Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Characterization of Optical Field Ionized Plasmas Formed in a 20 cm Long Gas Jet J. E. SHROCK, L. FEDER, B. MIAO, H.M. MILCHBERG, University of Maryland, College Park — We present a new 20 cm gas jet capable of forming a highly uniform gas profile of molecular densities around $3x10^{18}$ cm^{-3} and 1000 μm width. The jet utilizes a carefully optimized throat and reservoir to provide supersonic, steady-state gas flow with a rise time of about 3 ms. The transverse profile of this steady-state flow is characterized using neutral gas interferometry while plasma fluorescence measurements demonstrate uniformity and steep density gradients at the edges of the gas flow. Since the jet provides a gas profile with sharp cutoffs at the edges, it is an optimal target for the formation of sub-critical density Optical Field Ionized (OFI) plasmas. Plasmas are formed using the line focus of a J_0 Bessel beam (intensities on the order of 10^{15} W/cm^2), and hydrodynamically expand outward, forming a radial electron density gradient. Transverse interferometry of the plasma column is used to trace the dynamics of this channel formation.

Jaron Shrock
University of Maryland, College Park

Date submitted: 03 Jul 2019 Electronic form version 1.4