

Abstract Submitted
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Student Excellence Award Finalist: Laser-induced fluorescence measurement of enhanced ion-acoustic fluctuations in an electron sheath¹

RYAN HOOD, SCOTT BAALRUD, LUCAS BEVING, ROBERT MERLINO, FRED SKIFF, University of Iowa — We present ion fluctuation spectra, resolved spatially through the presheath region of a positively and negatively biased electrode using laser-induced fluorescence (LIF) [1]. Ion-acoustic fluctuations are observed near 500 kHz, about half the ion plasma frequency, throughout the presheath and for positively and negatively biased electrodes. The fluctuation power is observed to increase significantly when the electrode is biased above the plasma potential. However, the fluctuation power does not vary greatly with distance from the electrode. These observations are consistent with a recent theory that predicts the presence of a long-range electron presheath, in which the fast electron flow drives ion-acoustic fluctuations [2]. [1] S. W. Mattingly and F. Skiff, *Rev. Sci. Instrum.* 89, 043508 (2018). [2] B. Scheiner, S. D. Baalrud, B. T. Yee, M. M. Hopkins, and E. V. Barnat, *Phys. Plasmas* 22, 123520 (2015).

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