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Physical characteristics of the Saturn Kilometric Radiation, recent results based on Cassini's observations

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Abstract

Auroral radio emissions (AREs) are known to emanate from all magnetized planets via Cyclotron Maser Instability triggered by ~keV electrons on polar auroral regions. AREs have been intensively investigated in the cases of Earth (Auroral Kilometric Radiation, or AKR) thanks to many space observations, and Jupiter (broadband kilometer, hectometer and Io-independent decameter emissions) thanks to based-ground radiotelescopes.
The kronian analog of those emissions is the Saturn Kilometric Radiation (SKR), discovered by the Voyager flybys in the 1980's. Voyager studies deduced the main properties of the emission (rotational modulation, main mode of emission, location of intense sources…). More than 25 years later, the Cassini mission brought new SKR observations, thanks to the Radio and Plasma Wave Science (RPWS) experiment, that has continuously recorded kilometric emission since mid-2003.
The RPWS capability to determine the Stokes parameters and the k-vector of detected kilometric waves, associated with the large orbital coverage of the spacecraft, led to improvement of our knowledge of the SKR characteristics. Here, we present a brief summary of recent results obtained by several studies about SKR varying period, wave polarization, visibility of the emission, sources locus and variability. We analyze SKR properties with respect to Earth's and Jovian similar radio emissions and point out opened questions.