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Controlling emission of nitrogen-vacancy centers in diamond with nanoscale photonic interfaces NATHALIE DE LEON, BRENDAN SHIELDS, YIWEN CHU, Harvard University Department of Physics, BIRGIT HAUSMANN, MICHAEL BUREK, Harvard University School of Engineering and Applied Sciences, HONGKUN PARK, Harvard University Department of Chemistry and Chemical Biology, MARKO LONCAR, Harvard University School of Engineering and Applied Sciences, MIKHAIL LUKIN, Harvard University Department of Physics — Nitrogen-vacancy (NV) centers are a promising candidate for quantum information processing. They act as artifical atoms in the solid state that can be addressed optically, exhibit spin-dependent fluorescence, and can have transform-limited linewidths at the zero phonon line (ZPL). However, most (>95%) of the emission is into a broad, incoherent phonon side band, limiting quantum applications. We will present recent progress toward coupling NV centers in bulk diamond to photonic crystals and waveguides, with the goal of directing emission into the ZPL and realizing the strong coupling regime for applications such as entanglement of distant NV centers and single photon transistors.

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