Abstract Submitted
for the GEC11 Meeting of
The American Physical Society

**Study of Microwave Plasma Enhanced Methane Flame at Atmospheric Pressure**[1] NIMISHA SRIVASTAVA, CHUJI WANG, Mississippi State University, MS, 39762 — Non-thermal plasma assisted combustion can provide potential accommodation in improving fuel efficiency, contaminant reduction, faster ignition time, etc. A 2.45 GHz microwave (MW) plasma source was used with a premixed $He/CH_4$ gases to study the effect of MW power coupling and hence OH radical generation. UV pulsed laser cavity ringdown spectroscopy was employed to measure absolute number density of OH (A-X) (0-0) band in plasma enhanced flame. Emission species such as OH(A-X), $N_2$(C-B), $N_2^+$(B-X) and $C_2$ swan band were observed using optical emission spectroscopy. Depending on the mixing ratio of $CH_4$and MW power, two kinds of $CH_4$ flames were obtained; (1) Flame with coupled MW energy but no pre-flame (flame and plasma interaction region); at high $CH_4$/He mixing ratios and low MW energies, detached flame were obtained with detaching gap depended on MW power. (2) Flame with visible pre-flame region: at low $CH_4$/He mixing ratios and high MW energies. In both the cases total flame volume increased with increase in MW energy. Compared to the flame, OH concentration was higher in the pre-flame.

[1]This work is supported by the NSF grant # CBET-1066486.

Nimisha Srivastava
Mississippi State University, MS, 39762

Date submitted: 21 Jul 2011 Electronic form version 1.4