Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Plasma dynamics and development of plasma pulses in a kHz generated atmospheric pressure plasma jet QAIS ALGWARI, DEBORAH O'CONNELL, Queen's University Belfast — A cold plasma jet is ignited inside a glass capillary tube and sustained at atmospheric pressure. Two circular electrodes powered with 20 kHz excitation (approx. 6kV) surround the glass tube flowing helium gas. An intense plasma forms inside the glass tube between the two electrodes and a significant plasma plume emerges at either end of the glass capillary. The plasma plume though continuous to the naked eye, when observed on a nano-second time scale consists of discrete plasma pulses moving at a velocity much greater than the discharge gas velocity. We investigate the discharge formation mechanisms and the dynamics of the generated plasma pulses using time resolved optical emission spectroscopy with 3-d spatial resolution. Spectral resolution is also achieved using different interference filters. Different plasma species can be identified to exhibit different spatial profiles – both axially and radially. Penning ionization of metastable helium with nitrogen molecules is indentified as playing an important role in plasma sustainment.

Qais Algwari
Queen's University Belfast

Date submitted: 13 Jun 2010 Electronic form version 1.4