Abstract Submitted
for the GEC14 Meeting of
The American Physical Society

Experimental Characterization of the Time-Averaged and Oscillatory Behavior of a Hall Plasma Discharge[1] CHRISTOPHER YOUNG, ANDREA LUCCA FABRIS, NICOLAS GASCON, MARK CAPPELLI, Stanford University — An extensive experimental campaign characterizes a 70 mm diameter stationary plasma thruster operating on xenon in the 200-500 W power range. This study resolves both time-averaged properties and oscillatory phenomena in the plasma discharge. Specifically, we explore the time variation of the plume ion velocity field referenced to periodic discharge current oscillations using time-synchronized laser induced fluorescence (LIF) measurements. This LIF scheme relies on a triggered signal acquisition gate locked at a given phase of the current oscillation period. The laser is modulated at a characteristic frequency and homodyne detection through a lock-in amplifier extracts the induced fluorescence signal out of the bright background emission.

[1]This work is sponsored by the U.S. Air Force Office of Scientific Research with Dr. Mitat Birkan as program manager. CVY acknowledges support from the DOE NNSA Stewardship Science Graduate Fellowship under Contract DE-FC52-08NA28752.

Christopher Young
Stanford University

Date submitted: 13 Jun 2014 Electronic form version 1.4