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Quantum nonlinearities on photonic chips: going active

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Abstract

Quantum nanophotonics brings quantum optical effects onto photonic chips, where nanoscale structures interact with, and control, both photons and emitters. One key area that stands to benefit from this type of control is nonlinear quantum optics, which occurs at the ultimate low-power limit since an emitter responds markedly differently to one or two photons. Reaching this ultimate limit, however, is an enduring challenge, since it requires that the emitter (coherently) interact with each passing photon. In this talk, I outline recent progress toward true single-photon quantum nonlinear optics with solid-state emitters coupled to waveguides. I then discuss ways that we can take control of these nonlinearities, and actively tune these effects at, hopefully, ultrashort time scales. One intriguing path that we have begun exploring is the use of the quantum emitter itself as both the nonlinear, and the active, medium.

ההרצאה תתקיים ביום רביעי, ה-26.12.18 בשעה 12:30
באודיטוריום המכון למצב מוצק, קומת כניסה
The lecture will take place on Wednesday, 26.12.18 at 12:30
at the Solid State Institute auditorium, entrance floor

Host: Distinguished Professor Moti Segev