Evaluation of Multi-Anode Photomultipliers for the CLAS12 RICH JENNA SAMUEL, Florida Intl Univ, CAMERON CLARKE, Mississippi State University, VALERY KUBAROVSKY, Thomas Jefferson National Accelerator Facility — Thomas Jefferson National Accelerator Facility has recently upgraded its Continuous Electron Beam Accelerator Facility (CEBAF) Large Acceptance Spectrometer (CLAS12) to provide a comprehensive study of the complex internal structure and dynamics of the nucleon. The upgrade includes new detectors such as the Ring Imaging Cherenkov detector (RICH) composed of multi-anode photomultipliers (MAPMTs). Our study compared two models of Hamamatsu MAPMTs (H8500 and H12700) under consideration for the CLAS12 RICH in terms of their single photoelectron (SPE) peak, dark current, and crosstalk. The MAPMTs were tested inside a light-tight box, using a low intensity laser to simulate single photoelectron events similar to Cherenkov radiation. The H12700's SPE peaks were on average 78% the width of the H8500's peaks. In both models, crosstalk and dark current were found to be 0.1% to 10% the size of the SPE signal, small enough to be negligible for the purposes of the RICH. The H12700s were found to be superior to the H8500s because they had reduced crosstalk and dark current while providing a narrower peak for single photoelectron events. These results show a promising future for the relatively new H12700 MAPMT in identification of single photon events, and put the CLAS12 RICH on schedule to begin taking data with them in 2017.

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