Abstract Submitted
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**Testing of Photomultiplier Tubes in a Magnetic Field**[1] ZACHARY WALDRON, American University, A1 COLLABORATION — The A1 collaboration at MAMI in Mainz, Germany has designed a neutron detector that can be used in experiments to measure the electric form factor of the neutron. They will measure elastic scattering from the neutron, using the polarized electron beam from MAMI at A1's experimental hall. The detector will be composed of two walls of staggered scintillator bars which will be read out by photomultiplier tubes (PMT), connected to both ends of each scintillator via light guides. The experiment requires a magnetic field with strength of 1 Tesla, 2m away from the first scintillator wall. The resulting fringe field is sufficient to disrupt the PMTs, despite the addition of Mu Metal shielding. The effects of the fringe field on these PMTs was tested to optimize the amplification of the PMTs. A Helmholtz Coil was designed to generate a controlled magnetic field with equivalent strength to the field that the PMTs will encounter. The PMTs were read out using a multi-channel analyzer, were tested at various angles relative to the magnetic field in order to determine the optimal orientation to minimize signal disruption. Tests were also performed to determine: the neutron detector response to cosmic radiation; and the best method for measuring a magnetic field's strength in two dimensions.

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Zachary Waldron
American University

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