IQST

IQST Seminar by Prof. Richard J. Warburton

Department of Physics, University of Basel, Switzerland

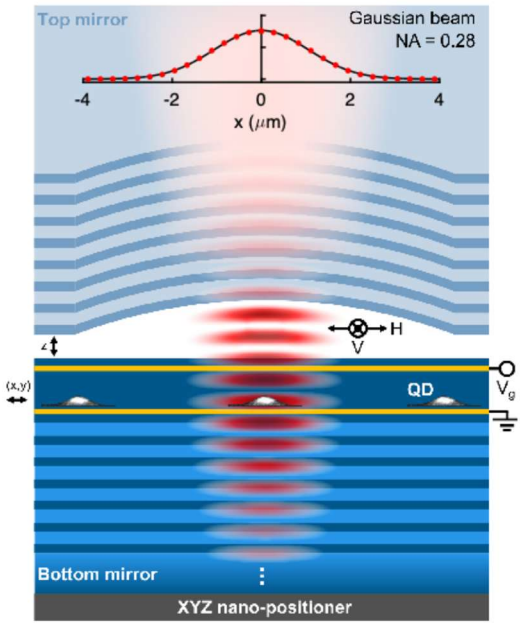
Quantum photonics with a semiconductor

Time: Thursday, 4 December 2026, 15:45
Location: KIT, Otto Lehman Lecture-Hall, Engesserstr. 7

Abstract:

A quantum dot in a semiconductor mimics a two-level atom. Semiconductor technology (growth of heterostructures and post-growth fabrication) can be exploited to add functionality. For instance, the quantum dot charge can be controlled via Coulomb blockade, the emission wavelength can be fine-tuned in situ via the dc Stark effect, and the radiative lifetime can be manipulated by engineering the photonic environment. This leads to a versatile system for probing the light-matter interaction at the quantum level. Furthermore, a deterministic single-photon source can be designed and realised. However, a noisy environment leads to noisy photons. Can the noise in the semiconductor be controlled such that the photons become useful in the most demanding quantum technologies? And can a high-fidelity source of entangled photons be realised? The talk will present recent progress in the field and present some discussion on these questions.

The figure shows a quantum dot embedded in an open microcavity.



For more information, please contact Prof. David Hunger at david.hunger@kit.edu