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Dynamics of cluster production in heavy ion collisions

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Collisions of heavy ions are the best tools at our disposal to probe nuclear matter. It allows us to reach extreme densities, giving us the possibility to constrain transport models. In particular, at incident energies around 100 MeV/nucleon a participant zone is formed by a part of projectile and target nuclei.

The aim of this work is to characterize the participant zone. We will focus on the characteristics of cluster production (chemical composition, energy, angular distributions, multiplicities, and their correlations). These analyses reveal the neutron richness of the emitted particles, and their yield provides an insight on the mixing of target and projectile contributions. Furthermore, a systematic analysis of the transverse energy of the emitted clusters shows a link between incident energy, compression energy, and density during the reaction.

For this study, INDRA datasets for 124,129Xe+112,124Sn collisions at 100 AMeV have been used to study the effect of neutron richness on the production of light particles. The kinematic study has been done using the datasets for 129Xe+124Sn at 65, 80, 100 and 150 AMeV collisions, and using the 136Xe+124Sn collision dataset for 32 and 45 AMeV.

The results of this analysis were compared to the semi-classical event generator ELIE. This work has been done with the goal of expanding it to a lighter system, 58,64Ni+58,64Ni, measured at 32 and 52 AMeV during the E789 INDRA-FAZIA campaign.

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