}{c^2} \frac{\partial^2 \Psi}{\partial t^2}$$

- which is the Klein-Gordon equation for a free particle. Now we want to obtain Schrödinger equation, which is non-relativistic case.

- The first step is to approximate...

$$\varepsilon = mc^2 \sqrt{1 + \frac{p^2}{m^2 c^2}} \approx mc^2 + \frac{p^2}{2m} \approx mc^2 + T$$

- After some approximation steps, then Ward & Volkmer obtained the Schrödinger equation:

$$-\frac{\hbar^2}{2m} \nabla^2 \phi = i\hbar \frac{\partial \phi}{\partial t}$$

- While we can conclude that there exists formal connection between classical wave equation and Schrödinger equation, but it still requires some assumptions and approximations.
- Therefore we can consider that Shpenkov's interpretation of classical wave equation is more realistic for atomic and molecular modeling.
- Furthermore, let us establish connection to sound wave (analogy)...

Sound wave analogy with quantum mechanics

- Hilbert and Batelaan explores equivalence between the quantum system and the acoustic system. They find that the analytic solution to the quantum system exhibits level splitting as does the acoustic system. A simple physical system is discussed that mirrors the quantum mechanical infinite square well with a central delta well potential. They compare the acoustic resonances in a closed tube and the quantum mechanical eigenfrequencies of an infinite square well. They find that the acoustic displacement standing wave is:

$$\xi(x) = \xi_{\max} \sin\left(\frac{n\pi x}{2a}\right)$$

- For the n th resonance. Equation above is the same shape as the quantum mechanical wave function. Their approach to find analogy between sound wave and quantum mechanics may be useful to be investigated further.
- References:
- (**) Ward, David W., & Volkmer, Sabine. 2006. How to derive the Schrödinger equation. *arXiv:physics/0610121*. 12 p.
- (***) Hilbert, Shawn A., & Batelaan, Herman. 2007. Acoustic Analog to Quantum Mechanical Level Splitting. *Am. J. Phys.*, Vol. 75, No. 11, Nov. 2007. Also in Faculty Publications, Department of Physics and Astronomy, University of Nebraska - Lincoln. Paper 103. URL:
<http://digitalcommons.unl.edu/physicsfacpub/103>

Concluding remark to first part of section B

- We have discussed how there is mathematical correspondence not only between quantum wave equation and classical wave equation, but also between quantum wave equation to sound wave.
- To put the above slides into one statement:
“*Everything is wave, therefore it is composed of frequencies.*”
- We shall discuss how laser light which is also a focused wave, composed of frequencies, interact with cold water.
- And later on in part III, we touch a topic on wave model of crystal, with possible further connection to describe interaction among laser pen + iced water + beryl crystal.

Section II: Small experiments on low intensity laser interaction with iced water + beryl (emerald & aqua marine)

