

# KIDS TALK

## “Rydberg-excited mesoscopic atomic ensembles: spectroscopy of a superatom”

Speaker: Tobias Weber, AG Ott

Abstract: Atomic ensembles which are optically driven to a Rydberg state represent quantum-matter that provides fascinating interacting many-body phenomena, such as atom-atom entanglement, many-body Rabi oscillations, strong photon-photon interaction and spatial pair correlations. In its most basic form, Rydberg quantum matter consists of an isolated ensemble with excitations restricted by the Rydberg blockade, constituting an effective two-level system - a so-called *superatom*.

In this talk I will give an introduction to Rydberg atoms, their mutual interaction and their ionization. I will introduce the concept of the Rydberg blockade via collective excitation and of temporal correlation functions. After explaining the technique of scanning electron beam microscopy of ultracold atomic gases, an apparatus that exploits all these tools, allowing for the realization of Rydberg-excited superatoms, is described. Finally, I will present recent results of the spectroscopy of Rydberg-excited ensembles in the superatom regime and beyond, revealing genuine properties of the excitation statistics, the effective interaction strength within the system and different regimes of the excitation dynamics.

When: Friday, December 5<sup>th</sup>, 10:00 am

Where: Room 46-387/388

All undergraduate and graduate students as well as postdocs are welcome and encouraged to join our discussion!

For subscription to kids mailinglist, questions, comments or suggestions:  
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\*\*\*\*\* **COFFEE, TEA AND COOKIES WILL BE SERVED** \*\*\*\*\*

