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Spectral envelope of Saturnian Kilometric Radiation observed by Cassini/RPWS

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We present a statistical study of the Saturnian Kilometric Radiation (SKR) spectrum recorded by the RPWS/HFR experiment onboard Cassini spacecraft, in orbit around Saturn. We mainly focus on an analysis of the spectral shape in order to determine an envelope spectrum. Although the SKR is found to be very variable in timescales of one hour or one saturnian rotation, we proceed to a classification of the spectra taking into consideration the phenomenology and the polarisation state of the radiation. The SKR frequency range observed by the HFR receiver typically spreads from 3.5 kHz to 1.2 MHz. We distinguish three main components having different spectral shapes and polarisation degrees. The well-known SKR component emits between 80–90 kHz and 800–900 kHz with a full circular polarisation; two additional components become visible below 80 kHz and above 900 kHz, exhibiting a weak linear polarisation (less than 10%). A comparison between the observational spectra and the theoretical spectrum proposed by Galopeau et al. [1989] is also discussed.