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Non-linear Optics with Cold Atoms inside a Hollow Core Photonic Crystal Fiber MICHAL BAJCSY, SEBASTIAN HOFFERBERTH, VLATKO BALIC, Harvard University, THIBAULT PEYRONEL, MIT, ALEXANDER ZIBROV, Harvard University, VLADAN VULETIC, MIT, MIKHAIL LUKIN, Harvard University — The confinement of cold atoms and photons to a diameter comparable to optical wavelength inside a hollow core photonic crystal fiber dramatically enhances the probability of interaction between a single photon and a single atom compared to free space. As a result, an atomic ensemble consisting of a relatively small number of atoms will create a high optical depth medium that will only need a small number of photons to saturate. Furthermore, coherent control techniques such as Electromagnetically Induced Transparency (EIT) can be used to manipulate atom-photon interactions. Here we present an experimental realization of a few-photon switch based on such a system.

Michal Bajcsy
Harvard University

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