



## **Auroral evidence of flux tube blockage near noon at Saturn's magnetosphere**

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We discuss plasma circulation in Saturn's magnetosphere on the basis of auroral observations. Auroral enhancements in the dawn region are suggested to be related to intense field-aligned currents generated by hot tenuous plasma carried inward in fast moving flux tubes as they return from tail reconnection site to the dayside. Here we demonstrate that the rotation of the auroral emission in the dawn sector is occasionally (in half of the auroral sequences examined) slowed down and blocked near noon for a couple of hours. When the blockage is prominent and persistent, we observe auroral evidence of dayside magnetopause reconnection and opening of flux. A possible interpretation for our observations could be that depleted flux tubes at large radial distances, which rotate around Saturn are blocked in the prenoon sector between the heavy Vasyliunas cycle flux tubes on one side, and the magnetopause on the other side. These depleted flux tubes have to move above or below the current sheet to pass this blockage. The blockage of the field lines close to midday will bend them and trigger reconnection, which opens the flux tubes and allows for solar wind material to enter the magnetosphere. Secondly, we suggest that the circulation pattern of depleted flux tubes close to noon in Saturn's magnetosphere alternates between a 'blocked' and 'unblocked' state, depending on the solar wind dynamic pressure and the internal processes.