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Isospin correlations in isotope yields at intermediate and high energy heavy-ion collisions

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Isospin correlations in isotopic yields of fragments produced in peripheral asymmetric reaction systems $^{80}\text{Kr} + ^{40,48}\text{Ca}$ at 35 MeV/nucleon performed recently by FAZIA collaboration [1], have been studied in the framework of a statistical ensemble approach. Isotopic yields of light and intermediate mass fragments, emitted from the quasiprojectile (QP) sources, are compared both with each other and with the experimental results obtained for two reaction systems [2]. The results indicated that the nucleon exchange between the target and projectile nuclei seems inevitable in order to reproduce experimental results. At relativistic energies, however, the nucleon exchange is very unlikely as shown in the analyses of ALADIN and FRS experimental data of projectile fragments produced in the peripheral and mid-peripheral relativistic heavy-ion collisions [3,4], including $^{112,124}\text{Sn} + ^{112,124}\text{Sn}$, and $^{136}\text{Xe} + \text{Pb}$ at an incident beam energy of 1 GeV/nucleon, and measured with the high resolution magnetic spectrometer, the Fragment Separator (FRS) of GSI [5,6]. We discuss possible applications of the results for the production of hypernuclei that may have a broad distribution in masses and isospin extending beyond the proton and neutron driplines, as well.

References

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