

Q 13 Hauptvortrag II

Zeit: Montag 16:30–17:00

Raum: HVI

Hauptvortrag

Q 13.1 Mo 16:30 HVI

Coupling Light and Atoms — Recent Results and New Approaches — ●A. RAUSCHENBEUTEL, W. ALT, I. DOTSENKO, D. HAUBRICH, M. KHUDAVERDYAN, Y. MIROSHNYCHENKO, M. PÖLLINGER, S. REICK, G. SAGUÉ, E. VETSCH, F. WARKEN, and D. MESCHÉDE — Institute for Applied Physics, University of Bonn, Wegelerstr. 8, D-53115 Bonn

In the Bonn experiment concerned with single atom manipulation, we actively work towards a deterministic coupling of single dipole-trapped neutral atoms to the mode of an ultrahigh finesse Fabry-Perot resonator. The goal of these cavity quantum electrodynamics experiments is to realize a coherent evolution of the coupled atom–light system and to eventually achieve a controlled interaction between two atoms, simultaneously coupled to the resonator mode. This would then allow the preparation of entangled pairs of neutral atoms and the implementation of quantum logic gates operating on a quantum register of neutral atoms. In addition, for possible future applications, it would be most desirable to minimize and integrate such trapped atom cavity QED systems. We have therefore initiated a new project that aims at combining atomic and molecular quantum optics with the field of light confinement and control in tapered optical fibres. This goal is motivated by the perspective of building and operating integrated glass fibre quantum optical devices which rely on the controlled interaction between light and matter close to or on the surface of specially designed optical fibres. Due to the quantum nature of this interaction, these devices promise to offer enhanced and even entirely new functionalities as compared to classical systems.