

The Modern Physics of Compact Stars and Relativistic Gravity

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Equilibrium properties and oscillation frequencies of charged spheres in GR

We derived an equation for the radial eigenmodes of charged spheres in GR. This equation is applied to stars with different equations of state. We construct stellar models of hadron stars and hybrid stars and calculate the frequencies of their lowest radial modes of vibration. For the hybrid stars a Gibbs construction is employed. It is found that the softening of the equation of state associated with the presence of deconfined quarks reduces the oscillation frequency, even though the average density increases. Chandrasekhar's equation for radial oscillations is generalized for stars with internal electric fields and some mistakes in earlier versions of that generalization are pointed out. We argue that the presence of slight charge imbalances can significantly affect the oscillation frequencies. The importance of non-linear effects for large perturbations or stars close to the maximum-mass configuration is emphasized.

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