School of Nano Science

School of PHYSICS

IPM Condensed Matter & Statistical Physics Group

# Weekly Seminar

## The new era of quantum technologies - quantum simulators in particular ...


Invited speaker:

**Dr. Hamed Saberi**

*Department of Optics at Palacký University (CZ) & Center for Optoelectronics and Photonics Paderborn (CeOPP) (DE)*



**Abstract:**

The frustration in physical realization of a universal quantum computer (UQC) conjectured earlier by R. Feynman mainly owing to real-life decoherence hassles and limitations led in recent years to a constructive shift of the computing paradigm toward the spin-offs of the long-standing efforts, the one referred to as "quantum technologies" (QuTech) with a wide and multidisciplinary range of potential applications in science and engineering: "Quantum simulators" among them promise to revolutionize our simulational capabilities by allowing us to solve otherwise unamenable problems: they are ad-hoc problem-solvers that turn a complex and typically NP-hard problem into a tractable "renormalized" analogue, i.e., the co-called "simulator", and offer this way an effective solution to the originally intractable one. Quantum simulation can be described as "fighting fire with fire" since the very exponential growth of the quantum many-body Hilbert space is employed in order to overcome the quantum complexity associated with real quantum platforms. Paradigmatic examples of the idea are given in the context of integrated photonics.


**Wednesday, February 7th, 2018(18 Bahman 1396), 14-15**

**Seminar Room (classroom A), Farmanieh Building, IPM**