Abstract Submitted
for the GEC19 Meeting of
The American Physical Society

Electromagnetic approach to a novel microwave driven ICP plasma jet[1] MICHAEL KLUTE, Ruhr University Bochum, HORIA-EUGEN PORTEANU, Ferdinand Braun Institute Berlin, ILIJA STEFANOVIC, NIKITA BIBINOV, Ruhr University Bochum, WOLFGANG HEINRICH, Ferdinand Braun Institute Berlin, PETER AWAKOWICZ, RALF PETER BRINKMANN, Ruhr University Bochum — Plasmas jets are usually Microwave or Radio frequency driven and operated in a capacitive mode. This mode, however, couples considerable power to ions which limits the plasma density and the efficiency. Inductive coupling eliminates these disadvantages. A novel small scale, microwave driven plasma jet has been proposed by *Porteanu et al.*. It is operated as an inductive discharge and that has been recently characterized using optical emission spectroscopy (OES) by *Stefanovic et al.*. In this work the proposed plasma jet is examined theoretically. An electromagnetic model is presented based on a series representation of the electromagnetic field in the resonator. An infinite number of modes is found ordered by an azimuthal wave number m. By equating the volume-integrated electromagnetic power that is absorbed by the plasma with the loss power, stable operating points and hysteresis effects are found. All results will be compared to the results of the OES measurements and imagines obtained from CCD-imaging. The relation between the electric field strength and emitted light intensity will be used to compare the spatially resolved calculated field to the measurements.

[1]We acknowledge the support of DFG.

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Date submitted: 22 May 2019 Electronic form version 1.4