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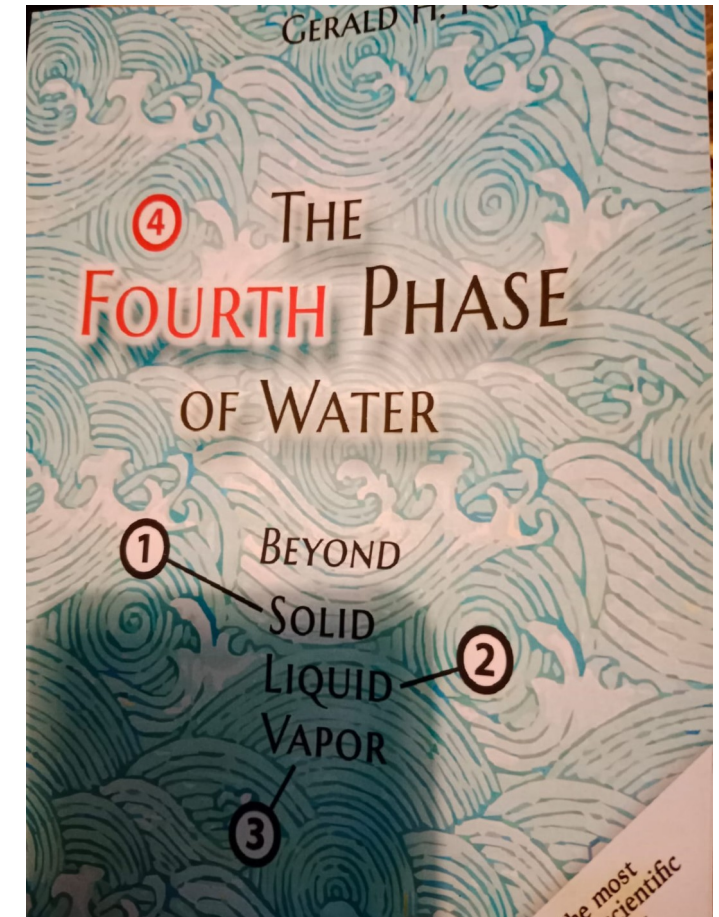
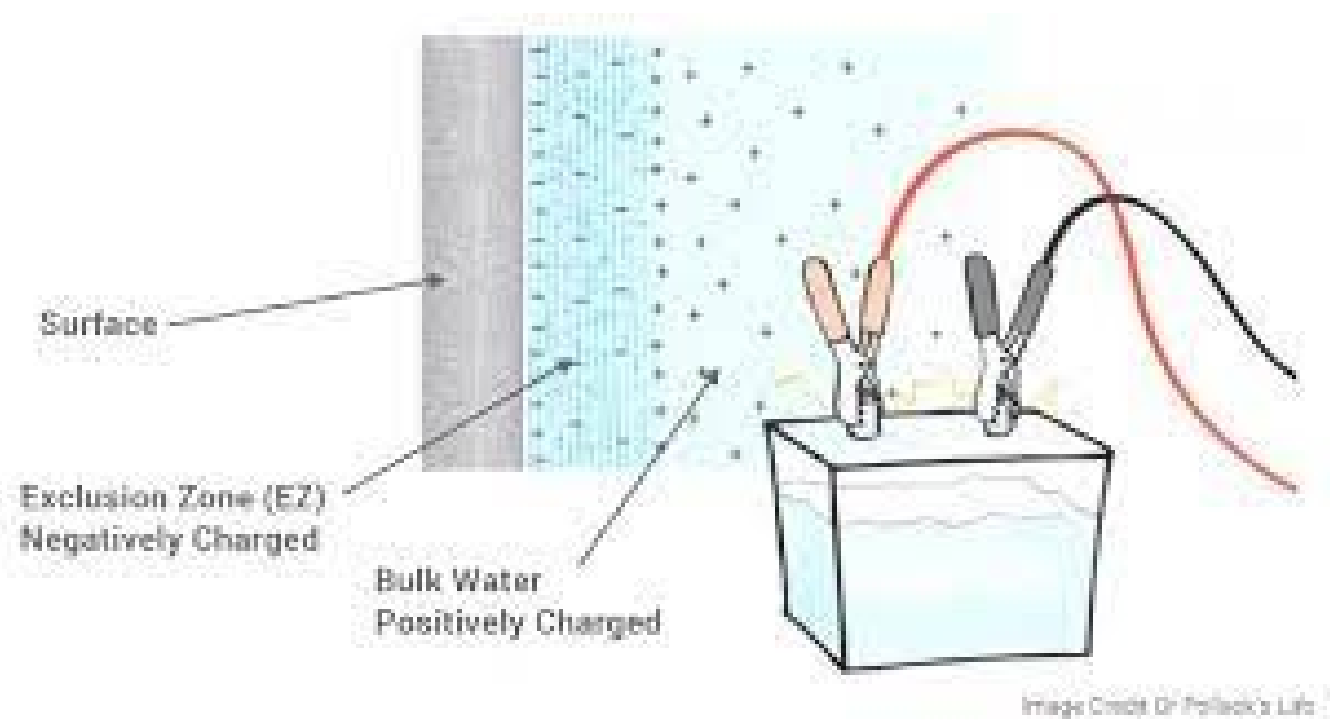
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30th Mei 2023

Background theory

- In a book by Prof Gerald Pollack, he suggested a new phase of water that is : “exclusion zone” or EZ water.
- Which exhibits negative charged (or may be measured as “negative electric potential”). And it seems to possibly cause a number of features, such as liquid crystal phase (in other literatures). That is where I started, can there be a liquid quantum state of that kind of new phase of water?

Scheme of EZ water



For example...

