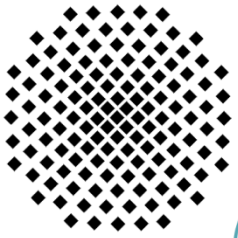
Stuttgarter Physikalisches Kolloquium

Fachbereich Physik, Universität Stuttgart
Max-Planck-Institut für Festkörperforschung
Max-Planck-Institut für Intelligente Systeme

Ansprechpartner: Prof. Harald Giessen
E-Mail: giessen@physik.uni-stuttgart.de
Telefon: 0711 - 685-65111



Dienstag, 16. Juli 2019	16:15 Uhr	Hörsaal V 57.01

Universität Stuttgart, Pfaffenwaldring 57, 70569 Stuttgart-Vaihingen

Gastgeber: Prof. Dr. Peter Michler, Universität Stuttgart, Telefon: 0711 - 685-64660

Hybrid Quantum Technology Based on Quantum Emitters in Condensed Phase

Oliver Benson
Humboldt-Universität Berlin

Abstract

A quantum hybrid system can be defined as two or more dissimilar physical systems that share a joint quantum state. Aside from being a fundamentally interesting object, several applications such as quantum information processing (quantum computers, quantum repeaters) or quantum sensing have been suggested. Bringing two dissimilar systems in a joint quantum state can be established by entangling them with photons or surface plasmon polaritons followed by joint measurements.

Here we provide an overview of different approaches in these directions. We introduce different kinds of quantum emitters (quantum dots, defect centers in diamond, molecules) as stationary quantum systems. Photon sources as part of a quantum hybrid architecture can provide the ‘glue’ for such dissimilar quantum systems.

We report on our recent results on non-linear photon conversion to the telecom band as well as strategies to employ efficient photon coupling of light from defect centers in diamond via dielectric or plasmonic antenna structures. Future directions towards a higher level of integration will be discussed.