Abstract Submitted
for the GEC13 Meeting of
The American Physical Society

Modeling of the filamentary plasma generated in an rf plasma jet at atmospheric pressure[1] F. SIGENEGER, J. SCHÄFER, R. FOEST, K.-D. WELTMANN, D. LOFFHAGEN, INP Greifswald, Felix-Hausdorff-Str. 2, 17489 Greifswald, Germany — The argon plasma occurring in an rf plasma jet at atmospheric pressure is investigated by a two-dimensional fluid model. The jet consists of two concentric capillaries and two ring-shaped electrodes which are twisted around the outer capillary with a gap of 4 mm. The plasma is sustained by an rf voltage at 27.12 MHz which is supplied to the upper electrode. The lower electrode is grounded. The axisymmetric model comprises continuity equations for electrons and the most important argon species, the electron energy balance equation, Poisson's equation and an equation for the surface charges at the walls of the capillaries. Furthermore, the heat balance equation is solved to determine the temperature of the gas. The transport properties of electrons and the collision rate coefficients have been determined by solving the electron Boltzmann equation as functions of the electron mean energy and of the ionization degree. The results show a distinct separation between the bulk plasma in the center between the inner and outer capillaries and the sheath regions in front of the electrodes.

[1]The work was supported by the Deutsche Forschungsgemeinschaft within SFB TRR 24.

Florian Sigeneger
INP Greifswald, Felix-Hausdorff-Str. 2, 17489 Greifswald, Germany

Date submitted: 13 Jun 2013 Electronic form version 1.4