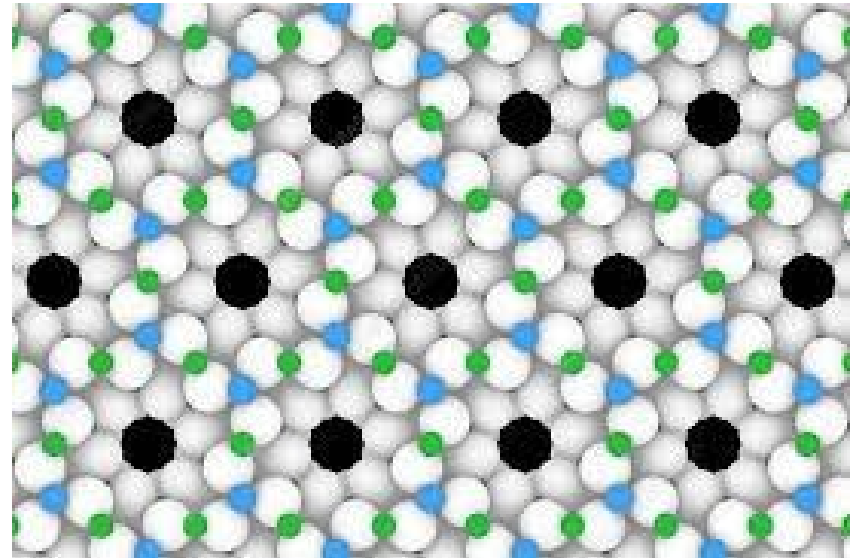
- As Prof. Gerald Pollack wrote in chapter 1 of his book:
- “The model of Emilio del Giudice of the University of Milan is characterized by a much larger scale of clustering. ...del Giudice posits ... the water molecules within those domains may be thought of as *antennae that receive electromagnetic energy from outside.*”
- See also
- ****Source: Seong G. Hwang, et al. PLoS One. 2018; 13(4): e0195057.

Hypothesis

- The physicist del Giudice in a lecture stated that quantum mechanics is actually the low temperature limit of more general physics. In other words, low temperature physics experiments will be closer to the realization of quantum mechanical theories.
- Among them is physics related to cold water and iced water, it can be said that a fraction of a percent of the composition of the iced water has undergone a phase transition to a liquid crystal state. Especially if beryl (emerald or aqua marine) is added to the iced water and exposed to a laser pen. Because there is *a laser cooling effect --> it can be expected that a negative electric potential will occur.*

What is emerald beryl?

- Emerald has the chemical composition $\text{Be}_3\text{Al}_2(\text{SiO}_3)_6$ and is classified as a cyclosilicate. It has a hexagonal crystal system $6/m2/m2/m$. Its density is 2.67-2.78 and it has an index of refraction in the range 1.566 to 1.602.
- Emerald crystal is shown here:



What is aqua marine beryl crystal?

- Aquamarine is a beryl with a hexagonal crystal structure and a chemical formula of $\text{Be}_3\text{Al}_2\text{Si}_6\text{O}_{18}$, a beryllium aluminium silicate mineral. It has a specific gravity of 2.68 to 2.74 and a Mohs hardness of from 7.5 to 8. Aquamarine typically is on the low end of the specific gravity range, normally at less than 2.7.

