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Experimentally Determining β-Decay Intensities for ^{103,104}Nb to Improve R-process Calculations[1] J. GOMBAS, P.D. DEYOUNG, Hope College, A. SPYROU, A.C. DOMBOS, S. LYONS, National Superconducting Cyclotron Laboratory, THE SUN COLLABORATION — The rapid neutron capture process (r-process) is responsible for the formation of nuclei heavier than iron. This process is theorized to occur in supernovas and/or neutron star mergers. R-process calculations require the accurate knowledge of a significant amount of nuclear properties, the majority of which are not known experimentally. Nuclear masses, β-decay properties and neutron-capture reactions are all input ingredients into r-process models. This present study focuses on the β decay of ^{103}Nb and ^{104}Nb. The β decay of ^{103}Nb and ^{104}Nb, two nuclei found in the r-process, were observed at the NSCL using the Summing NaI (SuN) detector. An unstable beam implanted inside SuN. The γ rays were measured in coincidence with the emitted electrons. The β-decay intensity function was then extracted. The experimentally determined functions for ^{103}Nb and ^{104}Nb will be compared to predictions made by the Quasi Random Phase Approximation (QRPA) model. These theoretical calculations are used in astrophysical models of the r-process. This comparison will lead to a better understanding of the nuclear structure for ^{103}Nb and ^{104}Nb. A more dependable prediction of the formation of heavier nuclei birthed from supernovas or neutron star mergers can then be made.

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