

Abstract Submitted  
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**Laser induced fluorescence observation of ion velocity distribution functions in a plasma sheath** NICOLAS CLAIRE, Turbulence Plasma, PIIM, CNRS/Universite de Provence, F13397 Marseilles, GERARD BACHET, Turbulence Plasma, PIIM, CNRS/Universite de Provence, F13397 Marseilles, ULRICH STROTH, IEAP, Christian Albrechts Universitat, G24098 Kiel — New experimental results obtained by laser induced fluorescence on metastable ion velocity distribution functions (MIVDFs) in electrostatic presheaths and sheaths in multipolar Argon plasmas are presented. The laser power broadening of the MIVDFs has been observed when there is no ion drift. The MIVDFs parallel to the plate in front of which the sheath is formed are Maxwellian with the ions at exactly the ambient temperature. The MIVDFs perpendicular to the plate (PMIVDFs) are in qualitative agreement, for the presheath, with Emmert's predictions: a Maxwellian profile at the center of the device where the potential is zero, with an ion temperature equal to the ambient temperature (0.027 eV), and a profile made of three pieces at the beginning of the pre-sheath. The PMIVDFs point out that their width is related to the neutral pressure. In the sheath, where the theory is no more valid, the PMIVDFs recover a Maxwellian profile. This "ion thermalization" has never been observed in published simulations. The velocity and potential profiles for different plasma conditions have also been measured.

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