Contribution ID: **137** Contribution code: **GAL** Type: **Poster**

Simulation of the gamma-ray flux of electrospheres and study of its detectability in our Galaxy

Monday 2 September 2024 09:05 (1 minute)

Electrospheres are the environments of magnetized and rapidly rotating neutron stars acting like particle accelerators. With their central star slightly less energetic than the one of a pulsar, they do not host electron-positron pair creation processes. They consist of a low density plasma made of primary high energy particles. Even if we do not know their number, they are supposed to be numerous in our Galaxy, accounting for the short life of pulsars and of their progenitors, and the long life of neutron stars. The radiative energy flux emitted by the low density plasma is too low to be observed and no electrospheres have been observed individually up to now. We have revisited this problem and analysed the radiative signature of such objects to check wether they could be responsible for a detectable diffuse gamma-ray flux. A recent code, Pulsar Aroma, computing self-consistent stationary solutions of plasma dynamics of electrospheres with the magnetic moment inclined with respect to the rotational axis of the star, was adapted to solve the radiative transfer of ultra-relativistic particles emitting curvature radiation. The spectra obtained in our simulations show a positive slope characterized by a power law which can peak above the TeV along some lines of sight, before undergoing an exponential cutoff. Accounting for the large number of dead pulsars in our Galaxy, electrospheres are likely to be responsible for a diffuse gamma-flux reaching Earth.

Primary author: Mr FRANCEZ, Théo (Laboratoire Univers et THéorie (LUTH) - Observatoire de Paris-PSL)

Co-authors: Mr MOTTEZ, Fabrice (Laboratoire Univers et THéorie (LUTH) - Observatoire de Paris-PSL); Mr VOISIN, Guillaume (Laboratoire Univers et THéorie (LUTH) - Observatoire de Paris-PSL)

Presenter: Mr FRANCEZ, Théo (Laboratoire Univers et THéorie (LUTH) - Observatoire de Paris-PSL)

Session Classification: Poster hang