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Simulation of a Novel Active Target for Neutron-Unbound State Measurements[1] NATHAN FRANK, Augustana College (IL), MONA COLLABORATION — Measurement of nuclei at extreme ratios of protons to neutrons is challenging due to the low production rate. New facilities will increase the production of neutron-rich isotopes, but still not reach the neutron dripline for heavier nuclei. We simulated a carbon-based active target system that could be constructed to both increase statistics while preserving the experimental resolution. This simulation is an adaptation of the in-house MoNA Collaboration C++ based simulation tool to extract the decay energy of neutron-unbound states. A number of experiments of this type have been carried out at the National Superconducting Cyclotron Laboratory (NSCL). In most experiments, we produce neutron-unbound nuclei by bombarding a Beryllium target with a radioactive beam. The nucleus of interest immediately decays into a charged particle and one or more neutrons. In this simulation, we have constructed a carbon-based active target that provides a measurement of energy loss, which is used to calculate the nuclear interaction point within the target. This additional information is used to improve the resolution or preserve the resolution of a thinner target while increasing statistics. This presentation will cover some aspects of the simulation process as well as show a resolution improvement of up to about 4 with a $\sim$700 mg/cm^2 active target compared to a Be-target. The simulation utilized experimental settings from published work.

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