THE INFLUENCE OF FISSION ON NEUTRON STAR MERGER R-PROCESS AND THE POSITION OF THE THIRD R-PROCESS PEAK

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Nucleosynthesis calculations in neutron star mergers (NSM) provide a good test forthe nuclear physics input. As the matter undergoes several fission cycles, the nucleosynthesis yields heavily depend on the distribution of fission fragments and the progress of the r-process path, which is determined by the choice of the nuclear mass model. Here we present NSM r-process calculations employing four different fission fragment mass distribution models in calculations of low-Y_e ejecta [1], ranging from a simple parametrization [2] to extensive statistical treatments (ABLA07) [3]. In addition, we study the effect of two different nuclear mass models, the Finite Range Droplet Model (FRDM) [4] and the Extended Thomas Fermi with Strutinsky Integral (ETFSI) model [5] on the final abundance distribution. Furthermore, we concentrate on the third r-process peak in the abundance distribution, which in many NSM nucleosynthesis calculations is shifted to higher mass numbers compared to the solar abundances (e.g., [6]). We show that its position in the final abundance distribution is very sensitive to the conditions of the freeze-out of the (n,γ)-(γ,n) equilibrium.

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