

Abstract Submitted  
for the DPP15 Meeting of  
The American Physical Society

**Non-LTE Steady-State Kinetics of He-Air Atmospheric Pressure Plasmas**<sup>1</sup> TZVETELINA PETROVA, GEORGE PETROV, ERIC GILLMAN, DAVID BORIS, SANDRA HERNÁNDEZ, SCOTT WALTON, Naval Research Laboratory — A non-LTE, steady-state collisional-radiative kinetics model is developed to study discharges produced in mixtures of He, N<sub>2</sub> and O<sub>2</sub> (He-Air) at atmospheric pressures. The model is based on a self-consistent solution of coupled Boltzmann equation for the electron energy distribution function, electron energy balance equation, gas thermal balance equation, and a system of non-linear equations for species that govern plasma chemistry (electrons, ions, radicals, atoms and molecules in ground and excited states) [1]. The model and results can be applied to study a variety of atmospheric pressure plasmas generated in He-Air mixtures, such as plasma jets, dielectric barrier discharges, laser-induced plasmas, microwave plasmas, etc. In this talk, collisional rates and species densities are obtained as a function of He-to-air ratio and the results are benchmarked against available experimental data.

[1] Tz. B. Petrova, H. D. Ladouceur, and A. P. Baronavski, Phys. Rev. E **76** (2007) 006405.

<sup>1</sup>Work supported by the NRL Base Program

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Date submitted: 22 Jul 2015

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