How to Bind Matter to Matter: The Nature of Time

D. Chakalov[Ω]
chakalov.net

Abstract

Three characteristics of the human mind are described, which cannot have material correlates. The question of how to bind *mind* to matter, posed in the initial paper from 15 January 1990[1], has been reexamined by scrutinizing the postulate of locality and the invariant speed of light in "vacuum", after the Michelson-Morley experiment[2]. It is shown that, in the so-called doctrine of *trialism*[3], the question of how to bind *mind* to matter depends on the underlying phenomenon of *matter* interacting with *matter*, by following the flow of Time.

I. Introduction

Let me describe the inherent characteristics of the human mind, exhibited in self-identity, human cognition, and mental rotation. It is obvious that any effort to present the human mind along the Marxist-Leninist philosophy (the brain is the hardware and its mind is the software[8]) leads to contradiction with facts, and will be considered false. On the other hand, any effort to present the human mind as some "mystical agent" capable of acting on brain's tissue, as suggested in parapsychology, is false as well. In fact, parapsychology is 'not even wrong', because its materialistic, Marxist-Leninist alternative[8] is also dead false. If we have a computing device made exclusively by atoms from the periodic chart, we won't expect from it to begin studying itself and develop Quantum Field Theory. No parapsychological "ghost" could animate such system either. We need a breakthrough. How can matter act on **itself**?

Let's examine the bold facts. Regarding self-identity: when you say, for example, 'it's about *me*' (and usually point to the chest, for unknown reason), you are referring to your *self* that does **not** change in time, as read with a clock. Your brain and body change every millisecond, but **not** your *self*. It is, with respect to a physical clock, time-less and *atemporal*. Also, once you remember a notion at the time you were a toddler, say, 'corner', you will never forget it, despite the fact that the neurophysiological correlates of 'corner' are kept in your brain, and these correlates will inevitably change, as your body and life experience grow. In this sense, the 'meanings' of all concepts kept in your memory, along with your *self* capable of "examining" them by your consciousness, are **invariant** in time. They are simply *atemporal*[4].

Next, cognition and mental rotation. Consider a simple experiment, which you can perform with your brain[4], and also try to "rotate" the mental image of a cube[5]. Your brain produces work, which is immediately related to your mental activity. How can we separate the brain, as *Res extensa*, from the mind (*Res cogitans*), and avoid all materialistic[8] and "psychic" crap?

The only possible solution is to reexamine the postulates of locality and the invariant "speed" of light in spacetime "vacuum", previously known as Aether[2], and explain how matter acts on **itself** in the course of the global Time: "Everything changes and nothing remains still — you cannot step twice into the same stream" (Heraclitus). This is the proposed answer to the question posed in the title above. Namely, the human brain is **self-acting**: only matter interacts with matter. The global Time is *not* "dark"[2]. It has "positive energy density of about 6×10^{-10} joules per cubic meter"[6] to **act on itself** and execute the elementary step of Time (known as chronon), in line with the postulate of locality (Fig. 2). But what *is* Time, really?

II. The nature of Time

The interpretation of 'time as change' originates from Heraclitus. It has two components, *atemporal*[4] (global) and physical (local), such that 'time as change' is manifested by a *dual* phenomenon: both 'change **in** space' (local time) and 'change **of** space' (global time). Yet physicists bluntly ignore the 'global time' and claim that "there is no dynamics within space-time itself"[7]. Let me try to explain the error in this widely spread but false claim.

Suppose you kick a football and after a few seconds it drops on the playground, as shown in Fig. 1 below. There is a unique geometric point at the center of mass of the football, and we can imagine (not observe) its consecutive states along the continual (Sic!) trajectory of the 4D football, like snapshots from a movie reel (Fig. 2).

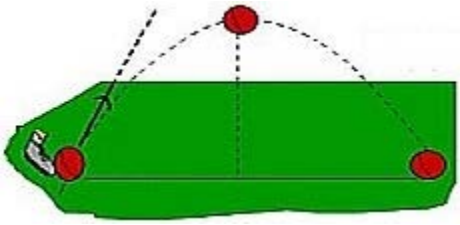

Fig. 1

Fig. 2

Q: What is *binding* the 4D states in Fig. 2? The "intuitively clear" answer is: the football. Yet the football is only the *necessary* condition. The *sufficient* condition is the "colorless" Time endowed with **self-action**[2], exactly like the human brain. Only the *atemporal*, global, and "colorless" Time[2] can render the 4D 'movie reel' (Fig. 2) by 'change **of** space' into a *perfect* continuum[3,4]: the Platonic world[5] is just like Zen[3]. **It** (not "He") *must not* (Sic!) exist in the *physical* world[2]. And since physicists examine only matter[7], they are *totally* blind of **It**.

Besides, as I warned against self-destructive theories in cosmology[9] thirty years ago[1], if we keep only the football and place it at 10^{-36} sec after the "big bang", there will be **nothing** to kick off the football into its "inflationary" stage. Only some half-baked "dark stuff", if any.

