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Speed of sound, compressibility and adiabatic index in the Many-Body Forces Model for nuclear matter at finite temperature

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We present the extension for finite temperature of the Many-Body Forces Model (MBF Model) for the first time. The MBF Model describes nuclear matter in a relativistic quantum hadrodynamics formalism that takes many-body forces into account, by means of a field dependence of the nuclear interaction coupling constants in an adjustable derivative coupling framework. Assuming nuclear matter to be charge neutral, beta-equilibrated and populated by the baryon octet, electrons and muons, we explore the parameters of the model, different hyperonic coupling schemes (also for the first time) and temperature effects to describe basic properties of nuclear matter, including speed of sound, compressibility and adiabatic index. Our first hand results at finite temperature open the path to a new description of proto-neutron stars using the MBF Model.

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