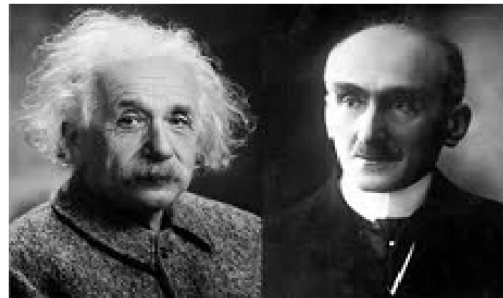


What is time?

Einstein-Bergson 100 years later

L'Aquila, April 4-6, 2019



----- **2nd SEMINAR**

February 7-8, 2019 - Gran Sasso Science Institute – (Via F. Crispi, 7) - Lecture Hall

MATTEO MORGANTI (Roma Tre University) & FEDERICO LAUDISA (Milano Bicocca University)

1. Lecture: *Is time an illusion?* - February 7, h. 16.00 - 19.00
2. Talk: *Relationism about time and Relationism in Contemporary Physics* – February 8, h. 9.30 -11.00
3. Talk: *Relational quantum events, spacetime and (non)locality* - February 8, h. 11. 30- 13.30

Abstract of part I: *Is time an illusion?*

While the flow of time is one of the fundamental, distinctive elements of our experience, the idea that time is in fact unreal cannot be ruled out as a mere absurdity. As a matter of fact, that time is an illusion has been explicitly claimed by both philosophers and scientists. The present talk will provide an overview of this counter-intuitive view of time, focusing, in particular, on important arguments provided by John McTaggart and Kurt Gödel, and on considerations related to recent developments in physical theory.

Abstract of part II: *Relationism about Time and Relationism in Contemporary Physics*

Albeit not particularly popular, there is a view of time, dating back at least to Leibniz, according to which it consists in the mere ordering of things. As a theory specifically about time, such relationism seems to mesh poorly with the developments experienced by physical theory in the 20th century. In this talk, however, I will suggest that relationism about time is still worth exploring, even (in fact, especially) from the perspective of a scientifically-aware philosophy. I will first outline the basic features of relationism about time, and draw some connections between the original relationism-substantivalism dispute and modern and contemporary relational approaches to physical theory. Then, I will look specifically at Julian Barbour's relational quantum gravity, and suggest that relationism is a possible, and indeed advisable, alternative to Barbour's rejection of time.

Abstract of part III: *Relational quantum events, spacetime and (non)locality*

The Rovelli relational interpretation of quantum mechanics (RQM) is based on the assumption according to which the notion of observer-independent state of a physical system is to be rejected. In RQM the primary target of the theory is the analysis of the whole network of relations that may establish among quantum subsystems, and the shift to a relational perspective is supposed to address in a satisfactory way the general problem of the interpretation of quantum mechanics. Here I discuss two basic issues, that I take to be open problems of the interpretation. First, the idea of relational quantum events as a basic metaphysical framework - that has been recently proposed by supporters of RQM - appears to depend crucially on the notion of quantum interaction: as such it is likely to inherit the vagueness of the very notion of interaction in standard quantum mechanics. Second, RQM does not seem to have a consistent position on whether locality holds or not in a relational view of the quantum world.