To sum up, we endorse the requirement 'only matter interacts with matter' above and model the human brain as **self-acting** system capable of correlating at least 86 billion neurons and trillions of synapses. If people wish to try some materialistic explanation[8], they will have to invoke some "miracle", such as "super-computer". Not my cup of tea. I suggested *atemporal* quantum reality thirty-three years ago, on 5 February 1987, to explain the physics of the brain with EPR-like correlations[10]. We also need the doctrine of trialism[3] to eliminate any *direct* link between the brain and its mind (remember, parapsychology is 'not even wrong'), and to suggest the Platonic theory of spacetime[2] in which the Platonic world (*Res potentia*) is the common source of both matter (*Res extensa*) and mind (*Res cogitans*). It's all about Time.

To understand how the Platonic world[5] is hidden by the invariant "speed" of light[2], let me go back to the Michelson-Morley experiment and the "quantization" of 4D spacetime continuum: the 'film reel' in Fig. 2 above.

III. What are light quanta?

In 1954, Albert Einstein wrote to his friend Michael Besso: "All these fifty years of conscious brooding have brought me no nearer to the answer to the question, 'What are light quanta?' Nowadays every Tom, Dick and Harry thinks he knows it, but he is mistaken."

Perhaps the "intuitively clear" picture of light quanta as tiny little cannonballs carried by EM radiation stems from analogy with buoys on ocean surface: once the water waves *push* and displace the buoy, it will obtain energy and momentum. As Murphy once noticed, complex problems[4] have simple, easy-to-understand, wrong answers.

The first puzzle of light quanta is that light does *not* propagate in some *physical* Aether.

As Justin Christensen explained (December 26, 2017), "waves travel in water because the water molecules pile up and then push other water molecules out of their way as they try to move downward under the force of gravity, and sound waves move in solids, liquids, and gasses because the atoms in these act like springs that oscillate when compressed or stretched from their equilibrium position. All of these examples only work because there is *something* there for the waves to **travel through** (Sic! – D.C.). If you take away the medium there are no waves."

Yet we must "take away the medium" — there is no *physical* absolute reference frame — and nevertheless observe propagation of light with *invariant* speed. Can we square the circle?

Yes we can. The film reel, acting as 'background' of the 4D football states in Fig. 2, *must not* exist as physical reality[2]. **It** is *atemporal* not-yet-squared **Platonic** reality[9] quietly residing "just in the middle between possibility and reality" (Werner Heisenberg[5]), depicted in Fig. 3. The latter shows the postulate of locality, with infinitesimal **dt** = 1cm.

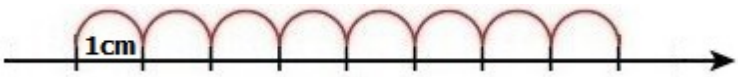

Fig. 3

The second puzzle of photons is that they do *not* exist as 'physical reality out there', e.g., like the football in Fig. 1 above. So, where do the photons come from, and how are they created with a light bulb[11]? Suppose it creates 1.8 x 10^{20} identical photons *per second*: where were these photons located *before* they were created? Wrong question. This is not a mundane physical process, such as, for example, flushing a toilet. In the latter case, we can place all events on a timeline: before we flushed the toilet, the water was present in toilet's reservoir, waiting patiently to be released down the pipe, with particular acceleration and gradually gaining the speed at which it does its final job; then it takes some time to refill the reservoir with fresh water, etc. Nope, photons do *not* exist before they are created from/by the quantum vacuum[12]: the *atemporal,* not-yet-squared **Platonic** reality, residing "just in the middle between possibility and reality" (Werner Heisenberg[5]), *must not* exist in the *physical* world[2]. Again, physicists are only interested in matter[7], and hence are *totally* blind of **It**.

Thus, Einstein's question 'what are light quanta?' points to the postulate of locality and the enduring issue of spacetime continuum[13]. Again, we need a breakthrough.

IV. The topology of spacetime continuum

According to the postulate of locality, an object, such as a football (Fig. 1), can be *directly* influenced only by its *immediate* surroundings. This is a metaphysical conjecture aimed at rejecting the metaphysical idea of 'action at a distance'. Can we have our cake and eat it?

Yes we can, by introducing both *necessary* ('change **in** space' as *local* time) and *sufficient* ('change **of** space' as *global* time) conditions for the flow of Time (Fig. 3), embedded in the topology of spacetime continuum. Namely, I suggest the *atom of geometry*[14], encapsulating the structure, dynamics, and topology of spacetime continuum[4]. There is no need for any

"quantum jumps"[5]. There is no "gravitational" energy *per se*, for the same reason there is no "mental" energy: energy belongs *only* to matter. In both cases, we face specific *distortions* of the physical (local) spacetime, yielding **self-acting** *gravitalized*[4] and biological systems[5].

This is the physics of Life. For a brief outline, read 'the three cats in quantum gravity'[2]. And don't forget that the so-called GW150914 is **FRAUD**: read p. 13 in *Zenon Manifold*[4].

