Modelling of an RF plasma jet at atmospheric pressure using complementary approaches\textsuperscript{1} FLORIAN SIGENEGER, JAN SCHÄFER, RUDIGER FOEST, DETLEF LOFFHAGEN, INP Greifswald, Felix-Hausdorff-Str. 2, 17489 Greifswald, Germany — Different model approaches have been used to investigate various aspects of a non-thermal RF plasma jet operating in argon at atmospheric pressure. The jet consists of two concentric capillaries and two cylindrical electrodes driven by an RF voltage at 27.12 MHz. The studies concern the generation of a filamentary plasma in the active volume investigated by a phase-resolved single filament model and the interaction of the plasma with the gas flow and with precursor molecules additionally injected for the deposition of thin films. The latter is studied by a period-averaged axially symmetric model of the plasma jet including the effluent which is directed to a substrate. Further studies refer to the phenomena of self-organization observed e.g. in the regular azimuthal rotation of filaments. The relation between the inclination of the filaments and the azimuthal gas velocity component has been revealed by a three-dimensional hydrodynamic model of gas flow and heating using the heating profile from the the single filament model.

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