

Abstract for an Invited Paper  
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**Experimental test of instability-enhanced collisional friction for determining ion loss in two ion species plasmas<sup>1</sup>**

NOAH HERSHKOWITZ, University of Wisconsin - Madison

Recent experiments have shown that ions in weakly collisional plasmas containing two ion species of comparable densities nearly reach a common velocity at the sheath edge equal to the bulk plasma ion sound velocity. A new theory suggests that this is a consequence of collisional friction between the two ion species enhanced by two stream instability. The theory finds that the difference in velocities at the sheath edge depends on the relative concentrations of the species being small when the concentrations are comparable and large, with each species reaching its own Bohm velocity, when the relative concentration differences are large. To test these findings, ion drift velocities were measured with Ar and Xe ion laser-induced fluorescence in Ar-Xe, He-Ar and He-Xe plasmas and combined with ion acoustic wave and plasma potential data. In addition, Te and neutral pressure were varied. The predictions were found to be in excellent agreement with the experimental data.

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