

Understanding the high-energy emission of pulsars with synchro-curvature radiation models

Out of the several hundreds of gamma-ray pulsars known nowadays, only a few tens have been detected to emit also non-thermal X-ray radiation. Some aspects of the high-energy magnetospheric radiation are still unclear, such as the location of emission. In this talk I will present a radiative model which aims at explaining the high-energy emission of pulsars in an effective way, relying on only three free physical parameters: the electric field, the local magnetic field and the size of the emitting region. The model computes the dynamics of an ensemble of charged particles traveling in peculiar regions of a pulsar's magnetosphere and calculates their spectral emission via synchro-curvature radiation losses. The model successfully fits the entire gamma-ray pulsar population. It also reproduces satisfactorily both the X-ray and gamma-ray bands of the spectral energy distribution of a majority of those gamma-ray pulsars emitting also non-thermal X-rays, describing their spectra across eight orders of magnitude. I will show the most relevant results of the systematic spectral fitting of our model to the known population of high-energy pulsars, after improving the injection region assumptions. Finally, I will present how the spectral fitting can constrain the probable range of the spin period for unidentified pulsar candidates.

Based on:

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