

Neutron stars: the equation of state, superconductivity/superfluidity and transport coefficients (PHAROS WG1+WG2 meeting)



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EOS dependence of the proto-neutron stars evolution

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We explore the Equation Of State (EOS) dependence of the proto-neutron star (PNS) evolution for the first tens of seconds after the core bounce in spherical symmetry.

In particular, we determine the neutrino signal on terrestrial detectors and the frequencies of the gravitational waves due to stellar oscillations.

In our study we consider a nuclear many-body theory EOS, the mean-field GM3 EOS, and the Lattimer-Swesty EOS.

These EOSs are included in a thermodynamical consistent way with a new fitting formula for the interacting free energy at arbitrary temperature and composition.

Moreover, the neutrino mean free paths are determined consistently with the underlying EoS, accounting for the EOS-dependent baryon in-medium effects with the proton and neutron effective masses and single particle potentials.

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