Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Evaluation of a Penning Mixture for Use in Plasma Adaptive Optics BRIAN NEISWANDER, ERIC MATLIS, THOMAS CORKE, University of Notre Dame — This research examines the use of a Penning gas mixture in a dielectric barrier discharge (DBD) plasma device to achieve stable plasmas at high pressures. Previous research suggests increasing pressure produces a larger dynamic range of refractive index, which is favorable for adaptive optics. As the pressure increases, however, plasma generation in air soon becomes impractical due to power requirements. Penning mixtures, such as neon with a small amount of argon, feature lower breakdown voltages and stronger ionization attributed to the presence of Penning ionization. Experimental measurements of voltage, current, power, and electron density are presented for a DBD plasma chamber containing the gas mixture. Results are evaluated against a previously developed empirical model. The work further motivates the creation of a plasma adaptive optics system.

Thomas Corke
University of Notre Dame

Date submitted: 05 Aug 2010 Electronic form version 1.4