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An Alternative to Excimer Based Neutron Detection CHANDRA SHAHI, JOSH GRAYBILL, University of Maryland, UWE ARP, ALAN THOMPSON, National Institute of Standards and Technology, MICHAEL COPLAN, University of Maryland, CHARLES CLARK, National Institute of Standards and Technology / University of Maryland — Scintillations from the noble gases excited by energetic charged particles consist of broad-band radiation from the decay of noble gas excimers and atomic line radiation. For xenon excited by MeV alpha particles, the excimer radiation is in the extreme ultra-violet (EUV), centered about 170 nm. The atomic line radiation is primarily in the ultraviolet (UV). The xenon excimer radiation has led to the development of a thermal neutron detector that consists of a film of ^{10}B immersed in xenon at pressures up to one bar[1]. The energetic products of the ^{10}B(n,α)^{7}Li reaction produce the excimer radiation that is detected by an EUV sensitive photomultiplier tube (PMT). Examination of the xenon UV atomic radiation over the region from 200 to 400 nm shows both sharp and broadened lines that can be associated with transitions in neutral and ionized atomic xenon. The ratio of the UV to EUV radiation is approximately 1:3, in agreement with the previous studies[2]. This UV radiation has made it possible to replace the low quantum efficiency, high voltage EUV PMT with a silicon photomultiplier.

[1]J. C. McComb, *et al.*, J. Appl. Phys. **115**, 144504 (2014).
[2]A. Sayers and C. S. Wu, Rev. Sci. Instr. **28**, 758 (1957).

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