Systematics in Intermediate Mass Fragment Produced in Heavy-Ion Collisions *

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The last few decades have seen advent in heavy-ion research due to production of nuclear matter away from the saturation density. The low density phenomena such as multifragmentation, has drawn great attention as a signature of liquid-gas phase transition. We aim to present here fragment formation as a function of excitation energy for different system masses.

The calculations were made within the framework of *quantum molecular dynamics* (QMD) Model [1]. We simulate the central HI collisions for three entrance channels ^{129}Xe +^{131}Sn (E= 45 to 140 MeV/A), ^{139}La+^{139}La (E= 50 to 120 MeV/A) and ^{197}Au+ ^{197}Au (E= 70 to 130 MeV/A). Model calculations are done with soft equation of state.

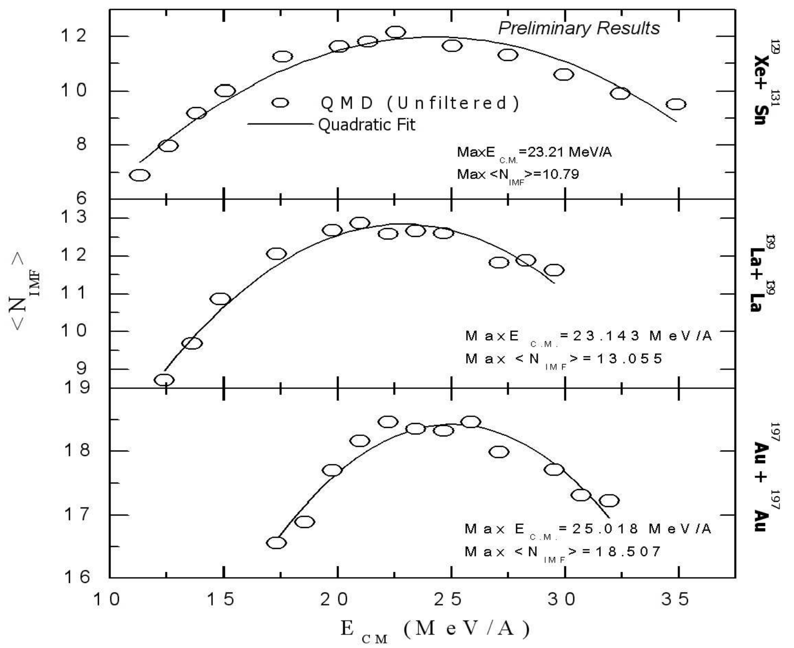

Figure 1: Multiplicity of IMF's as a function of available center of mass energy

In fig. 1 we display the dependence of mean IMF multiplicity $<N_{IMF}>$ on center-of-mass energy E_{CM} (open circles). Solid curves are the quadratic fits to calculated $<N_{IMF}>$. Quadratic curves give an estimate of the peak $<N_{IMF}>$ and the beam energy at which peak occurs. It is clear that (i) systematics of rise and fall in $<N_{IMF}>$ in these systems is consistent with onset of multifragmentation followed by vaporization at higher beam energies [2], and (ii) the center-of-mass energy available for peak IMF emission shows a weak rising trend with system size. This analysis reinforces the experimental attempts to study fragmentation over wide range of system size.

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[1] J. Aichelin, Phys. Rep. **202**, 233 (1991)
[2] T. Li et al., Phys. Rev. Lett. **13**, 1924 (1993); G. F. Peaslee et al., Phys. Rev. C **49**, R2271 (1994)