

Abstract Submitted
for the GEC07 Meeting of
The American Physical Society

First experimental test of the generalized Bohm criterion using Ar⁺ and Xe⁺ LIF in Ar-Xe plasmas¹ DONGSOO LEE, NOAH HER-SHKOWITZ, University of Wisconsin-Madison, GREG SEVERN, University of San Diego — The Bohm sheath criterion in single- and two-ion species plasmas is studied with laser-induced fluorescence (LIF) using two diode lasers in Xe and Ar-Xe plasmas. The plasmas are generated in a weakly-collisional (< 1 mTorr) unmagnetized dc hot filament discharge confined by multidipole magnetic fields. Two LIF schemes are employed to measure the argon and xenon ion velocity distribution functions (ivdfs) near a negatively biased boundary plate. The Ar II transition sequence at 668.614 nm and Xe II at 680.574 nm are adopted to detect each ion's fluorescence. The results show that the argon and xenon ion velocities appear to approach the ion sound speed of the system near the sheath-presheath boundary, which excludes the possibility that both the ions will have their own Bohm velocities. In addition, the generalized Bohm criterion is also satisfied with the measured data. This is the first experimental test of the generalized Bohm criterion.

¹Work supported by DoE Grant No DE-FG02-97ER54437.

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Date submitted: 14 Jun 2007

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