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Active Helium 3/4 Target for Use in MAMI Crystal Ball[1] JENNIFER DEMELL, American Univ, A2 COLLABORATION — By using a Helium 3 Active target (AT) with the A2 photon beam in MAMI, the polarizability of the neutron, a value that has not yet been well defined, can be determined. In order to be used in the MAMI Crystal Ball, the size of the ^{3}He Active Target needed to be decreased. For our experiment we tested new, compact photomultiplier tubes (PMTs) by comparing their response to changes in nitrogen admixture concentration to those of the original, larger PMTs. We also examined the contribution of NINO discriminators, to be attached to the new PMTs to decrease noise effects. We found that the new PMTs and NINO discriminator functioned well and will be used in the future experiment, though a decrease in voltage detection was experienced. Additionally, using AT Geant4, simulations of the upcoming experiment were performed and background and resolution studies conducted. We specifically examined mass loss due to quasi free Compton Scattering, π_0 production and the breakup of the ^{3}He nucleus.

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