



Colloquium

"Nonlinear quantum optics via interacting Rydberg atoms"

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Mapping the strong interaction between Rydberg excitations in ultracold atomic ensembles onto single photons enables the realization of optical nonlinearities which can modify light on the level of individual photons. This novel approach forms the basis of a growing Rydberg quantum optics toolbox, which enables photonic logic building-blocks such as single-photon sources, all-optical transistors and photonic quantum gates. More broadly, interacting photons are a novel approach to realize strongly correlated quantum few-body systems. In this talk, I will introduce the general concepts of Rydberg quantum optics and present recent experiments from our labs utilizing both Rubidium and Ytterbium atoms as nonlinear medium. Specifically, I will show recent results on transverse photon-photon interaction enabling photon-number dependent beam-shaping. Furthermore, I will present our first investigations of Rydberg-mediated photon-interaction in Ytterbium, highlighting possible advantages of this new platform.

Tuesday, November 17, 2026 11:00am - 12:00pm

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



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