

Can a slow rotating neutron star be a radio pulsar?

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ABSTRACT: It is shown that the curvature radius of magnetic field lines in the polar region of rotating magnetized neutron star can be significantly less than the usual curvature radius of dipole magnetic field. The magnetic field in polar cap is distorted by the toroidal electric currents flowing in the neutron star crust. These currents close up the magnetospheric currents driven by the generation process of electron-positron plasma in pulsar magnetosphere. Due to the decrease in curvature radius the electron-positron plasma generation becomes possible even for slow rotating neutron stars, $P \cdot B_{12}^{-2/3} < 10 \text{sec}$. P is the period of star rotation, B_{12} is the magnitude of the magnetic field on the star surface B in the units of 10^{12}Gauss , $B_{12} = B/10^{12} \text{G}$.