



SPEAKER: Immanuel Bloch

TITLE: **Realizing Richard Feynman's Dream of a Quantum Simulator**

DATE: 9 Nov 2018, 16:30

PLACE: 500-1-001 - Main Auditorium

ABSTRACT

More than 30 years ago, Richard Feynman outlined the visionary concept of a quantum simulator for carrying out complex physics calculations. Today, his dream has become a reality in laboratories around the world. In my first lecture I will introduce the remarkable new opportunities offered by ultracold quantum gases trapped in optical lattices to address fundamental physics questions ranging from condensed matter physics over statistical physics to high energy physics with table-top experiment. Specifically, I will introduce Quantum Gas Microscopes that have enabled us to image and control quantum matter with single atom sensitivity and single site resolution as well as to probe its dynamical evolution. This unique ability to take single particle resolved snapshots of a many-body system offers numerous wide-ranging applications in exploring the complex microscopic interplay of e.g. charge and spin carriers in electronic materials or the existence of Higgs particles in relativistic quantum field theories.