



## Colloquium

# Shedding Light on Nuclear Spins: Through the looking-glass

**Mete Atatüre**

University of Cambridge

Host: Denitsa Baykusheva

Optically active spins in solids are strong candidates for scalable devices towards quantum networks. Semiconductor quantum dots set the state-of-the-art as single-photon sources with high level tuneability, brightness, and indistinguishability. In parallel, their inherently mesoscopic nature leads to a unique realisation of a tripartite interface between light as information carrier, an electron spin as a proxy qubit, and an isolated nuclear spin ensemble. The ability to control these constituents and their mutual interactions create opportunities to realize an optically controllable ensemble of ~50,000 spins. In this talk, I will present a journey from treating the quantum dot nuclei as an uncontrolled noise source limiting spin coherence to the observation of their collective magnon modes and eventually to their function as a quantum register, all witnessed via a single electron spin driven by light.

**Tuesday, May 13, 2025 11:00am - 12:00pm**

Office Bldg West / Ground floor / Heinzl Seminar Room (I21.EG.101)



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.

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