Abstract Submitted
for the SES16 Meeting of
The American Physical Society

Measurements of radially and temporally distributed laser-induced plasma parameters GHANESHWAR GAUTAM, CHRISTIAN PARIGGER, Univ of Tennessee Space Inst — Laser-induced optical breakdown is generated in a mixture of ultra-high purity hydrogen and nitrogen gas inside a cell. The hydrogen and nitrogen gas mixture ratio is 9 to 1 at a pressure of 1.21 0.03 10^5 Pa. The radiation of a Q-switched Nd:YAG laser device, operated at its fundamental wavelength of 1064 nm, is focused to above threshold irradiance for generation of optical breakdown. For the determination of characteristic parameters of the transient micro-plasma in a gas mixture, spatially and temporally resolved line-of-sight spectra of hydrogen *Balmer* series H_α and H_β lines are recorded. The line-of-sight measurements are *Abel* inverted to extract the radial distributions of electron number density and temperature. Slight asymmetries observed in the recorded data are also considered in the analysis. The plasma kernel expansion speeds of 2 0.4 km/s and 1.5 0.3 km/s are determined at the time delays of 100 ns and 200 ns, respectively. Shockwave expansion speeds are also determined for these time delays. Furthermore, the isentropic micro-plasma expansion model is discussed in the data analysis.

Ghaneshwar Gautam
Univ of Tennessee Space Inst

Date submitted: 18 Oct 2016 Electronic form version 1.4