

Rotational modulation of Saturn's auroral radio emissions

L. Lamy

Laboratoire d'Etudes et d'Instrumentation en Astrophysique, Observatoire de Paris, Meudon, France (laurent.lamy@obspm.fr)

Abstract

Among the persistent questions raised by the existence of a rotational modulation of the Saturn Kilometric Radiation (SKR), the origin of the variability of the 10.8 hours SKR period at a 1% level over weeks to years remains intriguing. While its short-term fluctuations (20-30 days) have been related to the variations of the solar wind speed, its long-term fluctuations (months to years) were proposed to be triggered by Enceladus mass-loading and/or seasonal variations. This situation has become even more complicated since the recent identification of two separated periods at 10.8h and 10.6h, each varying with time, corresponding to SKR sources located in the southern (S) and the northern (N) hemispheres, respectively. Here, six years of Cassini continuous radio measurements have been used to derive long-term radio periods and phase systems separately for each hemisphere¹. The S phase has then been used to investigate the S SKR rotational modulation (see Figure 1), shown to be consistent with an intrinsically rotating phenomenon, in contrast with the early Voyager picture, but in agreement with the diurnal modulation observed in other kronian auroral phenomena.

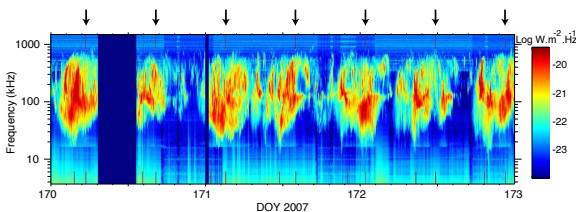


Figure 1: Example of SKR rotational modulation.

¹http://www.lesia.obspm.fr/kronos/skr_periodicity.php