

A single photon switch based on a color center in a diamond nanocavity

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ABSTRACT:

We demonstrate a quantum optical switch based on an individual Silicon Vacancy (SiV) color center integrated in a diamond nanophotonic device. Individual SiV centers with excellent optical coherence properties are introduced nearly deterministically at the center of a 1D diamond photonic crystal cavity via targeted Si ion implantation. We observe ~40% attenuation of weak probe transmission through the coupled system that saturates at a level of an individual photon per system's bandwidth. The transmission is controlled by switching the metastable state of an individual SiV defect. Photon correlation measurements are used to verify optical switching at the single photon level.

Biography: Alp Sipahigil received the B.S. degree in Physics and Electrical Engineering from Bogazici University in 2010. He is currently a Ph.D. candidate in the Department of Physics, Harvard University, working on quantum optics, solid-state spectroscopy and nanophotonics with Prof. Mikhail Lukin.