



Optics and Photonics Seminar

Friday, February 10, 2023, 11:00 am

IRIS – R. 2.049 (Foyer), Zum Großen Windkanal 2, 12489 Berlin

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Engineering useful quantum systems

Quantum technologies have the potential to revolutionize sensing, communication, and computation. To realize this potential, it will be necessary to scale the size and complexity of engineered quantum systems by several orders of magnitude without sacrificing coherence or fidelity. Trapped ion qubits provide unparalleled coherence and are a leading platform for current small-scale quantum technology demonstrations. Optical addressing of individual ions with low crosstalk enables high-fidelity single and multi-qubit gates, and ions trapped in the same potential naturally allow for all-to-all connectivity. However, demonstrations of trapped ion quantum information processing have not gone beyond tens of qubits. In this talk, I will lay out the hurdles facing large-scale trapped ion quantum information processing and discuss a path forward.