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Statistical characteristics and beam properties of Saturn Kilometric Radiation deduced from Cassini Radio data

L. Lamy, B. Cecconi, P. Zarka, R. Prangé
LESIA, CNRS - Observatoire de Paris, 92195 Meudon, France

Since Cassini entered Saturn's magnetosphere in july 2004, the kilometric radiation of Saturn (SKR), which dominates RPWS dynamic spectra, is observed quasi-continuously. Successive orbits of the spacecraft (S/C) have allowed to cover distances to Saturn down to 1.3 Rsat, all local time and, since december 2006, high magnetic latitudes. Based on carefully calibrated, cleaned and normalized long term time series and dynamic spectra, we analyse average properties of SKR. This study confirms and expands over previous results of analyses based on Voyager 1 & 2 observations in the 1980's and a similar behaviour of the left-handed and right-handed polarized SKR sub-components, corresponding respectively to south and north hemisphere. In addition, we report dependences of SKR spectrum versus distance to Saturn, local time, and magnetic latitude of the S/C. These dependences are consistent with the fact that SKR sources are presumed to emit radio waves at a frequency close to the local cyclotron frequency fce, along hollow cones fixed in the 9-12h local time range and localized at latitudes $>70°$. The characterization of beam properties brings constraints to the sources localization and their evolution with time.