20. Nuclear Matter at low temperature and density: A case study of frustration in a two component fluid

Claudio O. Dorso, Pedro A. Giménez Molinelli and Juan I. Nichols

Universidad de Buenos Aires, Argentina

Nuclear Matter is an ideal system comprised of two types of particles: 'Neutrons' and 'Protons'. The interaction is such that particles of the same type have a purely repulsive potential (Soft Spheres-like) while particles of differt type present a Lennard-Jones like potential, with a short range attractive part. We describe a purely classic interaction model which presents all these characteristics. Using mpolecular dynamics simulations with this model, we study the behavior of Symmetric Nuclear Matter (sytem with the same number of 'protons' and 'neutrons') under periodic boundary conditions for a wide range of densities and temperatures. We observe that, for low enough temperatures, there is a critical density below which the system relaxes to non-uniform, compact structures. Allegedly, these structures arise from a frustration of a volume energy term by a surface term.