Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Dual-Wavelength Interferometry Plasma Electron Density Measurements BRIAN NEISWANDER, ERIC MATLIS, THOMAS CORKE, University of Notre Dame — Plasma is an optically controllable medium with potential for improving high-speed adaptive optics technology, particularly in aero-optical wavefront-control. The index of refraction of a plasma depends on the electron density and gas density. These two parameters are highly coupled and must be uniquely determined in order to assess the effectiveness of plasma as a high-speed adaptive optic medium. Presented here are time-resolved experimental measurements of plasma electron density and gas density for a low-pressure cylindrical dielectric barrier discharge (DBD). Optical measurements were obtained using a dual-wavelength Michelson interferometer system featuring visible (0.633 μm) and infrared (3.39 μm) HeNe lasers. Along with results, a method used to increase the accuracy of the measurement system by incorporating a piezoelectric actuated scanning mirror and phase-demodulation analysis will be discussed.

Brian Neiswander
University of Notre Dame

Date submitted: 01 Aug 2014 Electronic form version 1.4