

Spin modulation periods detected in Saturnian kilometric radiation and inner magnetic field

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Abstract

A few years ago, observations performed by the radio and plasma wave science (RPWS) experiment on board the Cassini spacecraft revealed two distinct and variable rotation periods, at 10.6 hours and 10.8 hours, in Saturn's radio emissions. These two periods correspond to SKR produced in the northern and southern hemispheres respectively. The main time modulation of planetary radio emissions has always been attributed to the effect on the inner magnetosphere of the internal magnetic field which rigidly rotates with the deep interior of the planet. As a consequence, the magnetospheric plasma, which is supposed to be frozen in

the magnetic field, should rotate (or sub-rotate) with a unique spin period and such a north/south asymmetry in the radio period should never be observed. However, contrary to the other magnetized planets, Saturn presents a very particular magnetic field since its dipolar moment is nearly aligned with the rotation axis of the planet. This alignment could bring out some phenomena developing in the internal structure which are probably masked in the case of the planets the magnetic dipole of which is significantly tilted. We propose to interpret the existence of the two separated and slowly varying periods in the saturnian magnetic field as the signature of the inner dynamo.