On the Origin of Space

Part 9:

Dialogues Concerning a Third New Science

Day 3

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Abstract

Supporting material for articles on space and the basis of life is presented through a stage adding to Galileo’s 17th century Dialogues. In this last day, the participants review a number of points raised by the state of space being affected by the dynamical needs of matter, thereby generalizing, summarizing and concluding the dialogues.

THE STAGE: After being forgiven at last by the Pope, Galileo asked his friends Sagredo, Salviati and Simplicio to go back to Earth to find out what made the Pope change his mind 400 years after their dialogues on the two sciences that Galileo instigated back then.[1] Quite quickly to their dismay, they saw how distorted these sciences became at the hand of Scholars, with so much mathematics and so little physical feelings. They concentrated first on finding the facts and theories of the 20th century since they appeared to be behind the pardon by the Pope, and subsequently went to see whether any new science was hopefully in the works in order to redeem the situation. After 10 years of search and new learning, they finally fell upon a series of articles that reminded them a lot about the old ways of their dear Academician. Following the line of his work, these articles were running square against what they saw at the house of Scholars. A lot of hope was coming from them for the future of Science, as the science of Life they addressed could not be envisioned at all the first time they were on Earth. The decision was made to hold new dialogues, which were to last 3 days. This is the last day.
1. **Simpl.**: From that “Mind over Machine” article,[2] I can conclude that we are nothing more than self-aware computers; this is a priori depressing…

   **Sagr.**: “Self aware computers” may be an image drawn from that work, but it is an incorrect inference, as there are a lot of connotations in this 3-word bit. We are not computers because computers are MACHINES, by definition devices made out of separated things in the language of the Scholars, thus dead things, like our beloved boats in Venice, sorry to say. We are not golems, i.e. without soul. We are whole physical entities, SCQSs, as the Author identified systems like our minds, entities unlike anything that can be found in the world outside us, and certainly not in the world of this technology we see all around. (Such appears to result from the first two sciences we envisioned back then after being left at the hand of Scholars.) We are the jewel of Nature; and through our minds we hold the key to its future. The Scholars who call themselves “computer scientists” have in effect put out a propaganda since the 1950s about Humans being machines through their beloved Turing, the inventor of the theoretical concept of these machines. His “Human vs. Computer Test” was designed so that these machines could have a chance at being as “intelligent” as Humans or better. Of course they did not stand a chance when it came to dealing with Human behavior, and everything that comes with it, including its genius at designing these computers.

2. **Simpl.**: Now I feel better. The Author is then just expressing the Human values we know from the Bible in a scientific way, a way we could not express before. I can see this approach as allowing to tackle the ills of body and mind in a much more efficient way in the future, no longer as our alchemists of old were doing. I also missed the point of “contextual” motions mentioned in the articles…

   **Salv.**: Macro-molecules have been reported as moving apparently contextually, i.e. non-randomly to a certain long-range destination that looks to be appropriate for their use. In one case, a single molecule just made by a gene is seen heading out of the nucleus for use within the cytoplasm of the cell. [3] With only very small portholes in the nuclear membrane compared to the size of the membrane, how does it find its way out, and why would it go out in the first place? The corresponding report says nothing on that matter. (It does not even ask the question!) In two other cases ([4, 5] among many others) a molecular complex produced by the nucleus is found to locate itself around a specific component of the cell, with very little spreading around as expected if diffusion was the means to reach its destination. There again the question is not even asked…
A more recent article [6] shows at last that indeed there is a supramolecule that does the transporting in and out of the nucleus for some types of cargo, namely “importin” (how about that for an inventive name!). The structure of that molecule has just been studied, showing its extraordinary flexibility in conformations. So, again, a leptonic spatial function has to be present to allow it to go in and out of the nuclear membrane depending on its cargo. And again there, Scholars’ attention is directed at accumulating data, not into finding the physical function that would give the secret of its motion so we could act on it, same as for the question of viruses (even though there this is an obviously very pressing issue!). All these questions are about how the leptonic space of a specific molecule relates to the space sustained by the nuclear membrane. Scholars are apparently not interested in putting out an hypothesis.

