



Physical Sciences Seminar

Quantum Science with Tweezer Arrays

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Host: Maksym Serbyn

Recently, cold atoms in optical tweezer arrays have emerged as a versatile platform for quantum science applications. I will review these developments and give an update on ongoing experiments with alkaline earth atoms. 1) I will introduce atom-by-atom assembly as a fast and simple method to generate defect-free atomic arrays. 2) I will review how such arrays can be used as a quantum simulator of spin models by introducing Rydberg interactions. 3) I will outline how we can improve on current coherence limitations and open new avenues in quantum metrology by using alkaline earth atoms, followed by an overview of recent results. These include single atom imaging with ~ 0.9999 fidelity and ~ 0.999 survival fraction, enabling us to perform repeated high-fidelity detection for thousands of time. I will further present preliminary results on implementing an operational optical clock based on parallel single-atom interrogation of ~ 40 atoms in a tweezer array with $\sim \text{Hz}$ level resolution, effectively merging optical clock techniques with control of single neutral atoms.

Tuesday, June 4, 2019 11:00am - 12:00pm

Mondi Seminar Room 2, Central Building



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

Please find a schedule of the ISTA Shuttle on our webpage:

<https://ista.ac.at/en/campus/how-to-get-here/> The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.