Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

**Conversion of far ultraviolet to visible radiation: absolute measurements of the conversion efficiency of tetraphenyl butadiene**[1] ROBERT E. VEST, National Institute of Standards and Technology, MICHAEL A. COPLAN, University of Maryland, CHARLES W. CLARK, Joint Quantum Institute — Far ultraviolet (FUV) scintillation of noble gases is used in dark matter and neutrino research[2] and in neutron detection.[3] Upon collisional excitation, noble gas atoms recombine into excimer molecules that decay by FUV emission. Direct detection of FUV is difficult. Another approach is to convert it to visible light using a wavelength-shifting medium. One such medium, tetraphenyl butadiene (TPB) can be vapor-deposited on substrates. Thus the quality of thin TPB films can be tightly controlled. We have measured the absolute efficiency of FUV-to-visible conversion by 1 $\mu$m-thick TPB films vs. FUV wavelengths between 130 and 300 nm, with 1 nm resolution. The energy efficiency of FUV to visible conversion varies between 1% and 5%. We make comparisons with other recent results.[4]

[1]Work performed at the NIST SURF III Synchrotron Ultraviolet Radiation Facility,
[2] "Liquid noble gas detectors for low energy particle physics," V. Chepel and H. Araújo, *JINST* **8**, R04001 (2013)
[3] "Noble gas excimer scintillation following neutron capture in boron thin films," J. C. McComb,*et al., J. Appl. Phys.* **115**, 144504 (2014)
[4] "Fluorescence efficiency and visible re-emission spectrum of tetraphenyl butadiene films at extreme ultraviolet wavelengths," V. M. Gehman, *et al., Nuc. Inst. Meth.* **A654**, 116 (2011)

Charles W. Clark
Joint Quantum Institute

Date submitted: 06 Nov 2015 Electronic form version 1.4