Nuclear Theory

# System size dependence of intermediate mass fragments in heavy-ion collisions

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We simulate the central reactions of $^{20}$Ne+$^{20}$Ne, $^{40}$Ar+$^{45}$Sc, $^{58}$Ni+$^{58}$Ni, $^{86}$Kr+$^{93}$Nb, $^{129}$Xe+$^{118}$Sn, $^{86}$Kr+$^{197}$Au and $^{197}$Au+$^{197}$Au at different incident energies for different equations of state (EOS), binary cross sections and different widths of Gaussians. A rise and fall behaviour of the multiplicity of intermediate mass fragments (IMFs) is observed. The system size dependence of peak center-of-mass energy E$_{c.m.} ^{max}$ and peak IMF multiplicity $<$N$_{IMF}>^{max}$ is also studied, where it is observed that E$_{c.m.}^{max}$ follows a linear behaviour and $<$N$_{IMF}>^{max}$ shows a power law dependence. A comparison between two clusterization methods, the minimum spanning tree and the minimum spanning tree method with binding energy check (MSTB) is also made. We find that MSTB method reduces the $<$N$_{IMF}>^{max}$ especially in heavy systems. The power law dependence is also observed for fragments of different sizes at E$_{c.m.} ^{max}$ and power law parameter $\tau$ is found to be close to unity in all cases except A$^{max}$.

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