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Time-Averaged and Oscillatory Characterization of a Hall Plasma Discharge CHRIS V. YOUNG, ANDREA LUCCA FABRIS, NICOLAS GASCON, MARK A. CAPPELLI, Stanford Univ — We characterize a 70 mm diameter stationary plasma thruster operating on xenon at 200-500 W using nonintrusive laser measurements. This study resolves both time-averaged properties and oscillatory phenomena in the plasma discharge. Specifically, we explore how the plume ion velocity field evolves in time with respect to periodic discharge current oscillations using time-synchronized laser induced fluorescence (LIF) techniques. In this LIF scheme, a triggered signal acquisition gate is locked at a given phase of the current oscillation period, allowing for drift in the oscillation. The laser is modulated at a characteristic frequency and the induced fluorescence signal is extracted out of the bright background emission using homodyne detection with a lock-in amplifier.

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