Phase longitude Systems

Although Saturn’s magnetic field is very nearly axisymmetric, rotational modulation of nearly all magnetospheric phenomena (radio emissions, magnetic field perturbations, charged particles, energetic neutrals, motions of the plasma sheet, auroral oval, and magnetopause) have been observed.

Observations have shown that the periods associated with the northern hemisphere and the southern hemispheres have closely spaced but distinct periods and that these periods vary slowly by up to ~ ±1% about ~10.7 hr over Saturn's seasons. Various longitude systems based on magnetic field measurements and Saturn kilometric radio emission (SKR) measured by RPWS have been developed over the mission.

The phase model for the magnetic perturbation systems and a User’s Guide have been provided by Gabby Provan.

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A number of longitude systems defined by SKR emission measured by the RPWS instrument have been derived over the course of the mission (SLS2,3,4). The most recent is SLS5 developed by Ye et al., 2018. That reference provides a succinct history of the development of different SKR longitude systems over the course of the Cassini mission. Lamy ([2011](https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2018GL077976#grl57788-bib-0038)) also defined phase systems for both hemispheres (2004–2010) based on the variable periods of the northern and southern SKR, the power of which was separated according to circular polarization. More recently, Lamy ([2017](https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2018GL077976#grl57788-bib-0039)) extended the analysis to the end of the Cassini mission.

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