3. **Simpl.:** Also, DNA can duplicate itself together with its cell without need for an external helping system. How can it do that?

**Sagr.:** DNA duplicates itself in a stochastic environment (such as the ones in PCR procedures). The biochemistry books we looked at describe how this happens. [7] The key mystery is how the duplication can involve an entire cell (which is of course a non-stochastic duplication!). The study of mitosis shows the construction of leptonic space manifolds covering a whole cell, manifolds that split due to their complementary dimensional arrangement. The theoretical answer for these kinds of single cells may be that chromatin lining DNA must sustain by itself complementary leptonic space manifolds, and this since chromatin is otherwise part of mitosis. A structural analysis of chromatin should be done to confirm the leptonic space hypothesis for them. The fact that primitive cells do not have a nucleus tells us that some other structures are doing the overall control of the cell (an even more basic spatial physical process, no doubt).

The existence of leptonic space manifolds being sustained by rather simple supramolecules such as chromatin and tubulin (together with the nuclear membrane and the cell cortex receptors) would explain the quantum origin of Life, being then a very commonly occurring phenomenon in diversified molecules based on the carbon element that permits all sorts of spatially coordinated functions. We can’t say much more without a systematic study of the key supramolecules found in Life in the light of potential leptonic spaces.

4. **Simpl.:** Let’s then summarize the higher dimensional quantum aspects of space as we see them now, so they may finally make sense to me.

**Sagr.:** The physical knowledge found with the Scholars of this period in the history of this planet is obviously missing the higher dimensionality of reality by ignoring the manipulation of ordinary space by Life’s quantum dynamics. It is hard to believe such a feature is being missed, especially after Einstein’s discov-
ery that space was being manipulated in higher dimensions by the mere presence of its content (gravitation). But on the other hand, look at what they were missing back in the days of our Academician!

Salv.: First, an article from the Author [8] describes a spatial dynamics occurring at a supramolecular scale by using the Scholars’ quantum mechanical formalism with the extra assumption that space is a quantum entity, and thus can have other states than a ground state with its normal single layer as we see it everyday. The articles on Life by the Author are just a meager summary of what he found about the nature of space.

Starting from a description of an electronic evolution dependent as a whole on the conformational states (α and β) of a polymer of large molecules commonly found in Life, the resulting supramolecular structure would have to be able to exist with different such conformational states in two parallel space layers connected via semi-free electrons (part of the individual molecules of the polymer) shuttling between these layers of ordinary space. This electron dynamics effects then a new space called a "leptonic" space in dimensions other than the normal General Relativity curved 3D. If the mere possibility of such a space exists, a standard QM analysis informs us that ordinary space needs to be locally “squeezed” in order to produce a complete evolution of the quanta making up the structures and their shuttling electrons.

This semi-formal approach could be then generalized to any structure made out of individual identical molecules, which could exist in more than one conformational state while containing semi-free electrons. Space in areas containing such molecular arrangements would be lined up with leptonic space manifolds oriented differently in different dimensions, forcing a new dynamics in ordinary space (outside the one coming from gravitational forces). This dynamics would be specific to given molecular arrangements, and would be observed by Scholar biochemists as “tracks,” “accumulation points/patterns” and otherwise unexplained directed motions of proteins and other molecules. It would then give the true physical origin of embryo initial oocyte compartmentalization, as well as subsequent cell divisions and motion within the organism.

This kind of dynamics would explain the precise choreography observed in the evolution of cells, as well as the evolution of the matrix in-between cells (extracellular matrix), not to mention the holistic aspect of living entities. Life in that sense would be the tool of matter to mold space for its needs, needs which are to obtain an organized and meaningful universe, as the Author foresees.

