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An Experiment to Investigate Ion-Ion Two-Stream Instabilities in the Presheath RYAN T. HOOD, SCOTT D. BAALRUD, FREDERICK N. SKIFF, ROBERT L. MERLINO, University of Iowa — An experiment has been constructed to investigate ion-ion two-stream instabilities and their effect on ion flow velocities near sheaths. The device is a multidipole hot filament discharge operated in a mixture of argon and xenon. An emissive probe will be used to measure the electrostatic potential and laser induced fluorescence (LIF) will be used to measure the ion velocity distributions throughout the presheath of a negatively biased electrode. Optical tagging and LIF will be used to measure fluctuations in the ion distribution functions in an effort to search for evidence of ion-ion two-stream instability. This is thought to be responsible for anomalous friction causing a merging of ion speeds toward a common Bohm speed near the sheath edge. The results of measurements of the basic plasma parameters will be presented as well as a detailed description of the LIF system.

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