Abstract Submitted
for the GEC12 Meeting of
The American Physical Society

Atomic nitrogen measurements in a radio-frequency atmospheric-pressure plasma jet ERIK WAGENAARS, TIMO GANS, DEBORAH O'CONNELL, KARI NIEMI, York Plasma Institute, Department of Physics, University of York, York, YO10 5DQ, UK — Atmospheric-pressure plasma jets (APPJs) driven with radio-frequency voltages have the potential to be used in a range of new healthcare applications. To guarantee the safety and effectiveness of these new devices, a thorough understanding of the physics and chemistry of these plasmas is needed. The exact mechanisms through which APPJs affect biological materials like cells, bacteria and DNA are largely unknown, however, recent studies suggest the importance of reactive oxygen and nitrogen species (RONS). The starting point for the creation of many of the different RONS is the production of atomic oxygen and nitrogen in APPJs by breaking up oxygen and nitrogen gas molecules. In order to fully understand and control the production and effects of different RONS it is therforte important to measure atomic oxygen and nitrogen species in APPJs. This contribution presents the first direct measurements of atomic nitrogen species in APPJs. The measurements were performed with a two-photon absorption laser-induced fluorescence diagnostic, using 206.65 nm laser photons for the excitation of ground-state N atoms and observing fluorescence light around 744 nm. The APPJ was run with a helium gas flow of 1 slm and varying small admixtures of molecular nitrogen of $0 - 0.7$ vol%. A maximum in the measured N concentration was observed for an admixture of 0.25 vol% nitrogen gas.

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Date submitted: 12 Jun 2012 Electronic form version 1.4