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Title:	Nitrogen vacancy center coupling with optical cavity
Authors:	Sehgal, Drisha
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Abstract:	NV center has come forward as a reliable source of single photons at room temperature due to its long coherence time. It is an attractive candidate for quantum computation and information studies at room temperature. However, the emission of the NV center at the room temperature is heavily phonon assisted and only 3 percent of the emitted photons belong to the Zero Phonon line(ZPL), and are single photons. To make NV center a reliable source of single photons we need to minimize the phonon side band and also control the emission to get a better collection frequency and a greater intensity. The focus of my work was to enhance the photon emission rate of the NV center and cut the Phonon side band(PSB) by fabricating nano structures to couple with the NV center. I decided to fabricate a Metal Dielectric Metal cavity structure of resonance wavelength 637nm, same as the ZPL of the NV center. I tried to maximise the quality factor so that photons of a small range of frequency centered around the ZPL escape the cavity. The presence of the structure also enhances the LDOS and increases the Photon emission. I chose silver as the metal and Tantalum(V) Oxide as the dielectric to fabricate the cavity.
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