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The Equation of State for the Nucleonic and Hyperonic Neutron Stars

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We present a new equation of state for the nucleonic and hyperonic inner core of neutron stars that fulfills the 2 Msun observations as well as the recent determinations of stellar radii below 13 km. The equation of state is obtained from a new parametrization of the FSU2 relativistic mean-field functional that satisfies these latest astrophysical constraints and, at the same time, reproduces the properties of nuclear matter and finite nuclei while fulfilling the restrictions on high-density matter deduced from heavy-ion collisions. We also apply this new nucleonic and hyperonic equation of state for the analysis of the cooling of neutron stars with a hyperonic core.

Primary author: Dr TOLOS, Laura (ICE (CSIC-IEEC))

Presenter: Dr TOLOS, Laura (ICE (CSIC-IEEC))

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