

Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Cherenkov radiation of shear Alfvén waves in plasmas with two ion species¹ W.A. FARMER, G.J. MORALES, UCLA — In magnetized plasmas with two ion species there exists a unique frequency, the ion-ion hybrid frequency, which significantly alters the dispersion relation for Alfvén waves. Multiple ion species plasmas are encountered both in fusion devices and in planetary magnetospheres. Further, in these environments, various mechanisms exist that give rise to fast, energetic particle populations. It is of interest to examine the excitation of Alfvén waves by these fast particles. Results from a theoretical study of Cherenkov radiation by charged particle bursts in a two ion-species plasma are reported. Due to the presence of two ion-species, the Alfvén waves propagate within two different frequency bands separated by a gap. The radiation pattern in the lower frequency band is found to exhibit essentially the same properties reported in a previous study [B. Van Compernelle et al., Phys. Plasmas 15, 082101 (2008)] of a single species plasma. However, the upper frequency band differs from the lower one in that it always allows for the Cherenkov radiation condition to be met. The methodology is extended to examine the Alfvénic wake of point-charges. The wake is illustrated for conditions applicable to a fusion-born alpha particle in ITER.

¹Sponsored by DOE grant DE - SC0007791

William Farmer
UCLA

Date submitted: 11 Jul 2012

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