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Experiences Using TPB to Detect Scintillations in Liquid Helium

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In an experiment to measure the neutron beta-decay lifetime using magnetically trapped ultracold neutrons, neutron decays are detected using the scintillation process in liquid helium. When a neutron decays, the decay electron deposits on average 250 keV within the liquid. The helium then scintillates in the extreme ultraviolet, producing ~5500 EUV photons. The trap walls are coated with evaporated TPB which converts the EUV light to visible blue light that is guided and is detected using room temperature photomultiplier tubes. I will review our early work in measuring the fluorescence efficiency of TPB and other fluors, as well as discussing several geometries we investigated as part of our detector development.

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