
Contribution ID: **274** Type: **Poster**

# Emission Properties of Non-rotating Neutron Stars with magnetic field using modified TOV equations

*Monday 12 December 2022 14:00 (1 hour)*

Emission properties of the Astrophysical objects such as Neutron Stars are found using mass, pressure profile and thermal cooling rate. In this current work, we determine the cooling rate of spherically symmetric neutron star as a function of time and distance from the star's centre using NSCool code. Here we first find the mass, pressure and baryon number density profile of the non-rotating neutron stars using modified Tolman–Oppenheimer–Volkoff (TOV) system of equations in the presence of intense magnetic field. We used here a constant value of magnetic field and a distance dependent magnetic field in TOV equations to obtain the profile. We employ three different equation of states to solve the TOV equations by assuming that the core of Neutron Stars is composed of a hadronic matter. By employing above profile, we obtain the cooling rate with and without magnetic field to examine the effect of magnetic field for three different equations of states. Observed temperature of a few Neutron Stars have also been plotted along with calculated values for comparison. Finally, emissivity of axions as a dark matter candidates has been calculated as a result of the nucleon Bremsstrahlung mechanism with and without magnetic field.

## Session

Astroparticle Physics and Cosmology

**Author:** YADAV, SHUBHAM (Birla Institute of Technology and Science Pilani, Pilani Campus)

**Co-authors:** Prof. MISHRA, MADHUKAR (Birla Institute of Technology and Science Pilani, Pilani Campus); Prof. SARKAR, Tapomoy Guha (Birla Institute of Technology and Science Pilani, Pilani Campus)

**Presenter:** YADAV, SHUBHAM (Birla Institute of Technology and Science Pilani, Pilani Campus)

**Session Classification:** Poster - 1