



# Tempora sunt tria

Reflections on time in physics, philosophy and literature

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Time is our theme. It is probably the most difficult argument for any expositor to take seriously. Argentine writer Jorge Luís Borges used to say that time is the essential problem; that once this problem was solved, everything would be solved; he added, however, that there is no danger that the problem will be solved and, therefore, we will always remain anxious. Our reflection in this talk will be devoted to a problem that, from the start, we know that it defeats us; a problem that concerns life, man in particular, and the history of the Universe. This explains why all areas of knowledge are involved with the problem of time!

Poetry and literature give him a place of honor; philosophy has been defeated by time on all its fronts. Physics boasts of having solved the problem through the laws of nature. At first, one could accept the solution considered by mathematicians, that is, the trivial solution: time does not exist, it is an illusion! Once the problem of its existence has been resolved, denying it, it is nevertheless necessary to consider it as existing, because, in any case, it is perceived in the macroscopic world, that is, in life!

Time must exist because there are clocks and, of course, they must also be given a role in the sphere of abstract thinking, since they are crucial for experiments!

And the time, thus, of illusion becomes real: time reborn!

Starting from a phrase by Saint Augustine (tempora sunt tria..., i.e., “times are three...”), in this presentation we divide our reflection on time into three parts. The first part is dedicated to past time, that is, to memory, evoking the thought of the Greeks and Augustine himself. The second part of the presentation is dedicated to perception. The concepts of classical and contemporary physics regarding time are briefly revisited, emphasizing the role of time reversal and touching on some statistical interpretation given by Boltzmann to the Second Law of Thermodynamics. The third and final part, reserved for expectation, is dedicated to the analysis, in very general lines, of how time is treated in the contemporary physics: space-time, time travel, emerging time in quantum physics, etc.