

What nuclear reactions imply for astrophysical processes

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The astrophysical processes such as collapse of massive stars, and the supernova type-II explosions can be investigated in the light of thermal nuclear multifragmentation reactions [1]. In these astrophysical processes the stellar matter may reach the nuclear densities in the range of 10^{-5} and 2 times of nuclear saturation density, and the temperatures in $T = 0.5-10$ MeV. We adopt the statistical nuclear multifragmentation model to astrophysical processes to describe properties of supernova matter by including electrons and neutrinos in the statistical ensemble [2]. By this approach, the similarities of physical conditions in nuclear reactions and supernova explosions are discussed [2,3]. We show that possible modifications of the nuclear symmetry energy term at low densities produce significant changes in nuclear composition of stellar matter.

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[3] A.S. Botvina, I.N. Mishustin, Nucl. Phys. A **843**, 98 (2010).