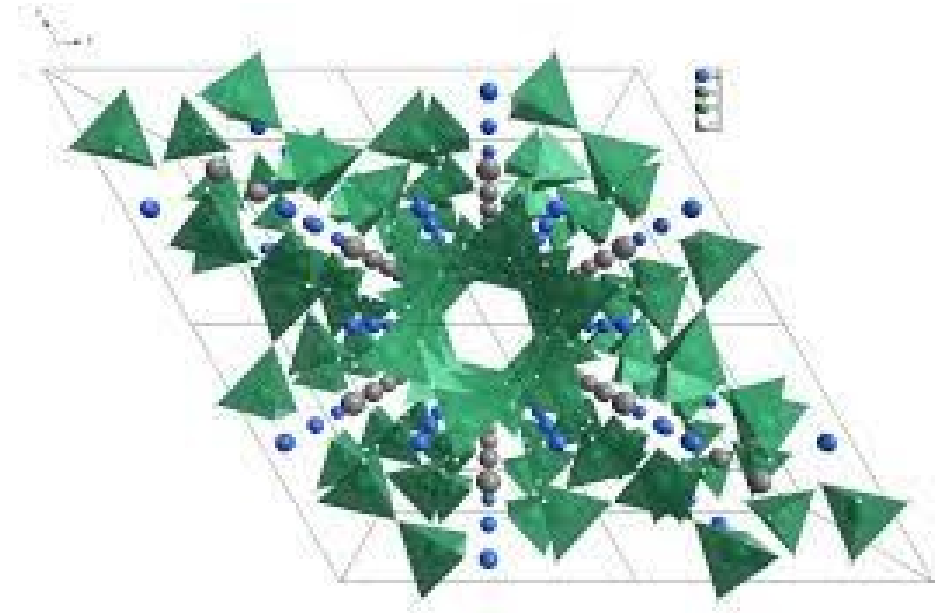
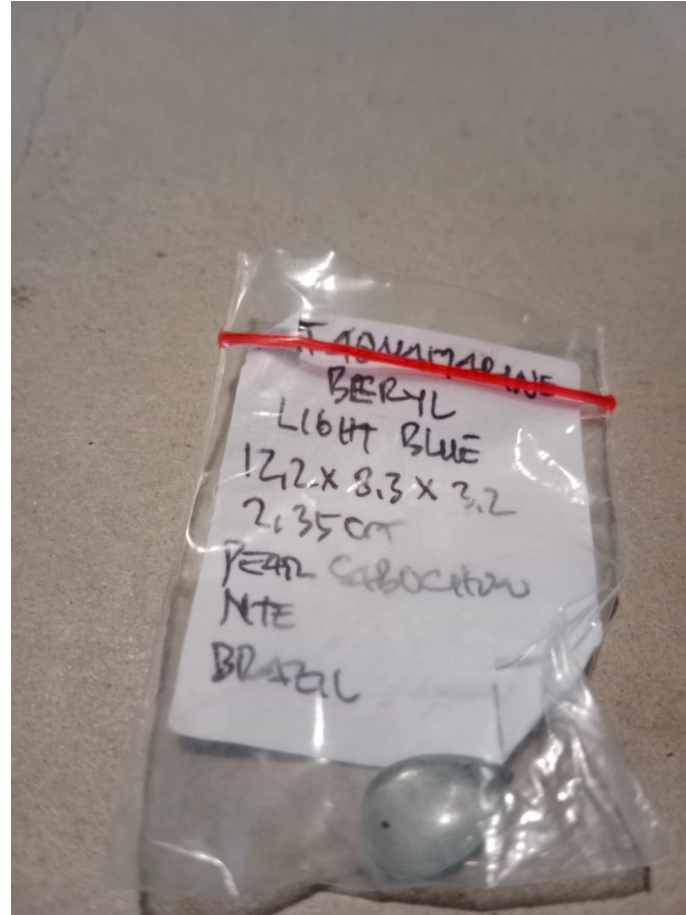


Photo on experiments with Emerald and Aquamarine



Experiment #1

(electric potential is measured in 200 mV scale)

Exp.	Descr.	Emerald	Aqua marine	Time (minutes)	Potential (mV)	Note
	iced water	x	x	0	-0,04	tanpa laser pen
1	iced water	x	x	1	-0,05	tanpa laser pen
2	iced water	x	x	3	-0,04	tanpa laser pen
3	iced water	x	x	5	-0,03	tanpa laser pen
4	iced water	x	x	10	-0,04	tanpa laser pen (stabil)

Experiment #2

(electric potential is measured in 200 mV scale)

Exp.	Descr.	Emerald	Aqua marine	Time (minutes)	Potential (mV)	Note
1	iced water	v	x	1	-0,02	with laser pen
2	iced water	v	x	3	-0,02	with laser pen
3	iced water	v	x	5	-0,03	with laser pen
4	iced water	v	x	10	-0,05	with laser pen

