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ABSTRACT

In my first two weeks here, I worked with one of Dr. Hemmer's group to help them find Nitrogen-vacancy centers in diamond samples. NV centers are currently the best-known source of single photons. The group would later use the NV centers in quantum cryptography experiments. During my second week, I started taking a class with Dr. Hemmer in which he taught me the basics skills, such as machining, optical alignment, and building small circuits. I am currently still taking this class. In my third week here, I moved to a different group of Dr. Hemmer's. This group is looking at the properties of sub-wavelength resonators. A sub-wavelength resonator is a small piece of metal of such shape that, when hit with electromagnetic radiation of proper frequency, it attains negative a index of refraction and a negative permittivity, and it can act as a high-quality filter. I am still doing some reading about the physics behind sub-wavelength resonators. In the coming weeks, I plan to work design my own sub-wavelength resonator that will maximize the quality of the filter.