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**Optical Thin Film Thickness Measurement for the Single Atom Microscope**[1] COURTNEY NELSON, Michigan State University, Occidental College, DUSTIN FRISBIE, JAIDEEP SINGH, Michigan State University, SPINLAB TEAM — The Single Atom Microscope Project proposes an efficient, selective, and sensitive method to measure the ${}^{22}_{10}Ne + {}^{4}_{2}He- >{}^{25}_{12}Mg + n$ reaction. This rare nuclear reaction is a source of neutrons for heavy element development through the slow neutron capture process. This method embeds Magnesium atoms in a solid neon film. The Magnesium atoms exhibit a shifted fluorescence spectrum allowing for the detection of individual fluorescence photons against the excitation light background. Currently, Ytterbium is used in place of Magnesium-25 because it has been more thoroughly studied than Magnesium and we expect it to have a brighter signal. To identify the signal emitted from the Ytterbium atoms, we need to quantify the amount of signal and background per atom in the neon film. We need to know the film thickness to find the number of atoms in the film to determine the amount of light emitted per atom. In preparation for the neon film measurement, I constructed an experiment to advance the understanding of what is required to optically measure a thin film by using a cover glass slide in place of the thin film. This preliminary experiment has determined a measurement method for finding the thickness of a neon thin film on a sapphire substrate.

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