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Properties of neutron-rich ^{71,72,73}Ni S.N. LIDDICK, R. LEWIS, A. SPYROU, S. LYONS, K.L. CHILDERS, A.C. DOMBOS, C. HARRIS, A. PALMISANO, D. RICHMAN, M SMITH, NSCL / MSU, D.L. BLEUEL, N.D. SCIELZO, LLNL, B.P. CRIDER, MissSU, M. GUTTORMSEN, A.C. LARSEN, UOslo, A. SIMON, Notre Dame, A TORODE, MSU, A URECHE, UCB — The rapid neutron capture process (r-process) is responsible for the synthesis of approximately half of the abundance of the heavy elements. The recent LIGO and Virgo gravitational-wave detection from two colliding neutron stars combined with the wealth of electromagnetic follow-up measurements across the electromagnetic spectrum demonstrated the production of heavy nuclei in an r-process. Despite knowing at least one location for the r-process, many open questions remain. The uncertainties in the nuclear physics inputs present a large barrier to accurately model the abundance distributions in large-scale nucleosynthesis calculations. In particular, neutron-capture rates are the most uncertain theoretical input and the most diffcult to measure directly. The β-Oslo method is one indirect approach for constraining the neutron-capture cross section. The β decay of a short-lived nucleus is used to populate the high-energy states in a daughter nucleus and the subsequent photon deexcitation is monitored and used to infer the nuclear level density (NLD) and the γ-ray strength function (γSF). The NLD and γSF are then input into a Hauser-Feshbach model to constrain the neutron capture cross section. A series of experiments have been performed at the National Superconducting Cyclotron Laboratory along the Ni elemental chain. The preliminary results obtained for ^{71,72,73}Ni will be presented.

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