Abstract Submitted
for the GEC12 Meeting of
The American Physical Society

Experimental study of pulsed corona discharge in air at high pressures YUNGHSU LIN, DAN SINGLETON, JASON SANDERS, ANDRAS KUTHI, MARTIN A. GUNDERSEN, University of Southern California — Understanding of the dynamics of nanosecond scale pulse discharges in air at multiatmospheric pressure is essential for the development of transient plasma enhanced combustion in internal combustion engines. Here we report the result of our experimental investigation of cathode-directed streamer discharges in synthetic air at pressures ranging from 1 to 20 bar. Two pulse generators with maximum pulse amplitudes of 50 kV and 65 kV, pulse width of approximately 12 ns and 85 ns and pulse rise times of 5 ns and 50 ns are used to generate streamers. The electrodes are coaxial with various radial gaps up to 11.75 mm. The discharge chamber is evacuated and backfilled with synthetic dry air at room temperature. Optical data is obtained from PI-MAX 3 ICCD camera with 3 ns gate width. The streamer propagation velocity variation with applied voltage, different pressures and reduced electric field, E/P, will be shown. Preliminary results indicate that the (pd) similarity law is violated at high pressures in agreement with other recent experiments [1].

[1] "Nanosecond Scale Discharge Dynamics in High Pressure Air," Pierre Tardiveau, Nicolas Moreau, François Jorand, Christian Postel, Stéphane Pasquiers, and Pierre Vervisch, IEEE Trans. on Plasma Sci., Vol. 36, No. 4, 2008.

Yunghsu Lin
University of Southern California

Date submitted: 15 Jun 2012 Electronic form version 1.4