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Time Zone: Central Daylight Time, USA

#### Session SR54: Modeling of Plasma Sources

4:00 PM–6:00 PM, Thursday, October 7, 2021

Virtual Room: GEC platform

Chair: Robert Arslanbekov, CFD Research Corporation

#### **Abstract: SR54.00007 : 3-dimensional semi-analytic model of a microwave driven miniature plasma jet\***

5:45 PM–6:00 PM

← Abstract

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Microwave or Radio frequency driven plasma jets play an important role in various technical applications and are usually operated in a capacitive mode. The **MiniatureMicroWaveICP** (MMWICP) is a new promising plasma source and successfully transfers the induction principle to a miniature plasma jet. This work presents a 3-dimensional semi-analytic model of the electron density of the MMWICP. The model is based on a drift-diffusion equation which is coupled to the electromagnetic model of the MMWICP presented by Klute *et al* in *Plasma Sources Sci. Technol.* **29** 065018 (2020). An analytic solution is found by expanding the expression of the electron density into a series of eigenfunctions. The 3-dimensional profile of the electron density is simulated for characteristic values of the power absorbed by the plasma. The results show that the spatial distribution of the electron density is highly depended on the absorbed power. The results are found to be in good agreement with experimental measurements.

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