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Detecting magnetization dynamics with atomic defects in diamonds ARON GUERRERO, Georgia Southern University, TRIO McNair Scholars Program, PASQUALE FERRARO, H.J. JASON LIU, Georgia Southern University — Progress in current technology can be attributed to scaling down internal components, such as magnetic devices. One type of magnetic device, known as a magnonic device, uses magnetic excitations, or spin waves, to transfer information. As these devices are reduced in physical size, current magnetic field detection methods are unable to accurately measure the small magnetic fields produced by the spin waves. Recent studies in the atomic defects in diamonds have shown that the photoluminescent characteristics of these defects can be used to detect fields as small as 3 nT. The defect, known as a nitrogen-vacancy (NV) center, contains a spin-1 electronic system which emits red photons when excited by a green laser. The spin system is also degenerate at microwave energies through Zeeman splitting. The difference in the microwave energies is proportional to the external field that the NV center senses. In this talk, I will discuss the process in which we use a custom confocal microscope to collect the red photons emitted by the NV center in order to determine the magnetic field created by the spin waves in magnetic nanostructures.

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