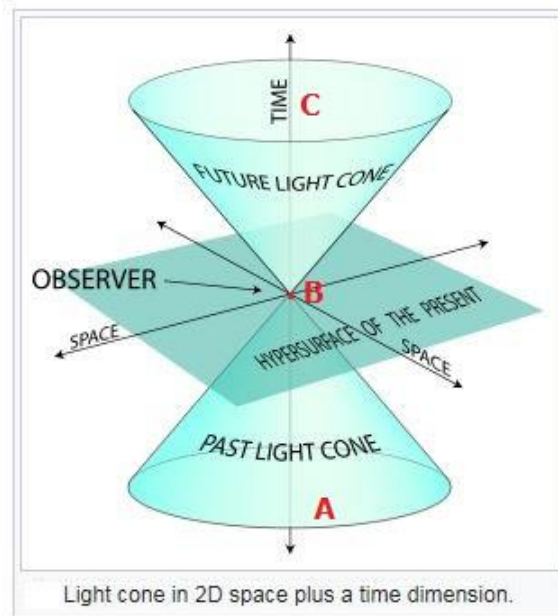


We are here obviously faced with events whose regular and lawful unfolding is guided by a 'mechanism' entirely different from the 'probability mechanism' of physics. We must be prepared to find a new type of physical law.

Erwin Schrödinger, *What Is Life?* February 1943, p. 28

Physics of Life: Flipping a Quantum Coin



To understand the physics of life, first we have to understand Quantum Mechanics⁽ⁱ⁾.

If [Schrödinger's cat paradox](#) is difficult, look at the light cone from [Wikipedia](#) above and consider [flipping a quantum coin](#). Saul Youssef writes in [quant-ph/9509004v1](#):

The situation before the observation could be described by the distribution $(1/2, 1/2)$ and after observing heads our description would be adjusted to $(1, 0)$. The problem is, what would you say to a student who then asks: "Yes, but what causes $(1/2, 1/2)$ to evolve into $(1, 0)$? How does it happen?"

To understand 'how it happens', try to trace back your observation 'heads' $(1, 0)$ from the instant **B** 'here and now'. Before 'heads' $(1, 0)$ happened at **B**, it *should* have been a quantum coin $(1/2, 1/2)$ in your past light cone **A**, according to the axiom of causality ([Wikipedia](#)), **A** → **B** → **C** ([Piotr Chrusciel](#)).

Q: Can you trace back the quantum coin $(1/2, 1/2)$ in your past light cone **A** ?

1. If your answer is 'yes', please explain (i) the dynamics of converting the quantum coin state $(1/2,1/2)$ at **A** into definite state 'heads' $(1,0)$ at **B**, and (ii) the history of the other coin state 'tails' $(0,1)$, which was also in your past **A**, but now is waiting patiently (where?) for the next (in any) flipping of the quantum coin, to get 50/50 chance to be observed.

2. If your answer is 'no', please explain why.

3. If your answer is 'the question does not have an answer', please explain why.

My answer to the quiz is (3), 'the question does not have an answer': the quantum coin $(1/2,1/2)$ is not a fact, and therefore it does not live **anywhere** on the light cone.

But where is it? What kind of 'time' is implied in [Schrödinger equation](#)?

As Alfredo Macias and Hernando Quevedo explain in [gr-qc/0610057v1](#), "time in quantum mechanics is a Newtonian time, i.e., an absolute time. In fact, the two main methods of quantization, namely, canonical quantization method due to Dirac and Feynman's path integral method are based on classical constraints which become operators annihilating the physical states, and on the sum over all possible classical trajectories, respectively. Therefore, both quantization methods rely on the Newton global and absolute time. The absolute character of time in quantum mechanics results is crucial for its interpretation, i.e., matrix elements are evaluated at **fixed** time, and the internal product is unitary, i.e., conserved in time, and it implies conservation of the total probability. Therefore, time is part of the classical background, which is needed for the interpretation of measurements."

Fine, but again, is the quantum coin $(1/2,1/2)$ located **anywhere** on the light cone? Read [Erwin Schrödinger](#) from 1935:

In general, a variable has no definite value before I measure it;
then measuring it does *not* mean ascertaining the value that it *has*.

Therefore, the quantum coin $(1/2,1/2)$ cannot have definite values, neither before we measure it nor *after* we measured it.

But again, is the quantum coin $(1/2,1/2)$ **anywhere** on the [light cone](#)? If not, where *is* it ?

Plato suggested the answer twenty-four centuries ago. In modern parlance, the inevitable non-definiteness of the *uncolored* Kochen-Specker sphere ([Helena Granström](#)) is noumenal 'monad without windows' ([Leibniz](#)). It defies any mathematical logic. Read p. 44 in '[Platonic Theory of Spacetime](#)' from 4 November 2018, available at my website below. Both the quantum coin and the [Schrödinger cat](#) exist 'out there' as Platonic reality, known as *Res potentia*. The Moon ([David Mermin](#)) also exists 'out there', but as physical reality of 'facts' (*Res extensa*) placed only in the past light cone **A**. The Platonic *Res potentia* originates "between" **null intervals**, i.e., "between" photon's emission and absorption ([Kevin Brown](#)). It communicates (p. 44) with matter and fields in the past **light cone A only** at the event **B** 'here and now' — once-at-a-time ([Slide 7](#)), as recorded with a clock. This is not some fake "quantum computing". This is the physics of life ([Erwin Schrödinger](#)). **RDFM**.

Needless to say, the physics of life cannot be understood without gravity. Many people are brainwashed with the current textbooks in General Relativity, and will claim that gravity is classical phenomenon, because it always has definite values, both before we measure it and

after we measured it. But what makes up 'gravity' to become *geometric*, and not physical, "field"? What is the *origin* of gravity? Let's try to find out what this phenomenon is not.

The origin of gravity is not some quantum phenomenon, like the quantum dice above, but the origin of gravity is not some force field either: read the first paragraph in [p. 45](#) and follow the links. Surely the physical *contributions* to gravity, placed in the right-hand side of [Einstein field equations](#), have *always* definite values, like the 'heads' (1,0) and 'tails' (0,1) above, but the left-hand side contains an *entirely* different, neither quantum nor classical, animal. Many people consider "intuitively clear" to interpret this brand new object as 'pure geometry', like the grin of the Cheshire cat *without* the cat ([p. 15](#)), but here's a catch: "There is no spring or sink *everywhere* (emphasis mine – D.C.) in spacetime for matter (particles' plus electromagnetic field's) energy-momentum" ([Zhaoyan Wu](#)), which could be reserved *exclusively* for gravity, so that gravity could employ such "spring or sink" to *interact* with matter and fields, say, with a plastic bottle ([p. 21](#)) or with "a bead on a stick" ([Richard Feynman](#)). We face the same puzzle in the physics of the [human brain](#): if the mind were able to interact with brain's tissue, then the mind will be a bona fide physical field.

The only available solution is provided with the Platonic theory of spacetime, [p. 44](#). Namely, the quantum-gravitational *Res potentia* does not live anywhere on the light cone, but only "around" (pardon my French) the event **B** 'here and now' (read [above](#)). Physically, we can observe only its *physicalized* "jackets", cast only in the past light cone **A**, once-at-a-time. We may detect these *gravitalized* "jackets" **iff** their detector is endowed with **self-action**, like the [human brain](#). Forget about the fake "GW astronomy". Welcome aboard and [RDFM](#).

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ⁱ Download the latest version from my website at [this http URL](#).