

Evidence for plasma transport by kinetic Alfvén waves at the magnetopause

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We present the first observational evidence for plasma transport across the magnetopause by wave-particle interaction with kinetic Alfvén waves (KAWs). First of all, we reconsider the diffusion process by a KAW. It is shown that the cross-field transport occurs efficiently for particles satisfying the condition $V_{para} = w/k_{para}$ and Lk_{perp} is less than 1.6, where w , k and L are angular frequency, wavenumber and gyroradius. Then we analyzed distribution functions of ions obtained by THEMIS around the magnetopause on 2007-06-03 when KAWs were detected by Chaston et al. (2008). We found that (1) transported cold ions inside the magnetosphere have perpendicular anisotropy, not consistent with plasma transport by poleward-of-the-cusp reconnection, and (2) the ratio of phase space density of these cold ions to that of magnetosheath ions has a peak in a velocity space corresponding to the above transport condition, indicating plasma transport by KAWs.