

# Nuclear EoS and transport properties in neutron stars

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We discuss the nuclear EoS in the framework of the Brueckner theory. The interaction is based on the meson exchange model with two and three body components, and the meson parameters are taken from the Bonn B potential, that fits the experimental phase shifts of the NN scattering. Imposing the EoS of  $\beta$ -stable nuclear matter to the stability conditions against the gravitational force, we derive the density profiles and the mass-to-radius plots of neutron stars. From the calculation of in-medium cross sections and nucleon effective masses we derive the shear viscosity and thermal conductivity of  $\beta$ -stable superdense nuclear matter. The density dependence of the transport coefficients combined with the density profiles of the neutron star interior, enable us to extract the time scales related to the damping of collective oscillation to compare with the time scale of the instabilities associated to the emission of gravitational waves. The above described equilibrium and non equilibrium properties of neutron stars could provide a strong crosscheck of the nuclear matter equation of state.