

## **Mauro Dorato**

*The overcoming of causal explanation in scientific revolution*

### **Abstract**

The main thesis of my talk is that, in three revolutionary transitions (the discovery of inertia, of the invariance of the speed of light, of free fall), phenomena that were previously regarded as crying out for a causal explanation ended up being regarded as “natural”, and therefore as something that did not require any *causal* explanation.

Consequently, we need to extend our theories of scientific revolutions so as to take into account the following three theses: 1) radical scientific change can be schematically characterized as the by-product of an extremely simple methodological rule, namely Goethe’s suggestion of *transforming a (causal) problem into a postulate!* 2) Such a transformation is the outcome of a dialectic between the “scientific” and the “manifest” image of the world in the sense of Sellars, in which *conceptual analysis* plays a decisive role in realizing that the pre-revolutionary puzzle was created by illusory *parts* of the latter image, that ended up being explained away after the acceptance of the former image. 3) The discovery of a new natural order is obtained thanks to arguments based on epistemic indistinguishability.

These three historical cases will then be used to argue that quantum entanglement needs no causal explanation and is fundamental (along with Fine and van Fraassen, since it is the new natural state of the quantum world); what needs to be explained is, rather, the fact that the macroscopic world of the manifest image is separable and non-entangled.