Int. Workshop “Shapes and Dynamics of Atomic Nuclei: Contemporary Aspects”
ed. Nikolay Minkov, Heron Press, Sofia 2021

Thermal support and rapid uniform rotation: Implications on protoneutron stars, hot neutron stars, and neutron star merger remnants

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Abstract

The equation of state along with the hot neutron star matter provides an important framework for studying important astrophysical phenomena, such as the formation of protoneutron stars and the neutron star merger remnants [1]. The equations of state of the fluid in the interior of the star for the above dynamical phenomena are based on the momentum-dependent interaction model and state-of-the-art microscopic data. In particular, we construct them at finite temperature with beta-stable matter, and finite entropy per baryon with varying proton fractions. Furthermore, we investigate in detail the thermal and rotation with the Kepler frequency effects on neutron star quantities, including the mass and radius, the frequency, the Kerr parameter, the moment of inertia, the central baryon density, etc. [2, 3]. Thermal support and its effect on isolated neutron stars, as well as on the postmerger remnants, could provide useful insight and robust constraints on the equation of state of nuclear matter.

References

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