

## Kronian current sheet geometry and its link to reconnection

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Saturn's magnetosphere is known to be very axisymmetric due to its near complete lack of a dipole tilt. Because of this we would expect no diurnal variations in the magnetic field. However, spacecraft missions to the planet have found these variations nonetheless. The cause for these diurnal variations are planetary period oscillations (PPOs), related to waves which propagate between Saturn's ionosphere and magnetosphere, creating a global pattern of spatial oscillations which rotates about the planet at a period close to the actual rotation period of Saturn. These waves cause deformations in the planetary current sheet in both height, a process known as flapping, and thickness, known as breathing. It is natural to believe that magnetic reconnection could occur in areas of significantly reduced thickness, however there has been a lack of literature investigating this potential process. Agiwal et al. (2022) is probably the most comprehensive work on this topic and it showed that PPO induced reconnection could occur if the thickness of the current sheet was comparable or smaller than the length scales of the dominant ion species. They also concluded however that PPO induced reconnection might not be an ongoing process and the Vasyliunas cycle is still the primary driver of reconnection. We believe that there is still more to be learned about this process and in this paper wish to expand on the work of Agiwal et al. (2022). This would be done by creating a model of the Kronian current sheet, introducing it in magnetospheric simulations (Hybrid or MHD) and then performing simulations for the period corresponding to the Cassini mission. We would then compare potential PPO induced reconnection sites with Cassini data to determine if these reconnection events actually occur and if and how they differ from ones caused by the Vasyliunas cycle.

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