

# Retrocausality and Life

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**Abstract.** Descartes famously distinguished between two types of substance: *res extensa*, the so called objective reality, and *res cogitans*, our conscious experience. On the contrary, in the energy, momentum, mass equation of Special Relativity:

$$E^2 = m^2 c^4 + p^2 c^2$$

where  $E$  is energy,  $m$  is mass,  $p$  momentum and  $c$  the constant of the speed of light the substance is one “Energy” and the solutions are two. The positive or forward-in-time solution describes energy that diverges from a cause, for example light diverging from a light bulb or heat spreading out from a heater. But in the negative solution, the energy diverges backward-in-time from a future cause. This, quite understandably, was considered an unacceptable solution since it implies retrocausality, which means that an effect occurs before its cause. Einstein solved this problem by assuming that the momentum is always equal to zero; he could do this because the speed of physical bodies is extremely small when compared to the speed of light. And so, in this way, Einstein’s complex energy/momentum/mass equation simplified into the now famous  $E = mc^2$  equation, which always has positive solution. But in quantum mechanics this simplification is not possible, since the spin of particles nears the speed of light; therefore the full energy/momentum/mass equation is required. In 1925 the physicists Oskar Klein and Walter Gordon formulated the first equation that combined quantum mechanics with Einstein’s special relativity. But since the negative time solution was considered unacceptable, it was rejected. Nevertheless, in 1941 the mathematician Luigi Fantappiè suddenly noticed that the properties of this solution perfectly match the mysterious qualities of life:

*“I felt as if I were falling in an abyss, with incredible consequences and conclusions. It suddenly seemed as if the sky were falling apart, or at least the certainties on which mechanical science had based its assumptions. It appeared to me clear that these finalistic properties which lead to differentiation and complexity were real, and existed in nature, as I could recognize them in the living systems...opening consequences which were just incredible and which could deeply change the biological, medical, psychological, and social sciences.”*

In 1942 Fantappiè published a small book titled: “*The Unitary Theory of the Physical and Biological World*”. However, backward-in-time causation was considered impossible and finalism unscientific, and soon after Fantappiè’s death (1956) his theory vanished into thin air.

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