Simpl.: Experimentally, an atom with two states of its orbital electrons has been observed with these states coexisting in separate locations (up to 80 nanometers in distance) in what was perceived by Scholars as ordinary space. [9]
They have been called “Schroedinger Cat states” in reference to the 1935 paper by Schroedinger where a cat was imagined being both dead and alive at the same time, [10] something Schroedinger saw then as a hint that quantum mechanics may be far from complete in describing reality. Were the above two atomic states two “shadows” of the same quantum structure seen through a warp of space in higher dimensions (as General Relativity considers)? The answer seems to have been given here with the centriolar evolution.

**Sagr.:** Yes. The second, more important, question raised by this Schroedinger Cat Ion experiment is whether quantum coherence (unseparability of the evolution) in a single atom could be extended to much larger scales, beyond a supramolecular structure, and even to macroscopic sizes. The answer here is also simple:

Quantum “decoherence” occurs in our world as a result of the presence of atomic nuclei in ordinary space (they are the source of the disorder called “entropy” in thermodynamics). Thus, if a space could be maintained without nuclei present (with only leptons), coherence (i.e. non-separability) of the evolution could be maintained at any scale as long as this space existed.

Even though atoms lining up the connection of ordinary space with this new “leptonic” space would be subject to random thermal evolution at their location in ordinary space, the overall conformational state of the molecule they belong to would only have to follow the evolution of the semi-free electrons generating the space layers “between” the conformational states, itself a quantum coherent evolution outside ordinary space.

Then the full evolution of the molecular conformations can occur along the supramolecular structure, per the detail work of the Author,[7] and this in a “non-local quantum cellular automata” fashion at the level of molecular conformations. The geometrical arrangement in slats of the structure dictated by its phonon evolution would allow only one direction for the evolution of molecular conformations, and thus would permit a deterministic quantum computation to take effect through this last evolution. The supramolecular structure would then be a true quantum data processor (with data being in some extended form, such as patterns).

The structures that cannot warp space due to their smaller size (“microtubules”) would act as memory systems via their persistent conformational states.

**Simpl.:** Indeed! We saw in class these microtubules creeping like tiny serpents on top of a glass as a result of their internal dynamics. These really freaked me out...

**Salv.:** Neurons (unlike the ones misdiagnosed in Scholars’ biological outlooks) would then contain the “memory-mapped” I/O system for a self-constructing
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and self-modifying network of interacting processors located in glial cells. This would be a historical case of mistaken identity!

5. Simpl.: A number of small questions remain in my mind. For example, does DNA protein production work along the same lines of self-assembly? There are millions of possible shapes proteins are folded into (geometric origami).

Sagr.: Yes, of course. Life would not have been possible without the multidimensional character of space and the many-realities character of its contents. The simple fact a supramolecule can split space into other dimensionally complementary manifolds allows the splitting of a cell as a whole without complicated (impossible) interactions between localized elements; and that splitting as a whole phenomenon is the defining character of Life.

6. Simpl.: There are screen savers available like the SETI program to fold proteins with spare computer time.

Sagr.: Yeah, and it takes one year of an IBM supercomputer to do that folding. What are the odds for a FINITE entity to beat an infinite one?

Salv.: Protein folding seems too precise a thing to happen randomly.

Sagr.: Have you ever looked at the motions of a shadow of a chair on the ground, when you move the chair in a vertical circle above it? Doesn't the thing look random? Same here, and random things do not belong to Life. They are eliminated promptly by the whole; its easy: A localized item has no chance against a non-local whole. The only problem a whole can have is another whole such as cancer, or an invading whole called a virus/bacteria.

Simpl.: Do the proteins have split space associated with them?

Sagr.: Not all of them. They use the multiple reality aspect of the quantum to find their minimal energy shape in general. The ones that end up having a split space can act with others to build even larger entities (self-assembly), or be recognized by the central processor through their quantum states in leptonic space so they are directed to build things such as vesicles.

Simpl.: Does each protein have an intent?

