May 19, 2025
15:00 Aula Rostagni
Department of Physics and Astronomy, PADOVA

Tim Maudlin

Professor of Philosophy at **New York University (NYU)**,
Founder and Director of the **John Bell Institute**

The Great Rift in Physics:
Tension Between Relativity and Quantum Theory

Present-day physics rests on two pillars: quantum theory—which is used to account to all the known physical forces save gravity—and General Relativity—which is our presently best theory of gravitational phenomena. But there have been severe difficulties trying to merge these theories, or to see them as both consequences of some single coherent fundamental theory. These difficulties manifest in different ways. Some of them concern the sorts of mathematical resources used in framing each of the theories individually. But some can be appreciated much more directly in a physical way. In short, Special and General Relativity were designed to provide a space-time framework for understanding *local* physics while quantum theory predicts phenomena that John Bell proved cannot be accounted for by any sort of local physics. I will give a quick overview of the sort of space-time structure postulated by Newton (and everyday folk), then the changes to that structure introduced by Einstein, and finally Bell's Theorem and how it bears of the issue of the fundamental structure of time.