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## Simulations of the Multi-layer Active target for MoNA Experiments (MAME) with Garfield++

The study of neutron unbound systems via the invariant mass technique is the primary focus of the MoNA Collaboration, which built and operates the MODular Neutron Array (MoNA) and the Large multi-Institutional Scintillator Array (LISA). Reaction cross-sections for producing neutron unbound systems from radioactive ion beams can be small, 0.1-1mb, and the use of a thick reaction target degrades the resolution of the measurement. As an upgrade to a pre-existing Si-Be segmented target, the Gas Electron Multiplier (GEM) technology is being investigated for its use in a Multi-layer Active target for MoNA Experiments (MAME) for the Collaboration's research program at the Facility for Rare Isotope Beams with a possible expansion to missing mass capability. A GEM-based detector could allow for a higher degree of Be-foil segmentation. Performance studies are conducted using Garfield++ to understand electron transport within MAME including GEM configurations, electron position distribution, drift speed, signal generation, and simulation optimization. A Geant4 simulation is being developed to work in tandem with the Garfield++ simulation to model the detector response along with the physics of the reaction/decay process. Preliminary results from simulation-based sensitivity studies will be discussed.

**Primary author:** Mr MENDEZ, Nicholas (Michigan State University)

**Co-authors:** Dr REDPATH, Thomas (Virginia State University); Dr GUEYE, Paul (Michigan State University/FRIB); Ms PHAM, Phuonganh (Michigan State University)

**Presenter:** Mr MENDEZ, Nicholas (Michigan State University)

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