prof. **Rosario FAZIO**, Head of the Condensed Matter and Statistical Physics Section, The Abdus Salam International Centre for Theoretical Physics, ICTP and professor of Condensed Matter Physics, Università Federico II, Napoli

*Synthetic Quantum Matter*

In the last four decades, the study of specially designed artificial structures have opened new avenues to explore quantum many-body phenomena. This effort has made Feynman's dream come true with the realization of the first prototypes of quantum simulators. I will go on a journey through the major capabilities of these artificial systems both for simulating physical processes and for realizing states of matter that are unlikely to be observed in nature. An example of this sort is the prediction and observation of quantum time crystals.