Abstract Submitted
for the GEC15 Meeting of
The American Physical Society

Laser Thomson scattering in a pulsed atmospheric arc discharge BRADLEY SOMMERS, STEVEN ADAMS, Air Force Research Laboratory, Wright-Patterson AFB — Laser scattering measurements, including Rayleigh, Raman, and Thomson scattering have been performed on an atmospheric pulsed arc discharge. Such laser scattering techniques offer a non-invasive diagnostic to measure gas temperature, electron temperature, and electron density in atmospheric plasma sources, particularly those with feature sizes approaching 1 mm. The pulsed discharge is ignited in a pin to pin electrode geometry using a 6 kV pulse with 10 ns duration. The electrodes are housed in a glass vacuum chamber filled with argon gas. The laser signal is produced by a Nd:Yag laser supply, repetitively pulsed at 10 Hz and frequency quadrupled to operate at 266 nm. The scattered laser signal is imaged onto a triple grating spectrometer, which is used to suppress the Rayleigh scatter signal in order to measure the low amplitude Thomson and Raman signals. Preliminary results include measurements of electron temperature and electron density in the plasma column taken during the evolution of the discharge. The laser system is also used to measure the Rayleigh scattering signal, which provides space and time resolved measurements of gas temperature in the arc discharge.

Bradley Sommers
Air Force Research Laboratory, Wright-Patterson AFB

Date submitted: 19 Jun 2015 Electronic form version 1.4