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Radial modes of oscillations of magnetized compact hybrid stars

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The nuclear equation of state (EOS) at high density is still an unresolved issue though many theoretical and experimental efforts have been made in the last five decades. It is believed that compact stars such as neutron stars (NS) consist of hadronic and strange quark or color superconducting matter. Stars having a quark core surrounded by hadronic matter, may be considered as hybrid stars (HS). In the HS, there is a phase transition from hadronic to quark matter and a possible region is mixed phase of hadrons and quarks. The mixed phase is well proportionate of both the hadron and quark phases.
A huge magnetic field is predicted in core as well as on surface of the neutron star. We investigate the influence of strong magnetic field on EOS of relativistic high density cold hadronic matter in beta equilibrium and also of quark matter. For hadronic matter, EOS we have considered modified chiral sigma model in a relativistic mean field approach and for quark matter EOS, we have used MIT bag model, assuming density dependent bag pressure. Then we incorporated density dependent strong magnetic field in both EOS. We have also constructed an intermediate mixed phase assuming Glendenning conjecture [K K Mohanta et al. PRAMANA journal of physics,82,2014, 797-807]. Finally, we have verified the occurrence of phase transition and mixed phase from the unique behaviour of distribution radial modes of oscillation vs gravitational mass[P K Sahu et al. The Astrophysical Journal, 566, L89 L92, (2002)]. We found that there is a significant effect of magnetic field on the EOS of both the phases, as a result the value of maximum mass and radial modes of oscillation get significantly modified. I will display the details of these effects in my presentation.

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