Abstract Submitted
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Measurement of two-dimensional distribution of electric fields in collisional environments.[1] EDWARD BARNAT, BRIAN BENTZ, Sandia National Laboratories — In this presentation we describe a picosecond pump-probe method termed laser induced fluorescence dip (LIF-dip) spectroscopy for interrogating electric fields in medium pressure (200 Torr) plasma discharges. We employ an intense picosecond pump laser to drive two-photon absorption on a Kr seed immersed in a helium environment. Specifically, we utilize ˜202.3 nm to excite the Kr from the ground state to the $5p'[]_0$ state. Shortly after excitation, a second tunable picosecond laser excites the $5p'[]_0$ state to (Stark shifted) n = 11 to n = 25 Rydberg states causing a depletion in the observed fluorescence of the excited state to the $5s'[3/2]_1$. The electric field dependence of the Stark shifted Rydberg states is experimentally measured for a few select Rydberg states to provide electric field detection spanning ˜500 V/cm to 10 kV/cm and then utilized to asses electric field distributions. We also discuss the use of a least-squares fitting procedure with additive gaussian noise-based approach to assign observed LIF-Dip profiles electric field values.

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Edward Barnat
Sandia National Laboratories

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