Experiment #3

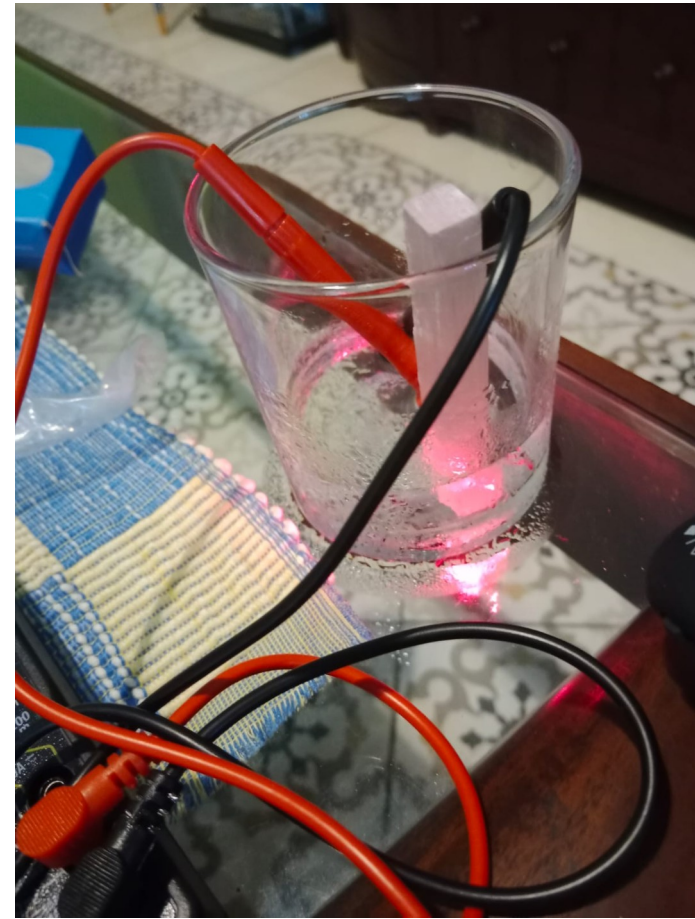
(electric potential is measured in 200 mV scale)

Exp.	Descr.	Emerald	Aqua marine	Time (minutes)	Potential (mV)	Note
	iced water	v	v	0	-1,1	
1	iced water	v	v	1	-0,06	with laser pen
2	iced water	v	v	3	-0,06	with laser pen
3	iced water	v	v	5	-0,07	with laser pen
4	iced water	v	v	10	-0,07	with laser pen
5	iced water	v	v	20	-1,8	seems to undergo phase transition to liquid crystal (quantum effect)

Next stage: there's more to “cool dance” physics

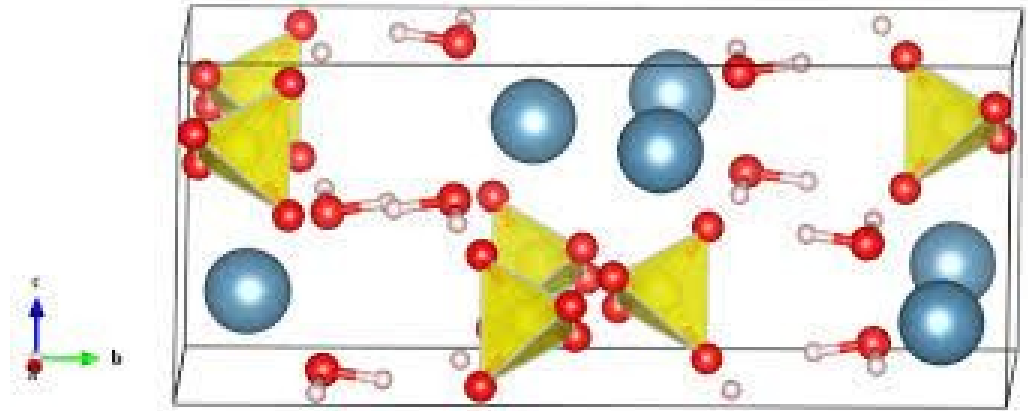
- I also started experimenting with Selenite crystal, with rather different molecular structure....

Photo on experiment with Selenite



What is selenite crystal?

- Selenite crystallises in the monoclinic system, commonly as tabular crystals with a rhombus shaped outline. It is often found twinned: a crystal started to grow and the growth direction changed abruptly in a symmetrical manner. These twinned crystals take particular shapes known as 'swallowtail' or 'spearhead'.



