

IQSE AMO QO Seminar Series

Tuesday, June 20th, 11:30 am ZOOM & IQSE
seminar room (MPHY 578)

Pizza will be served for IQSE members at 11:00 am. The talk will start around 11:30 am

Dr. Ofer Firstenberg

(Weizmann Institute of Science, Rehovot, Israel)

Photon-photon interactions: from conditional phase to quantum vortices

ABOUT THE SPEAKER: Prof. Ofer Firstenberg obtained his PhD at the Technion, Israel, working on quantum memories and atomic physics in hot vapor systems. He did his postdoctoral training at Harvard and MIT on photon-photon interactions with ultracold atoms. Since 2014, he has been heading the Light-vs-Matter lab at the Weizmann Institute of Science. The lab studies quantum nonlinear optics with Rydberg atoms, long-lived quantum memories, and quantum-enhanced sensors.

EVENT DETAILS: I will discuss the experimental realization of strong photon-photon interactions in a quantum nonlinear medium based on ultracold Rydberg atoms. This interaction results in a faster phase accumulation for copropagating photon pairs, producing a quantum vortex-antivortex pair within the two-photon wavefunction. The “conditional” phase localized between these vortices could be employed for deterministic quantum logic operations. Moreover, triplets of photons produce vortex lines and a vortex ring, giving rise to a conditional phase. The deviation from the conditional phase, expected for a quantum Kerr-nonlinear medium, attests to genuine three-photon interaction.

ZOOM information:

<https://tamu.zoom.us/j/98156251523?pwd=QVdSdGxtL1UyY0g1L083SU5QR0QrUT09>

Meeting ID: 981 5625 1523

Passcode: 297578

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