

Abstract Submitted
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On the Ar^+ and Xe^+ Velocities near the Presheath-Sheath Boundary in an Ar-Xe Discharge JON T. GUDMUNDSSON, Science Institute, University of Iceland, MICHAEL A. LIEBERMAN, Department of Electrical Engineering and Computer Sciences, University of California, Berkeley, California 94720, USA — We explore the velocities of positive ions near the presheath-sheath boundary in an Ar-Xe discharge by particle-in-cell/Monte Carlo collision simulation [1]. In the absence of ion-ion collisions, 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. Thus, each ion reaches its own Bohm speed at the presheath-sheath interface [1] which contradicts the experimental findings of Lee et al. [2] where the ion velocities approach the common ion sound speed for both ions in the Ar-Xe discharge. These results have been challenged due to the lack of ion-ion Coulomb collisions in our simulations [3]. We discuss the influence of adding ion-ion Coulomb interactions to the simulation as well as increased electron temperature. We estimate the ion-ion Coulomb collision cross section by a Coulomb momentum transfer cross section and assume isotropic angular distribution of the scattered ions.

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- [2] D. Lee et al., Appl. Phys. Lett. 91, 041505 (2007)
- [3] N. Hershkowitz et al., Phys. Rev. Lett. 108, 139501 (2012)

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