

Abstract Submitted
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Development of a Neutron Detector for A1 at MAMI¹ ZOE PIERCE, George Washington Univ, MAMI A1 COLLABORATION — The Mainz A1 spectrometers perform high precision measurements to investigate the structure of the nucleus and its constituents. Previous knowledge of the neutron form factor (FF) is limited due to poor detection efficiencies. Our goal is to create a neutron detector with an efficiency better than 80%, leading to the improvement of the measurements of the neutron electric FF and reducing systematic uncertainties. This new detector would also open up the possibility to study non-mesonic two-body weak decays. The neutron detector should have a large active detector volume, a high detection efficiency (>80%), a good resolution (<.5 ns), and must be low in cost. The proposed design of the detector follows a modular concept with an active detector volume of approximately one cubic meter. In order to allow high beam currents and their resulting high rates, this detector will be highly segmented using 32 crossed layers consisting of 64 bars, utilizing solid and liquid organic scintillators, with dimensions (15 x 30 x 960) mm³. In total 4096 channels have to be read out via WLS fibers using silicon multi pixel photon counters (MPPC).

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