Multifragmentation with Brownian One-Body Dynamics *

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A first application to nuclear multifragmentation has been made of Brownian One-Body Dynamics [1], a recently suggested simplified model for the dynamics of the one-body phase-space density that approximates the nuclear Boltzmann-Langevin description.

A gold nucleus is compressed to double density and then let free to evolve under the combined influence of the effective one-body field and the residual two-body collision processes, with the effects of the fluctuations included whenever local spinodal instability occurs.

The system quickly expands into a hollow and unstable configuration which transforms into several intermediate-mass fragments. The analysis of the resulting fragment pattern suggests that the model provides a physically reasonable description of nuclear multifragmentation.

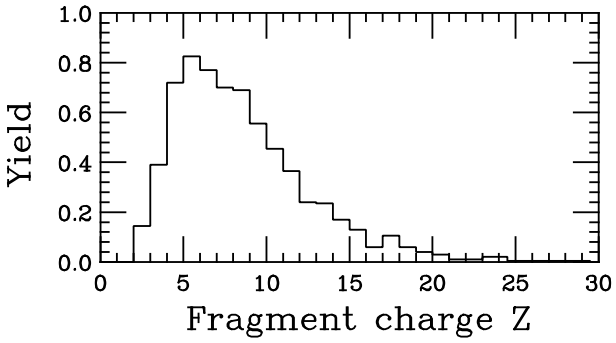

Figure 1: Fragment charge distribution. The fragment charge distribution as obtained by analyzing the matter density at time t=200 fm/c using a density cut equal to $\rho_{\rm cut}$=0.05 fm^{-3}.

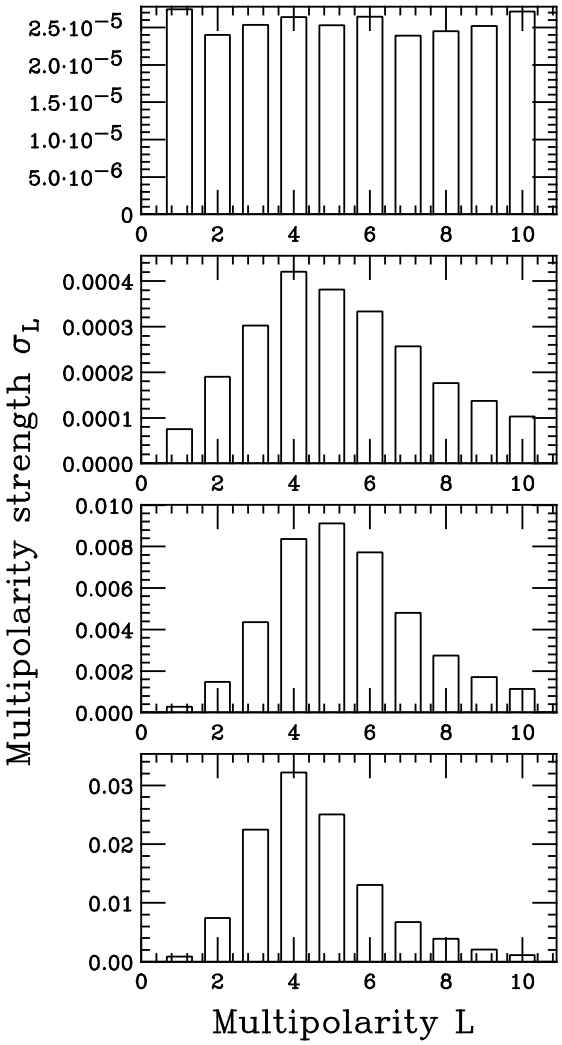

Figure 2: Multipole strength distribution. The multipole strength coefficients σ_L [2] are shown at various points in time, t=0, 60, 120, 180 fm/c, as the initially compressed gold nucleus expands towards a fragmenting hollow shell. The results are obtained by averaging over 100 events.

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[1] Ph. Chomaz, M. Colonna, A. Guarnera, and J. Randrup, Phys. Rev. Lett. 73 (1994) 3512

[2] G. Batko and J. Randrup, Nucl. Phys. A563 (1993) 97