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Light cluster production in 32 A.MeV ^{136,124}Xe+^{124,112}Sn reactions.

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The 4π multi-detector INDRA was used to study four reactions with beams of ^{136}Xe and ^{124}Xe, accelerated at 32 MeV/nucleon, and thin (530 μg/cm^2) targets of ^{124}Sn and ^{112}Sn. Recorded event functionality was activated under a triggering factor based on a minimum number of fired detectors over 4π. For the studied reactions the INDRA multi-detector possesses excellent detection performances in the center of mass forward hemisphere whereas in the backward part, energetic detection thresholds prevent the detection with full efficiency of fragments from peripheral reactions. This study is thus performed on the forward part of the c.m and all measured quantities are related to this half hemisphere. Light charged particle (lcp) total transverse energy ($(\Sigma E_t)^{lcp}_{AvCM}$) is used as impact parameter evaluator. Lcp multiplicities (forward c.m) are examined as a function of the impact parameter evaluator (figure 1). It is seen that all multiplicities increase with decreasing impact parameter. This increase is first steep and then reaches a sort of saturation. The saturation is not a plateau-like behavior since the impact parameter evaluator and the lcp multiplicities are self-correlated. By comparing the multiplicity values between the four systems it is possible to extract general evolutions. For very peripheral collisions, data are grouped in two categories (black points and white points, ^{136}Xe and ^{124}Xe projectiles respectively). In that case, the multiplicity evolution depends more on the nature of the projectile than on target N/Z. Decreasing the impact parameter, particle production deviates from this first order target independent behavior towards a dependence on the combined (projectile+target) system N/Z. This is evidenced by almost identical production, for central collisions, of most of the isotopes for ^{124}Xe+^{124}Sn and ^{136}Xe+^{112}Sn systems. The exception is ^{3}He whose trend seems linked to memory of projectile N/Z for all impact parameters.

Ratio of particle production between the different systems will be presented and compared to transport model calculations using different density dependence of the symmetry energy.

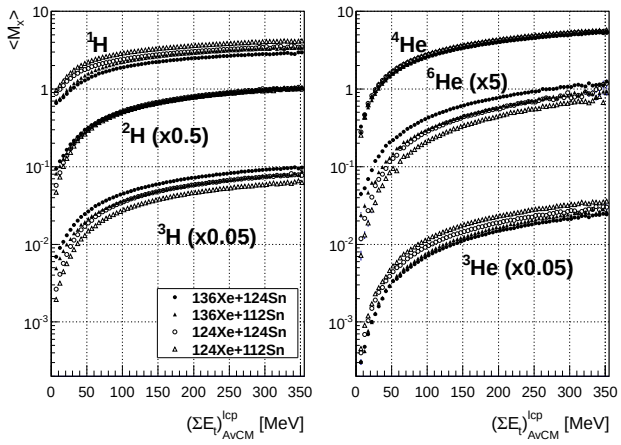

Figure 1: *Average lcp isotope multiplicities (forward c.m) as a function of centrality parameter evaluator for the four systems from peripheral (left) to central collisions (right).*