Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Nitrogen-Vacancy centers coupled to fiber-based optical microcavities YANNIK FONTANA, ERIKA JANITZ, MAXIMILIAN RUF, MARK DIMOCK, JACK SANKEY, LILIAN CHILDRESS, Department of Physics, McGill University, Canada — We present our efforts to couple nitrogen-vacancy centers (NVs) embedded in micron-thin, ultra-smooth diamond membranes to the optical modes of a fiber-based microcavity. We take advantage of the membrane-based approach to channel the NVs emission to low-loss modes and show cavity finesses up to 20000 for the operational platform. In addition, the cavity can be tuned to modify the NV spectrum over a wide spectral range (ar. 650 to 710 nm). At room temperature and for our typical cavity mode volume, phonon-induced linewidth broadening of the NV spectrum prevents modification of the radiative lifetime (the Purcell effect). However if the cavity length can be reduced down to a few microns, a phonon-assisted process helps increasing the fraction of emitted photon in the cavity mode beyond simple spectral filtering. We discuss progress toward the observation of cavity-funneling with the membrane-based approach. This first step in the direction of coupling broad transitions to "good cavities" is essential for the realization of tunable single-photon sources with high indistinguishability at room temperature.

Yannik Fontana
Department of Physics, McGill University, Canada

Date submitted: 10 Nov 2016 Electronic form version 1.4