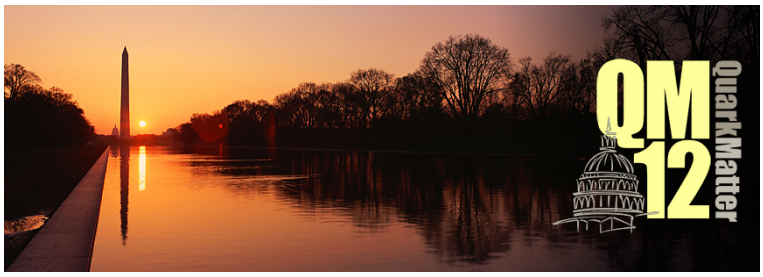

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Constraining the Nuclear Equation of State by Neutron-Star Observables

Thursday, 16 August 2012 16:00 (2 hours)

Recently, the mass of the pulsar PSR J1614-2230 has been measured at a one-percent accuracy to be roughly two solar masses. This, in addition to the statistical analysis of neutron-star radii by Steiner, Lattimer, and Brown lead to tight constraints for the equation of state of dense baryonic matter inside the neutron star. We combine a realistic phenomenological equation of state at low densities with equations of state around nuclear densities derived both from chiral effective field theories, on one hand, and from the Polyakov-loop-extended Nambu–Jona-Lasinio model, on the other. Our analysis based on the Tolman-Oppenheimer-Volkoff equation strongly supports an equation of state of ordinary nuclear matter. This means, that there is no need to include exotic matter in order to stabilize a two-solar mass neutron star. Furthermore, with these constraints we draw conclusions for the QCD phase diagram.

Primary author: Dr HELL, Thomas (Technische Universität München)

Co-authors: Prof. KAISER, Norbert (Technische Universität München); Prof. WEISE, Wolfram (Technische Universität München)

Presenter: Dr HELL, Thomas (Technische Universität München)

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