Experiment #4 : on Selenite crystal (electric potential is measured in 200 mV scale)

Exp.	Descr.	Emerald	Selenite Crystal	Time (minutes)	Potential (mV)	Note
	iced water	x	v	0	1,8	initial point
1	iced water	x	v	1	2,2	with laser pen
2	iced water	x	v	3	2,7	with laser pen
3	iced water	x	v	5	3,2	with laser pen
4	iced water	x	v	10	3,8	with laser pen
5	iced water	x	v	20	4,8	seems to be quite fit for experiment for water battery (cf Pollack)

Discussion

- In experiments 1 and 2, even when emerald was added with a low intensity laser pen exposure, the potential difference tended to be stable in the range -0,03 until -0,06 mV.
- Only in experiment 3, when the laser pen was shined on the gem emerald and aqua marine which were placed in a row, when it reached the 20th minute of exposure, the potential difference dropped to -1,8 mV.
- Temporary conclusion, in the 20th minute and most likely also if the laser pen exposure is carried out longer, there will be a greater negative electric potential ($< -1,6$ mV). This can be interpreted as an early indicator of the transition of the water ice (at least partially) into the liquid crystal phase.
- In contrast, Selenite mixture with water exhibit positive electric charge, which may be useful for further experiments on plausible water-battery system (cf Pollack)

Further experiments are recommended

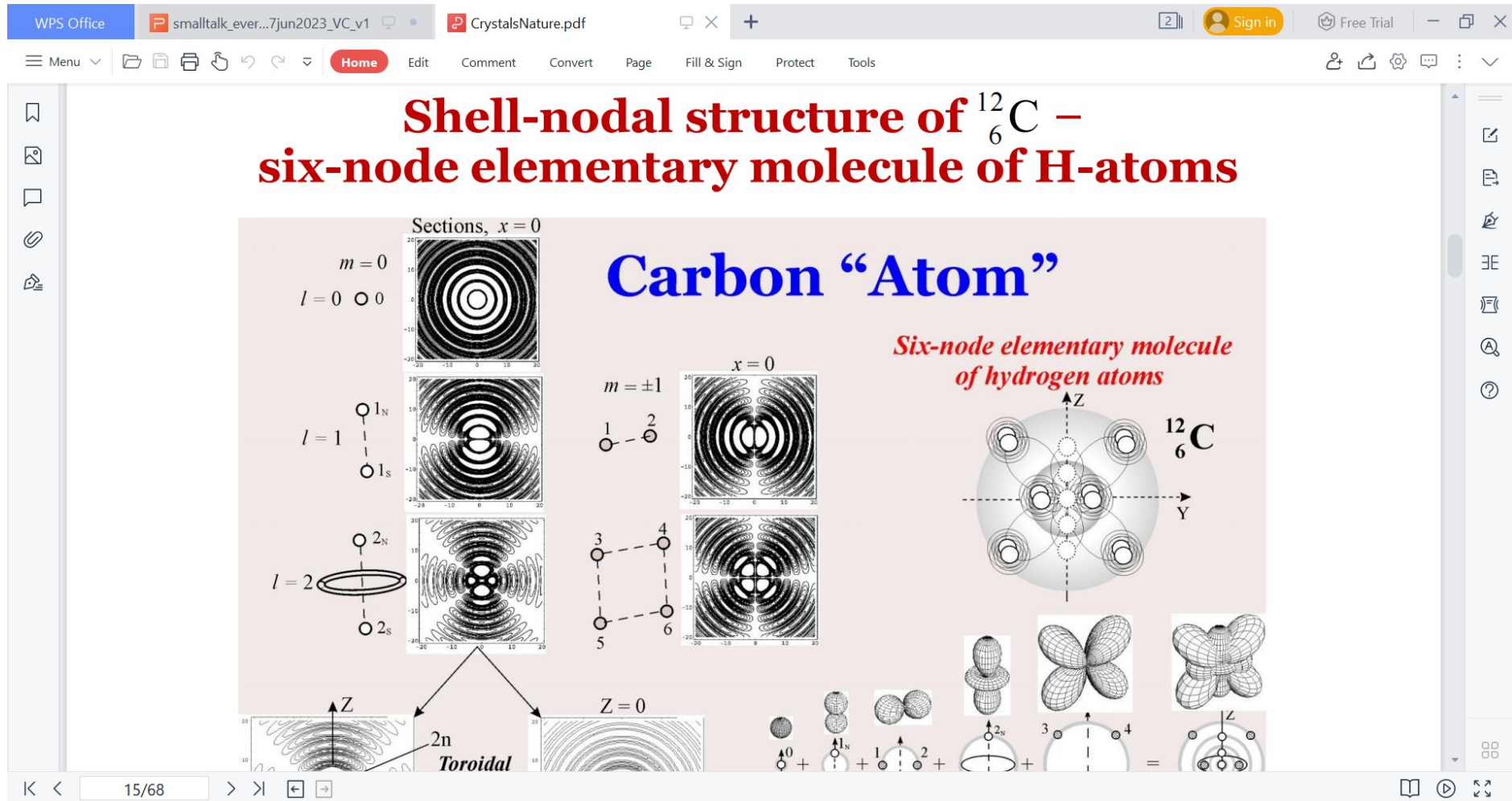
- - the experiment was repeated with the addition of other types of beryl, for example beryl morganite.
- - the experiment was repeated with all three types of beryl: emerald, aqua marine and the larger morganite (6 ct or more, would be better).
- - the experiment is repeated with exposure using a laser pen with a higher intensity, for example 5 Watt, or with green light.
- - the experiment was repeated with exposure using a laser pen and beryl emerald stones and aqua marine placed on ice + salt water solution (NaCl).
- by Victor Christianto, 30th Mei 2023, revised 29th June 2023

