

Non-perturbative Cavity QED

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September 27, (2018), 11:00.

Place: Department of Theoretical Condensed Matter Physics, Faculty of Sciences, Module 5, Seminar Room (5th Floor).

Speaker: Peter Rabl, Vienna University of Technology, Austria.



In quantum optical systems the coupling between a single dipole and a single cavity mode is always much smaller than the absolute energy scales involved, which allows us to understand and model light-matter interactions in terms of well-defined atomic and photonic excitations. With recent advances in the field of circuit QED it is now possible to go beyond this well-established paradigm and enter a fully non-perturbative regime, where the coupling between a single artificial atom (e.g. a superconducting qubit) and a microwave photon exceeds the energy of the photon itself. Such conditions can be associated with an effective finestructure constant of order unity and in this talk I will give a brief introduction about the basic models and novel effects that govern the physics of light-matter interactions in this previously inaccessible regime.