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Investigation of a possible control by Saturn satellites of auroral kilometric radiation

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Abstract

We attempt in this contribution to investigate the possible control of the Saturnian kilometric radiation by the planet's satellites. We use the observation of the Radio and Plasma Wave Science (RPWS) onboard the Cassini spacecraft. We consider the variation of the flux density versus the observation in time and frequency. The auroral kilometric emissions of Saturn are recorded in the frequency band from few kilohertz up to 1 MHz. The investigated period started from 01 Jan. 2004 to 31 Dec. 2007. We distinguish in this analysis between different Saturnian 'sources' which can be recognized by their spectral characteristics. We define two kinds of arc structures: the 'vertex early arcs' (VEA) and the 'vertex late arcs' (VLA). The arcs of the first group set open toward increasing time, while the arcs of the other one open towards decreasing time. A total of 556 arcs have been observed during the four investigated years, where 310 and 246 correspond, respectively, to the vertex early and late arcs. We show how the occurrence of arcs may be related to the position of the satellite around the planet Saturn. We emphasis in this analysis on the eventual control of the Saturnian kilometric radiation by Titan. Our results are compared with previous investigations performed by Daigne et al. (1982) and Kurth et al. (2006) using, respectively, Voyager and Cassini observations.

References

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