



Current systems associated with local plasma injections in Saturn's magnetosphere

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Recent work on local plasma injections in the inner Saturn magnetosphere using Cassini Plasma Spectrometer data showed that they obey the general predictions of centrifugal interchange. This paper will report on further investigations of these phenomena with the goal of determining the nature of the magnetic field-aligned currents that connect them to the ionosphere producing the convection electric fields responsible for their transport. Signatures contained in the magnetic-field data as well as the plasma data show the existence of current systems that both drive and retard the inward motion of flux tubes containing tenuous hot plasma. In both cases the current carriers are shown to be suprathermal electrons originating in either the ionosphere or the magnetosphere that are accelerated by low-frequency waves such as Alfvén ion cyclotron waves.