ID de Contribution: **4** Type: **Non spécifié**

Systematic investigations for the presence of quark matter in neutron star cores

mardi 25 avril 2023 11:30 (30 minutes)

The nature of the fundamental degrees of freedom of the strong interaction at suprasaturation densities, reachable in the core of massive compact stars, is the subject of a large debate. While ab initio nuclear physics calculations provide substantial constraints on the equation of state at low densities, the presence of deconfined quark matter at larger densities, as hinted by perturbative QCD, remains a widely considered hypothesis. In this context, it is important to set limits on the properties of an hypothetical phase transition as well as on the size and characteristics of a possible quark core in these objects. The past decade has also witnessed a drastic improvement in the detection of compact stars, with notably the first observation of a binary neutron star merger with gravitational mergers in August 2017 or the X-ray observations of the NICER mission since 2017. These observations provide promising data in order to constrain the equation of state of dense matter and decide on the occurrence of a phase transition. In this talk, I will discuss different frameworks that have been suggested to describe quark matter and the deconfinement phase transition and examine the potential of the recent astrophysical observations in bringing constraints to the hybrid star hypothesis.

Orateur: PFAFF, Antoine (IP2I)