



## **Spontaneous generation of self-organized solitary structures at the magnetopause,**

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Recent observations by the Cluster satellites in the magnetopause demonstrate the existence of electrostatic solitary wave structures moving down the density gradient associated with the magnetopause boundary. These structures coincide with much higher frequency modes around the lower-hybrid drift frequency, and theory suggests that the two are associated. In this paper we demonstrate that the low-frequency electrostatic solitary structures, also known as zonal flows, are driven by the higher frequency drift modes through the modulational instability. A numerical simulation of the modulational instability of drift waves, adapted for the Cluster context, show very good quantitative agreement with the observation. The turbulence is shown to be responsible for a transport barrier between the solar wind and magnetosphere.