IV. Conclusion

It's all about Time. The solution to the puzzle 'how to bind *mind* to matter'[1] depends on the underlying phenomenon of *matter* interacting with *matter*, following the Heraclitean flow of Time. It is being ***completely*** nullified[7] in the *squared* spacetime interval – once-at-a-time, as read by an inanimate clock. Hence in the *physicalized* world endowed with 4D spacetime, the *necessary* condition for the flow of Time – 'change **in** space' as *local* time (read above) – is the sole physical observable; for example, the *local* time exhibited in the consecutive states of the ball in Fig. 2. In the inanimate world at macroscopic scale studied in classical physics, the effects of the *atemporal,* **not-yet-squared Platonic** reality, pertaining to the *sufficient* condition for the flow of Time – 'change **of** space' as *global* time, Fig. 3 – are FAPP zero. For example, the inanimate ball in Fig. 2 could not be EPR-like correlated[10] into holomovement, like a fish from a school of fish. The living[5] and quantum-gravitational matter[2] is smarter[4].

Finally, may I add a historical note. This paper is a sequel to the first one, launched thirty years ago. It announced the broadest form of relativistic causality, applicable to all living organisms and to the quantum world, called *biocausality*[1]. The latter includes the crucial '*atemporal* quantum reality' (depicted with the Feynman loop in Fig. 4), as suggested at a seminar at the Bulgarian Academy of Sciences in Sofia 33 years ago, on 5 February 1987[10]. Simply insert Fig. 4 "inside" the infinitesimal **dt** in Fig. 3 above, and you're done.

Fig. 4

To understand the *atemporal*, **not-yet-squared Platonic** quantum reality, read carefully p. **6** in *Brain-Controlled Cold Plasma*[3]. Thirty years ago, I also made a bold statement[1]: "the description of the bond "between" mind and matter and the description of the topology of spacetime are, in essence, one and the same problem". Yes, because in both cases we face the underlying phenomenon of *matter* interacting with *matter*, by following the flow of Time.

However, thirty years ago[1], I could not explain the *atemporal* **Platonic gravitational** reality, thanks to which all gravitating systems exhibit **rotation** (Richard Feynman). I'm still trying. Read pp. 41-45 in *Platonic Theory of Spacetime*[9].

As of today, we still do not have scalable applications of spacetime engineering[14], perhaps because we do not fully understand Time and Continuum[4]. Our 'map' is still at conceptual level, much like the one used by Christopher Columbus. But if he didn't go west, with the insane hope to find shorter route to the Far East, how could have he discovered America?

25 December 2019, 17:35 GMT

References and Notes

1. D. Chakalov, *How to Bind Mind to Matter?* Unpublished manuscript, 15 January 1990; abstract available here.

2. D. Chakalov, *What is the fabric of spacetime made of?* Online paper, 15 December 2019, pp. **4**-**6**, available here.

3. D. Chakalov, *Brain-Controlled Cold Plasma*. Online paper, 27 November 2019, pp. **20**-**21**, p. **25**, available here.

4. D. Chakalov, *Time and Continuum: Zenon Manifold*. Online paper, 15 August 2019, p. **3**, p. **11**, pp. **15**-**16**, p. **22**, available here.

5. D. Chakalov, *The Physics of Life: Flipping a Quantum Coin*. Online paper, 20 January 2019, p. **2**, p. **6**, p. **8**, available here.

6. John Baez, *What's the Energy Density of the Vacuum?* Online paper, 10 June 2011, available here.

7. Robert Geroch, *General Relativity From A to B*. University of Chicago Press, 1976, p. 21; excerpt here.

8. Many physicists are brainwashed with materialistic philosophy. James Hartle, for example, contemplates some "information gathering and utilizing systems (IGUSes)", despite the fact that any IGUS will require a second IGUS nested in the first one, to supervise and organize the gathering and utilizing of information by the first IGUS, *etc.*, just like a homunculus.

9. D. Chakalov, *Platonic Theory of Spacetime*. Online paper, 10 February 2019, p. **3**, p. **31**, available here.

10. D. Chakalov, *Penrose-Norris Diagram*. Online paper, 21 June 2017, p. **4**, available here.

11. D. Chakalov, *Quantum Spacetime*. Talk on 14 March 2017, Slide **9**, available here.

12. Peter W. Milonni, *The Quantum Vacuum*. Academic Press, 1993, Ch. 2.6 available here.

13. John Baez, Struggles with the Continuum, arXiv:1609.01421v3, 2 January 2018, p. 2. Ioannis Raptis, arXiv:gr-qc/0110064v1, 15 October 2001; Sec. 2, (a)-(f) pathologies of the classical spacetime manifold.

14. D. Chakalov, *Spacetime Engineering*. Online paper, 8 August 2019, p. **7**, available here.

You only have to swing the carrot (*potential* future) toward your desired destination, and the donkey will carry you and the cart there.

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Ω Email dchakalov@gmail.com. No permanent address. Download the latest version at this http URL.