Section III: wave model of Crystal (A review to G. Shpenkov, 2019)

- In 2019, Prof George Shpenkov presented wave nature of Crystal...



for instance six-node elementary model of H

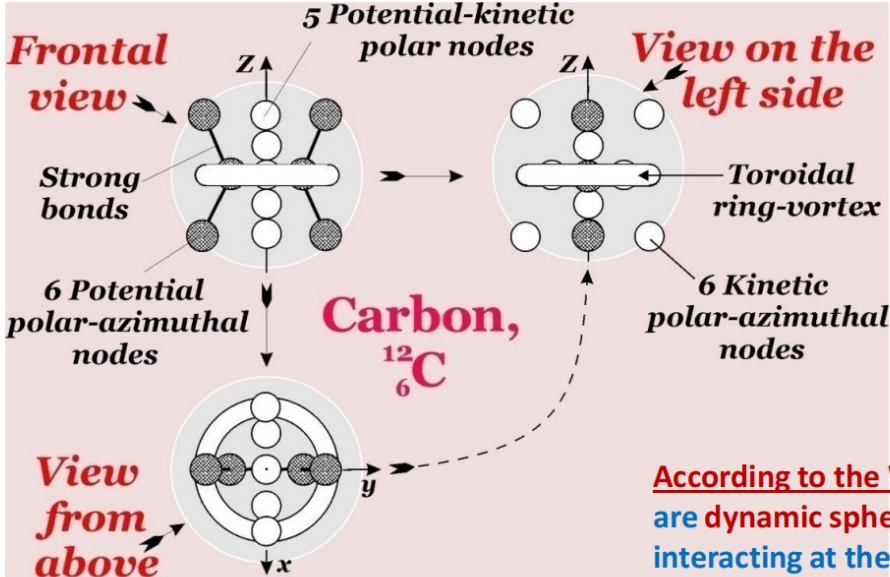


Shpenkov's model of Carbon atom

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Six-node elementary molecule of hydrogen atoms (carbon "atom"), ${}^{12}_6\text{C}$



Frontal view

View on the left side

View from above

Carbon, ${}^{12}_6\text{C}$

5 Potential-kinetic polar nodes

6 Potential polar-azimuthal nodes

6 Kinetic polar-azimuthal nodes

Toroidal ring-vortex

Strong bonds

Potential and kinetic polar-azimuthal nodes dislocated relative to each other in the radial direction, and are in planes differing in phase by $\varphi = \pi/2$

Fundamental frequency and the fundamental wave radius of the atomic and subatomic levels:

$$\omega_e = 1.869162559 \times 10^{18} \text{ s}^{-1}$$

$$\lambda_e = \frac{c}{\omega_e} = 1.603886492 \times 10^{-8} \text{ cm}$$

According to the WM, all elementary particles and atoms are dynamic spherical formations pulsating and interacting at the frequency ω_e (discovered in the WM, along with ω_g and E_B).

Fundamental frequency and the fundamental

Binding energy of the nodes in ${}^{12}_6\text{C}^{-4}$, calculated by the formula

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Concluding remark

- Earlier in this small talk, we discuss series of small experiments consisting of laser pen interaction with iced water in mixture with beryl stone.
- Interestingly, not only that laser light is focused wave, but also H₂O itself and crystal can be viewed in terms of wave nature.
- These can be interesting topics to investigate further.
- quote for the day: “life is water dancing to the tune of solids” - Albert Szent-Gyorgyi (quoted in G. Pollack, Chapter 2)

Thank you

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