



Electron acceleration in Titan's ionosphere

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Prior to Cassini flights the solar wind was considered as the only source of electrons responsible for Saturn kilometric radiation (SKR). Detected correlation of the SKR occurrence and Titan position at its orbit (Farell et al., 2005, Meniotti et al. 2007) points out the energy source of SKR associated with Titan. The observed correlation is not the only indication of acceleration mechanism in the satellite ionosphere. Spacecrafts Voyager I and II discovered ultraviolet airglow from excited molecules in Titan's atmosphere. Estimations showed that the observed radiation intensity corresponded to energy input $(3-5) \times 10^9$ W into Titan's atmosphere. It was also shown that solar photons and photo-electrons are not able to provide the necessary energy input, and energetic magnetosphere electrons can give not more than $\sim 2 \times 10^9$ W (Hunten et al., 1984). The presence of acceleration mechanism in Titan's ionosphere is also confirmed by the results of Radio and Plasma Wave Science (RPWS) experiments during Cassini flyby through Titan's atmosphere tail: energetic electrons and ions with parameters different from those for particles coming from Saturn's magnetosphere have been discovered there (Coates et al., 2007).

In this contribution we consider electron acceleration mechanism in Titan's ionosphere which was successfully used for explanation of observed Io influence on decametric radio emission from Jupiter (Zaitsev et al. 2003, 2006). According to suggested mechanism electron acceleration in the ionosphere occurs due to electric field of charge separation. This field is of the order of induced electric field, but has a field-aligned component. Under Titan's conditions the accelerated electron energy can reach 10 keV that is sufficient for SKR generation. Acceleration mechanism power is enough also for explanation of ultraviolet airglow from Titan.

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