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# Hyperon bulk viscosity and r-mode suppression in massive neutron stars

We propose and apply a new parameterization of the modified chiral effective model to study rotating neutron stars with hyperon core in the framework of the relativistic mean-field theory. The inclusion of the mesonic cross couplings in the model has improved the density content of the symmetry energy slope parameters, which are in agreement with the findings from recent terrestrial experiments. The bulk viscosity of the hyperonic medium is analyzed to investigate its role in the suppression of gravitationally driven -modes. The hyperonic bulk viscosity coefficient caused by non-leptonic weak interactions and the corresponding damping timescales are calculated and the -mode instability windows are obtained. The present model predicts a significant reduction of the unstable region due to more effective damping of oscillations. We find that from $10^8 K$ to $10^9 K$, hyperonic bulk viscosity completely suppresses the -modes leading to a stable region between the instability windows. The instability can reduce the angular velocity up to $0.15$ , where is the Kepler frequency of the star.

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