Contribution ID: **137** Type: **not specified**

Gravitational Wave Signatures of Spin-Polarized Dense Matter in Neutron Stars

Wednesday 15 January 2025 10:28 (7 minutes)

The presence of ultra-strong magnetic fields in magnetar induces significant spin polarization of baryons, profoundly affecting the equation of state (EoS) of dense nuclear matter. This study employs the CDM3Y interaction, a G-matrix-based M3Y interaction, within the Hartree-Fock framework to model spin-polarized nuclear matter in the presence of such extreme magnetic fields. By incorporating spin polarization into the EoS, we analyze its impact on the structure and deformability of neutron stars.
The study explores gravitational wave (GW) signals generated by time-varying quadrupole moments and it is proposed that spin polarized EoS, modifying the star's quadrupole moment can affect the amplitude and characteristics of the emitted GWs.
Future GW observations also will be able to offer unique opportunity to constrain the spin polarization of highly magnetized neutron stars, providing valuable insights into the spin-polarized physics of dense matter.

Author: DAS, Biswarup (PhD. scholar)

Presenter: DAS, Biswarup (PhD. scholar)

Session Classification: Parallel C

Track Classification: 5. Baryon rich QCD matter, nuclear astrophysics