ID de Contribution: **218** Type: **Contribution orale**

Magnetic fields and pasta phases reexamined

mardi 4 juillet 2023 10:14 (14 minutes)

In this work, we compute the structure and composition of the inner crust of a neutron star in the presence of a strong magnetic field, such as it can be found in magnetars.
To determine the geometry and characteristics of the crust inhomogeneities, we consider the compressible liquid drop model, where surface and Coulomb terms are included in the variational equations, and we compare our results with previous calculations based on more approximate treatments.
For the equation of state (EoS), we consider two non-linear relativistic mean-field models with different slopes of the symmetry energy, and
we show that the extension of the inhomogeneous region inside the star core due to the magnetic field strongly depends on the behavior of the symmetry energy in the crustal EoS.
Finally, we argue that the extended spinodal instability observed in previous calculations can be related to the presence of small amplitude density fluctuations in the magnetar outer core,
rather than to a thicker solid crust. The compressible liquid drop model formalism, while in overall agreement with the previous calculations, leads to a systematic suppression of the metastable solutions, thus allowing a more precise estimation of the crust-core transition density and pressure, and therefore a better estimation of the crustal radius.

Affiliation de l'auteur principal

CFisUC, Department of Physics, University of Coimbra, 3004-516 Coimbra, Portugal

Auteurs principaux: Prof. GULMINELLI, Francesca (Normandie Univ., ENSICAEN, UNICAEN, CNRS/IN2P3, LPC Caen, F-14000 Caen, France); Dr PAIS, Helena (Department of Fundamental Physics, University of Salamanca, E-37008 Salamanca, Spain); SCURTO, Luigi (University of Coimbra, LPC Caen)

Orateur: SCURTO, Luigi (University of Coimbra, LPC Caen)

Classification de Session: Mini-colloques: MC11 La matière nucléaire : du laboratoire au cosmos

Classification de thématique: MC11 La matière nucléaire : du laboratoire au cosmos