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Analyzing the Performance of Multi-Anode PMTs for the SoLID Project at Jefferson Lab PATRICK HAURIE, Longwood University — As a part of their particle accelerator upgrade from 6 GeV to 12 GeV, Jefferson Lab is building a Solenoidal Large Intensity Device (SoLID). SoLID is a high rate and large acceptance particle detector containing multiple detectors including an electromagnetic calorimeter, and a large solenoidal magnet. Due to the large number of particles that need to be detected, SoLID needs a photomultiplier setup with high channel density. This research is to characterize the level of performance of Hamamatsu H10966 multi-anode Photomultiplier Tubes (PMTs) for the SoLID project. The two types of PMTs, multi-anode and single-anode, both have advantages and disadvantages. With higher channel density, multi-anode PMTs are more cost effective than single-anode, but it's not possible to control the relative gains of their channels. Single-anode PMTs have more control over their gain, but are easily affected by magnetic fields. We performed a uniformity scan of the multi-anode PMT, which is a measurement of the relative gain of each pixel to make sure the PMT works as the manufacturer specified. The next step was to measure the crosstalk across the PMT. This is the most important part of our research because it tells us if the PMT will be beneficial to the SoLID project.

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