ICFO

PLUS+ Training and Development Program

APR

Bell nonlocality in networks

Dr. Marc Olivier-Renou

Course Outline

Bell's theorem proves that quantum theory is inconsistent with local physical models: the correlations created by a single entangled quantum state cannot be reproduced classically. This is quantum nonlocality. It has propelled research in the foundations of quantum theory and quantum information science. As a fundamental feature of quantum theory, it impacts predictions far beyond the traditional scenario of the Einstein-Podolsky-Rosen paradox. In the last decade, the investigation of nonlocality has moved beyond these traditional one source scenarios to consider more sophisticated experiments that involve many independent sources that distribute shares of physical systems among several parties in a network. Network scenarios, and the nonlocal correlations that they give rise to, lead to phenomena that have no counterpart in traditional Bell experiments. In these lectures, I'll first review Bell nonlocality in standard scenarios. Then, I'll discusses the main concepts, methods, results and future challenges in the emerging topic of Bell nonlocality in networks.

Calendar

- Tuesday 13th April 10:00 – 12:00 via Teams
- Thursday 15th April 10:00 – 12:00 via Teams