## Abstract Submitted for the DAMOP17 Meeting of The American Physical Society

An integrated diamond nanophotonics platform for quantum optical networks<sup>1</sup> MIHIR BHASKAR, ALP SIPAHIGIL, RUFFIN EVANS, DENIS SUKACHEV, CHRISTIAN NGUYEN, MICHAEL BUREK, BARTHOLOMEUS MACHIELSE, JOHANNES BORREGAARD, HAIG ATIKIAN, CHARLES MEUWLY, Harvard Univ, LACHLAN ROGERS, PETR SIYUSHEV, MATH-IAS METSCH, Ulm Univ, JOSE PACHECO, RYAN CAMACHO, EDWARD BIELEJEC, Sandia Natl Lab, FEDOR JELEZKO, Ulm Univ, HONGKUN PARK, MARKO LONCAR, MIKHAIL LUKIN, Harvard Univ — We demonstrate a platform for quantum optical networks based on silicon-vacancy (SiV) and germaniumvacancy (GeV) color centers in diamond nanodevices. By placing SiV centers inside diamond photonic crystal cavities, we realize a quantum optical switch controlled by a single SiV. Raman transitions are used to realize a single-photon source with a tunable frequency and bandwidth in a diamond waveguide. We measure intensity correlations of indistinguishable Raman photons emitted into a single waveguide, observing a quantum interference effect resulting from the superradiant emission of two entangled SiV centers. We incorporate GeV centers into nanoscale waveguides and demonstrate high single atom-photon interaction probabilities in a single-pass. We discuss prospects for a high-cooperativity (C >10) spin-photon interface using GeV centers in diamond nanocavities.

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