Abstract Submitted
for the GEC08 Meeting of
The American Physical Society

GEC Student Award for Excellence Finalist: Laser Diagnostics of High Pressure Microdischarge Plasmas[1] SERGEY BELOSTOTSKIY, VINCENT DONNELLY, DEMETRE ECONOMOU, University of Houston, NADER SADEGHI, Université J. Fourier de Grenoble, UNIVERSITY OF HOUSTON TEAM, UNIVERSITÉ J. FOURIER DE GRENOBLE COLLABORATION
— Laser diagnostics were performed in the positive column of a high pressure (100s of Torr) parallel-plate DC microdischarge operating in argon or nitrogen. For 50 mA current and over the range of 300 – 700 Torr, Laser Thomson Scattering yielded $T_e = 0.9 \pm 0.3$ eV and $n_e = (6 \pm 3) \bullet 10^{13}$ cm^{-3}, in agreement with a mathematical model. Rotational Raman spectroscopy was performed for a set of N_2 pressures (400 – 600 Torr) to measure the gas temperature. T_g changed from 450 ± 40 K at 5 mA to 740 ± 40 K at 30 mA, and was nearly independent of pressure, within experimental error. Finally, spatially resolved diode laser absorption spectroscopy was used to measure the density of argon metastables. The metastable number density peaked at the plasma-sheath ($\sim 10^{14}$ cm^{-3}) interface in agreement with simulation. The gas temperature was also extracted from the Doppler width of the absorption profile.

[1]The authors thank the Department of Energy (Grant no. DE-FG02-03ER54713) for funding.

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Date submitted: 08 Jul 2008 Electronic form version 1.4