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Constraining the equation of state of dense matter through thermal emission of neutron stars

Neutron stars are one of the most compact objects in the universe. They are made of a totally degenerated fermion gas, but their interior composition remains unknown. Several scenarios exist and some of them predict phase transitions from ordinary nuclear matter to mesons condensates, hyperonic matter, quark gluon plasma in the core, or even absolutely stable strange quark matter. In order to investigate the possibility of a phase transition, we present a new empirical model for purely nucleonic matter which is able to mimic several existing nuclear model. We show the possibility to put some constraints on the equation of state describing a purely nucelonic interior in order to reproduce observational data coming from thermal emission of low mass X-ray binaries (using Chandra and XMM-Newton observatories). We simultaneously analyse 6 sources with a stretch move algorithm from Monte Carlo by Markov Chains Methods.

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