Sagr.: Of course not! That's the “Intentional Stance” defined by Daniel Dennett, the cognitive psychologist. [11] Molecules do not have a mind of their own of course. But they act AS IF they had one, and this because they are part of a quantum whole that we can't see, since in leptonic space.
7. **Simpl.** By the way, I think SETI is looking in the wrong places for alien communication if there are alien civilizations out there, I don't think they would use radio waves for communication hence why they see nothing. 100 years of radio transmissions compared to 3.8 billion years of life on the planet. Not very good odds to find another civilization.

**Sagr.** No kidding. Didn't the Author mention how we are going to reach the diversity out there?

8. **Simpl.** Does the SCQS control the structure of it's support, i.e. like centrioles? I assume so because a centriole controls the self assembly of the daughter.

**Sagr.** Yes, of course. It is a self-modifying system. If a solution to a problem can't be found, it will increase its quantum computation paths until it finds a solution. Of course if it can't find the solution, it encounters a problem that its other realities will have to fix. Mental problems are of that sort.

**Simpl.** Does the SCQS provide the dots (if you like) for matter to join to, a set of plans to create the structure?

**Salv.** Remember that this is a gigantic network of processors. The decisions are like a political congress with a lot of compromises. The plan is reached and constantly changed via a consensus of separate quantum computations based on a constitution, i.e. the genes' programmatic data. The neuronal development is of that sort, followed by the glial cell processors.

9. **Simpl.** When the leptonic space layer in the centriole copies itself, does it peel itself off the mother?

**Sagr.** Normally no. The split from the mother is a physical change in the leptonic manifolds due to an external molecule destroying the spatial quantum links between the two. It's the beginning of mitosis.

**Simpl.** I've been playing with 2 bits of paper to picture leptonic space. Is there one leptonic space layer in the centriole, or lots of separate ones in the MT's?

**Sagr.** MT's have one dual layer of space along the surface of their cylinder, a single manifold. Centrioles have slats, each slat having a single manifold. This set of manifolds has quantum links between manifolds going in one direction only, as I described earlier.

10. **Salv.** Someone should write a book on the start of behavior/interaction of separate SCQS systems with their environment and with other SCQS's.
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**Sagr.**: I did not think about psychology this way...This is quite a neat idea.

**Salv.**: This is a consequence of the new science we are talking about. It just does not have psychology and behavior combined into one yet. I am basically seeing the consequences of the Author’s work and the advantage of its physical approach to such a study.

**Sagr.**: Good thinking. There is a sharp difference between behavioral science, cognitive science and psychology when it comes to the physics of the system. The first refers to the quantum program, the second to physical features of the computation and the third to the interface (“loaded”) program received during the computation.

11. **Simpl.**: A thought I had, to have a look into the different perceptions of animals in what they SEE, look at camouflage of the hunted species, “mindsight” for an animal if you like.

**Sagr.**: Motion is the key of focus of attention. Without that perception, the focus is not changed. Another sense has to intervene.

**Simpl.**: I meant mimicry more than camouflage, and it's always big eyes that animals copy, like on certain fish: the bigger the eye no matter what animal is looking at, it assumes the rest of the animal is in proportion to the eye size. All/most advanced predatory animals KNOW to look at eyes to judge animals when they have seen them. How far back down the evolutionary path this goes will be a good guide to the thinking of animals, i.e. patterns, all patterns.

**Sagr.**: There is more in Nature than numbers, which are separated objects (since you can give them a specific name). Patterns are inseparable things, where their parts are meaningless, without information if you want. Only the whole has information. A circle has a meaning. Its points by themselves don't. This is why true geometry cannot be represented by numbers, in spite of the wishes of Descartes.

**Simpl.**: I have seen a lot of books about patterns. Relationships between patterns can be metaphors, i.e. metaphors from patterns in words to patterns in pictures.

**Sagr.**: One of the first manifestations of a self-aware physical system is the ability of making metaphors. Computers of course cannot catch a metaphor.[12]
12. **Simpl.**: I think if one takes the Author's ideas, one can go a long way in understanding a lot of diseases and illnesses. Then nobody will be able to deny the rest of his work.

