

Abstract Submitted
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Experimental test of the Baalrud's model for ion loss from a two-species plasma¹ NOAH HERSHKOWITZ, CHI-SHUNG YIP, University of Wisconsin - Madison — Recent experiments have shown that ions in plasmas containing two ion species reach a common velocity at the sheath-presheath boundary [1]. A new theory [2] suggest that collisional friction between the two ion species enhanced by two stream instability dominates the drift velocity of each ion species near the sheath edge but also suggest that there are differences in ion the velocity at the sheath-presheath boundary given by $\sqrt{\frac{1}{2\alpha}(v_{th1}^2 + \alpha v_{th2}^2)}$. This suggests that significant differences in velocity will occur as the relative concentration varies. We report the first experimental test of this model. We measure ion velocity distribution functions (ivdfs) near sheath edge in an Argon/Xenon plasma as a function of the concentration ratios. The relative concentration of the two ion species is determined by the Ion Acoustic Wave phase velocity measurements, the ivdfs are determined by Laser Induced Florescence, the electron temperature is measured by Langmuir probe and the plasma potential is measured by emissive probe.

[1] Lee, D; Hershkowitz, N; Severn, GD. Appl. Phys. Lett. **91**, 041505 (2007)

[2] S.D. Baalrud, J.D. Callen, and C.C. Hegna, GEC 2009

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