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Simulating the beam dynamics of the SECAR Recoil Mass Separator using DYNAC ANNA TETZLAFF, GEORGIOS PERDIKAKIS, PELAGIA TSINTARI, Central Michigan Univ — The reaction rate of ^{56}Ni(n,p)^{56}Co serves a key role in the neutrino-p process which is theorized to contribute to the synthesis of the elements heavier than Fe (e.g. St, Y, and Zr) in Type II core-collapse supernova. To constrain the reaction rate, the cross section of the inverse reaction, ^{56}Co(p, n)^{56}Ni, will be measured with the Separator for Capture Reactions (SECAR). By simulating the transport of the ^{56}Co beam and the ^{56}Ni reaction product we are able to optimize the beam optics before the actual experiment. A model of the recoil mass separator SECAR has been created using the multi-particle beam simulation code DYNAC. The model allows the user to adjust the beam settings as well as the electric and magnetic fields of the elements along the beam line. DYNAC also enables users to create plots of the beam at any point in the beam line. These tools allow the user to optimize the electric and magnetic fields for a beam and study the aspects of the beam without ever having to visit the SECAR facility. With this model, we have been able to accurately recreate the transport of various beams used in SECAR commissioning . We then used the model to simulate and optimize a ^{56}Co beam that we will use in the ^{56}Co(p, n)^{56}Ni experiment.

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