

On the nature of high brightness temperature of pulsar giant pulses

V.M. Kontorovich

Institute of Radio Astronomy of NAS of Ukraine (Kharkov, Ukraine)

One of the important problems, raised by observations of pulsar giant pulses (GPs), is the indication of ultra high energy density of GP radiation, $\sim 10^{15} \text{ erg cm}^{-3}$ [1]. The explanation we propose is based on the idea that the inner vacuum gap is a resonator-cavity [2] excited by discharges in a strong longitudinal electric field that accelerates electrons to high Lorentz-factors. The energy density of the power low-frequency oscillations in the gap can reach the level necessary for GPs [3]. The GPs, in the simplest version of our model, arise due to accidental origin of cavities in magnetospheric plasma through which the radiation goes out. The high energy density of GP radiation is determined by the energy density of cavity oscillations. The duration, phases of GPs, power law distribution of GP intensities are determined by stochastic processes of cavity appearance.

References

- [1] V.A. Soglasnov, et al. ApJ, 616, 439, 2004.
- [2] V.M. Kontorovich. astro-ph:0710.4020.
- [3] V.M. Kontorovich & A.B. Flanchik. astro-ph:0801/0057