Abstract Submitted
for the APR16 Meeting of
The American Physical Society

An Estimation of Photon Scattering Length in Tetraphenyl-butadiene DUSTIN STOLP, OLIVIA DALAGER, NAVNEET DHALIWAL, BENJAMIN GODFREY, MICHAEL IRVING, University of California (Davis), KAREEM KAZKAZ, Lawrence Livermore National Lab, AARON MANALAYSAY, CHRISTIAN NEHER, SCOTT STEPHENSON, MANI TRIPATHI, University of California (Davis) — Tetraphenyl-butadiene (TPB) is a wavelength shifting material that can absorb ultraviolet photons and emit blue photons. It is used in the detection of vacuum ultraviolet (VUV) photons, for which typical photo-sensors, such as most photomultiplier tubes (PMT) and silicon photomultipliers (SiPM), do not have any quantum efficiency. The secondary blue light is emitted isotropically, however, due to scattering within the material, its angular distribution upon exiting the material can not be easily predicted. Here we describe a procedure for estimating the scattering length of blue light in TPB, by measuring and modeling the angular distribution as a function of layer thickness. The experiment consists of shining ultraviolet light at various thicknesses of TPB deposited on fused silica, and measuring the intensity of blue light using SiPMs on either side of the sample. We simulate light propagation within the sample to estimate the light yield and compare that to the data. This allows us to estimate mean scattering length for photons in TPB the results of which will be presented.

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Date submitted: 07 Jan 2016 Electronic form version 1.4