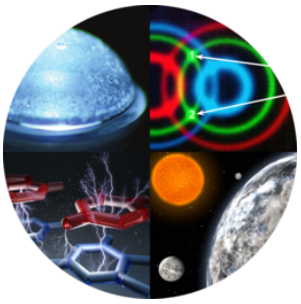

Münchner Physik-Kolloquium

at home! Winter 2020/21

Dieses Semester findet das Kolloquium online statt: https://tum-conf.zoom.us/j/93234766313

Quantum Science with Tweezer Arrays

Prof. Dr. Manuel Endres, *Caltech, Pasadena, USA*

Monday, 5 October 2020, 17:15 h
https://tum-conf.zoom.us/j/93234766313 Meeting-ID: 932 3476 6313 Passwort: Kolloquium
Software bitte möglichst vorab installieren.

Optical tweezer arrays applied to cold neutral atoms have emerged as a versatile platform for quantum science. In particular, atom-by-atom assembly–a feedback-based scheme for entropy removal–now enables he generation of defect-free atomic arrays with flexible geometric arrangements. These assembled atomic arrays form the starting point for experiments in quantum simulation and computing based on excitation to Rydberg states. I will review these developments and describe our very recent results for alkaline-earth atoms. The rich level structure of such two valence-electron atoms enables novel cooling, control, and read-out schemes. We have used these techniques in demonstrations of record imaging and two-qubit entanglement fidelities for neutral atoms. At the same time, this direction naturally merges high-precision spectroscopy with single-atom control within many-atom systems, as exemplified by novel *tweezer array clocks*. All in all, tweezer arrays with alkali or alkaline-earth atoms promise a host of high-fidelity applications along almost all axes of quantum science, including simulation, computing, metrology, and communication.

Unfortunately, there won't be a ''Student event: Meet the speaker'' this week.