

The Modern Physics of Compact Stars and Relativistic Gravity

18-21 Sept. 2013, Yerevan, Armenia



Contribution ID: 5

Type: **not specified**

The influence of small scale magnetic field on the polar cap X-ray luminosity of old radio pulsars

The influence of small-scale magnetic field on the polar cap heating by reverse positrons is considered. The reverse positron current is calculated in the framework of two models: rapid (J. Arons, E.T.Scharlemann (1979)) and gradually screening (A.K.Harding,A.G.Muslimov (2001), Yu.E.Lyubarskii (1992)). To calculate the electron-positron pairs production rate we take into account only the curvature radiation of primary electrons and its absorption in magnetic field. We use the polar cap model with steady space charge limited electron flow. It is shown that the rapid screening model is in the better agreement with observations of old (age $> 10^6$ years) radio pulsars. The second model usually leads to too strong heating and too large X-ray luminosities. The work has been supported by the RFBR (project 13-02-00112), by the State Program "Leading Scientific Schools of the Russian Federation" (grant NSh-4035.2012.2) and by the Ministry of Education and Science of Russian Federation (agreement No.8409).

Primary author: BARSUKOV, Dmitriy (Ioffe Institute, SPbSPU)

Co-authors: TSYGAN, A. I. (Ioffe Institute); GOGLICHIDZE, Oleg (Ioffe Institute)

Presenter: BARSUKOV, Dmitriy (Ioffe Institute, SPbSPU)