

Abstract Submitted  
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**A new scheme for laser-induced fluorescence measurements in Xe II plasmas**<sup>1</sup> GREG SEVERN, University of San Diego, DONGSOO LEE, NOAH HERSHKOWITZ, University of Wisconsin-Madison — We report laser-induced fluorescence (LIF) measurements in Xe II plasmas which utilize the  $5p^4(^3P_1)5d[3]_{7/2}$  metastable state. The wavelength of the excitation transition is 680.574nm in air. To our knowledge, this scheme has never been used before for LIF measurements in plasmas. The complete scheme is  $5p^4(^3P_1)5d[3]_{7/2} \rightarrow 5p^4(^3P_1)6p[2]_{5/2}^o \rightarrow 5p^4(^3P_1)6s[1]_{3/2}$ , and the detectable photon has a  $\lambda = 492.15nm$  in the rest frame, in air. The plasmas are created in a hot filament, DC discharge, with  $kT_e \sim 1eV$ ,  $P_o \sim 1mTorr$ , and  $n_e \sim 10^9cm^{-3}cm$ . Preliminary measurements suggest that the metastable state is sufficiently populated to permit measurements of ion velocity distribution functions (ivdfs). We also report on LIF measurements in XeII plasmas using a scheme commonly<sup>2</sup> used in Hall-Thruster plasmas, with excitation at 834.96 nm (air), and we assess the relative merits of the schemes. We are interested in these LIF schemes for the purpose of testing the generalized Bohm Criterion in the vicinity of sheath edge for two-ion plasmas. Proving new XeII LIF schemes for these plasmas permit measurements of the ivdfs *for both ions*, something never before accomplished.

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<sup>2</sup>Hargus, Jr., W.A.; Cappelli, M.A.. Appl. Phys. B (2001), **72**, 961

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