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Ar^+ and Xe^+ Velocities near the Presheath-Sheath Boundary in an Ar-Xe Discharge JON TOMAS GUDMUNDSSON, Shanghai Jiao Tong University, MICHAEL A. LIEBERMAN, University of California at Berkeley — The velocities of Ar^+ and Xe^+ ions near the presheath-sheath boundary in an Ar-Xe discharge are studied by particle-in-cell/Monte Carlo simulation [1]. For a pure argon discharge the argon ion has almost the same velocity profile as it does in the mixture of argon and xenon. Similarly, for a xenon discharge the xenon ion has almost the same velocity profile as it does in the mixture of argon and xenon. The ion speed at the sheath-presheath boundary is the same for an ion in a pure argon or xenon discharge and for the same ion in a mixture of argon and xenon. We conclude that, in our simulation, each ion reaches its own Bohm speed at the presheath-sheath interface. These findings contradict the experimental findings of Lee et al. [2] where the ion velocities near the presheath-sheath boundary approach the common ion sound speed for both argon and xenon ions in the Ar-Xe discharge. The simulation results are evaluated by calculating the ion-ion instability condition from kinetic theory. We find no evidence of unstable waves in our simulation, which is the proposed mechanism [3] for a common system speed. [1] J. T. Gudmundsson and M. A. Lieberman, Phys. Rev. Lett. accepted July 2011 [2] D. Lee, N. Hershkowitz, and G. D. Severn, Appl. Phys. Lett. **91** 041505 (2007) [3] S. D. Baalrud and C. C. Hegna, Phys. Plasmas **18** 023505 (2011)

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