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Understanding the Isotopic Fragmentation of a Nuclear Collision[1]

T.C. FAGAN, REU student from Florida A&M Univ., L.W. MAY, S. WUENSCHEL, Z. KOHLEY, A.S. BOTVINA, S.J. YENNELLO, Cyclotron Institute, Texas A&M Univ., SJYGROUP TEAM — The Statistical Multi-fragmentation Model (SMM) coupled with the Deep Inelastic Transfer Model (DIT) was used to simulate the production and fragmentation of quasi-projectiles produced in the reactions of ^{78,86}Kr+^{58,64}Ni at 35 MeV/u. In order to compare the theoretical results to experimental data taken on the NIMROD-ISIS charged particle array, the simulated data was filtered to account for the acceptance of the detector and experimental source cuts. An isoscaling analysis was performed on the resulting fragments by comparing fragment yields from neutron-rich and neutron-poor reconstructed quasiprojectiles. The results from the simulation show qualitative agreement with the experimental data. The isoscaling parameter α, which is related to the symmetry energy, decreases with increasing excitation energy. This result is seen in both the filtered and un-filtered simulation demonstrating that the experimental observation of the decreasing α /Δ value is not due to the detector bias or source cuts. Furthermore, the isoscaling was investigated as a function of the source N/Z bin widths and a trend in α as a function of changing bin width is observed.

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