## Abstract Submitted for the GEC13 Meeting of The American Physical Society

## Towards fully hybrid simulations of atmospheric pressure plasmas

ALEXANDRE LIKHANSKII, Tech-X Corporation — Recent experimental studies demonstrated high potential of using atmospheric pressure plasmas for a number of industrial application, such as plasma medicine, plasma processing, plasma aerodynamics and plasma transistors. Majority of the numerical efforts addressing this type of gas discharges were done using fluid plasma representation. However, fluid plasma models lack important plasma effects, such as non-Maxwellian EEDF in the cathode sheath of streamer head or formation of filamentary structures. These effects must be addressed using kinetic approach. The presentation will describe the developed hybrid (kinetic+fluid) model in Tech-X code VSim (formerly Vorpal) for simulation of wide range of discharges. The model incorporated majority of relevant physics processes, including photoionization for accurate description of filament development. The results of the simulation of atmospheric pressure discharges for relevant industrial problems using kinetic, fluid and hybrid approaches will be presented, and detailed comparison between the models will be provided.

Alexandre Likhanskii Tech-X Corporation

Date submitted: 23 May 2013 Electronic form version 1.4