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Study on the Radiation Damage of VUV-sensitive MPPC in Liquid Xenon

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A Multi-Pixel Photon Counter (MPPC) sensitive to vacuum ultraviolet (VUV) light, called VUV-MPPC, is used in the liquid xenon (LXe) gamma-ray detector for the MEG II experiment. In the MEG II runs with high intensity muon beam, the degradation of VUV-MPPC's photon detection efficiency (PDE) to VUV light was observed. The cause of PDE degradation is considered due to a surface damage of VUV-MPPC by the irradiation of the muon beam. The plausible candidate radiation sources make the radiation damage are gamma-ray and VUV photon but we couldn't specify which radiation sources make that damage yet. To elucidate the cause of the PDE degradation, we irradiated a VUV-MPPC with the comparable amount of VUV photons as in the MEG II experiment in LXe. In this presentation, we present the results of the reproduction test of PDE degradation for the VUV-MPPC.

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