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Damping of density oscillations from bulk viscosity in quark matter

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In the coalescence of binary neutron stars nonequilibrium processes unfold. The dynamics of these processes is influenced by the material's transport coefficients. A comprehensive understanding of the transport coefficients of ultradense matter becomes imperative, as these are determined by the microscopic composition and the dominant interactions of its constituents. To this end we compute the bulk viscosity and the associated damping time of baryon density oscillations in unpaired three-flavor quark matter considering both nonleptonic and semileptonic electroweak processes. Using two different equations of state, namely, the MIT bag model and perturbative QCD, including the leading order corrections in the strong coupling constant. We analyze the dependence of our results on the density, temperature and value of strange quark mass in each case. Our results suggest that bulk viscous damping might be relevant in the postmerger phase after the collision of two neutron stars if deconfined matter is achieved in the process.

session

H. Equation of State and Neutron Stars

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