

Abstract Submitted
for the GEC18 Meeting of
The American Physical Society

Laser Diagnostic for Interrogating High Electron Densities in Low Pressure Plasma Environments BRIAN Z. BENTZ, EDWARD V. BARNAT, Sandia National Laboratories — This communication reports methods to apply laser-collision induced fluorescence (LCIF) diagnostics in regions with high electron density in low pressure helium environments. LCIF diagnostics allow quantitative and multi-dimensional interrogation of electron densities and temperatures. However, in low pressure plasma environments with electron densities above 10^{12} cm^{-3} , overcoming the collisional quenching of fluorescence emission and the reduced lifetime of excited states remains a challenge, limiting the application of LCIF for studying arc discharges. Experimental and computational aspects are considered, including the rejection of scattered excitation light and optimization procedures for determining high electron densities. Initial LCIF images of arc discharges are presented and a collisional radiative model is used to interpret results. Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy National Nuclear Security Administration under contract DE-NA0003525.

Brian Bentz
Sandia National Laboratories

Date submitted: 05 Jun 2018

Electronic form version 1.4