EXTENDED SKYRME EQUATION OF STATE IN ASYMMETRIC NUCLEAR MATTER

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The quest of unified equation of state (EoS) which is able to describe all the layers forming a neutron stars, *i.e.* from isolated nuclei to an homogeneous Fermi liquid is one of the major goal of the nuclear-astrophysics community. In the present talk, I will briefly present the re- sults we obtained for a new equation of state and based on the extended Skyrme functional. The parameter of the functional have been constrained by using some microscopic Brueckner- Bethe-Goldstone results. The resulting equation of state reproduces the main features of micro- scopic calculations very accurately and is compatible with recent measurements of two times Solar-mass neutron stars. Compared to other microscopic-based EoS is also suitable not only to describe ground state properties of the medium, but also excited states which are relevant for other process as neutrino mean-free path.

The second major advantage of the current EoS is that the extension to finite-temperature case can be done in a very simple way and by using proper approximation also analytically. This is a major advantage for numerical code since the EoS is thus calculated at *any* given value of density and temperature.