

From Nuclei to Neutron Stars

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In this presentation I will briefly review the properties of, and some recent results obtained with, the Classical Molecular Dynamics model (Illinois Potential)

Then I'll explore the properties of an infinite neutral system in which the nuclear part is described with the above mentioned interaction potential. In this case Coulomb interaction is described by a screened short range term with a Thomas Fermi screening length λ

$$V_c(i, j) = \frac{e^2}{r_{ij}} e^{-r_{ij}/\lambda} \tau_p(i) \tau_p(j)$$

We explore the dependence of fragment mass distributions, topological properties of the system, and other dynamical quantities with the proton fraction X ($0.1 < X < 0.5$),

Temperature ($0.1 \text{ MeV} < T < 1. \text{ MeV}$) and density ($0.1 \rho_0 < \rho < 0.7 \rho_0$)

I'll show different exotic (Nuclear Pasta) shapes that are formed for low temperatures