**Sagr.**: Denial is based on fear of the future. If you tell a medical doctor he knows nothing about Life, he will shut you down, as his future is at stake. Here you are touching on why the Author is so adamant about his work as a scientific worldview like our Academician had. He cannot predict the use of his approach. Our Academician could not predict the use of his approach either.

What was important by publishing his work was to have his views understood as the source of a future approach that could bring fruits that no other approach could, and in a quantity undreamable through the old approaches. Scientific revolutions are NOT paradigm shifts (as Kuhn, the hater of Science, said), they are the adoption of a new way of seeing reality. **They are not constructing a new model of rational experience, but a new outlook of conscious experience.**

This falls in line with Einstein's approach: The multidimensional aspect of space, a conscious experience, was going to be the source of future progress, not the math of the thing, the resulting rational model. There, people who refuse to see this multidimensionality of space by still thinking about “fields” in flat space (such as “gravitons”) are like the ones in our Academician's time who wanted to keep seeing a flat earth. They were the past. Einstein's view is a lot more fruitful. This is also why the Author mentioned the anti-gravity/curved beam experiments, as they will for the first time show the world that the reality of space is curved, and thus multidimensional. This is the missing proof that Einstein needed, and the view he failed to emphasize to the world as being true reality.

**Salv.**: The way I look at it is that, from the Author's point of view, there are only certain diseases that drugs are applicable to. The other diseases will be a function of Life, i.e. SCQS's. It is a whole new field of understanding of how real diseases relate to the function of a SCQS; and from that understanding must come a new form of medicine. What form will it take? Well, no one knows yet.

**Sagr.**: Another view of the world on the conscious level, not on the rational level, will get to things that no a priori math or model of separated views of reality can reach.

13. **Simpl.**: A last matter remains stuck in my mind: Is quantum “entanglement” a joining of matter through a leptonic manifold?
Salv.: It is the dynamics of parts of one single piece of matter that are not at the same place in a space manifold (different realities). An entangled single piece of matter split in space can come from a single event in time and space where two or more possibilities exist for the dynamics. The two or more possibilities are realized at the same time.

Simpl.: They tend to talk about 2 things being entangled but in reality isn't there a limit to the number of things that can be entangled?

Salv.: No limit per the definition above. Think of an “electron cloud:” It can be seen as matter located at infinitely different places in space at the same time.

Simpl.: Scholars always talk about entanglement but are very vague, is it presumably because they don't really understand it?

Salv.: This notion appeared from a mathematical property of the wave function of several variables. Here D'Espagnat did a pretty good job at explaining what entanglement (inseparability) was about on the math level. However, he never brought it up to the conscious experience level because he never saw it outside mathematics. He did not see it in pictures, and especially not through experiments as the Author does, because he missed the meaning of Everett's view of many realities. If concepts can't be brought up in pictures, they really are not understood. This is the key problem Heisenberg identified about the original quantum theory. This is why much of quantum mechanics has remained impossible for students, let alone ordinary people, to understand. Everett has helped a lot in that area, but was misunderstood as himself missed the understanding of space as a quantum entity. The quantum descriptions by the Author using his approach remove a lot of mystery and bring simplicity to an otherwise obtuse subject.

14. Sagr.: Needless to say, and to finish, the phenomena discussed here would provide also a much more basic (if not practical) way to engineer true quantum computers at large scales than the nuclear spin and other methods presently envisioned by Scholars outside living materials. Let's hope we won't have to wait for another 400 years to see the applications...

Let's go back and report our findings to our dear Academician!
Acknowledgement: I thank Ben Connell of Liverpool, England for bringing a number of questions to the front so the Reader could be represented here through him.

References
[1] Galilei (1638), Discorsi E Dimonstrazioni Matematiche intorno à Due Nuoue Scienze (Dialogues Concerning Two New Sciences), Elzevir, Leyden, transl. de Salvio, Dover 1954 reprint