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3D simulation of a radio-frequency driven microplasma jet[1] TORBEN HEMKE, THOMAS MUSSENBROCK, RALF PETER BRINKMANN, Institute for Theoretical Electrical Engineering, Ruhr-Universitaet Bochum — An increasing number of microplasma sources were developed in the last few years. These sources differ in geometries, single or array discharge configurations, DC or RF discharges, and the used chemistry - depending on the underlying application. In this paper we concentrate on a radio-frequency driven microplasma jet (refered to as the μ-APPJ) invented by Schulz-von der Gathen and co-workers. The μ-APPJ with an electrode gap of 1 mm is driven at 13.56 MHz (approx. 10 W), typical chemistry consists of He with addition of less than 1% molecular oxygen. To study the μ-APPJ in 3D we use a commercial computational fluid dynamics code (CFD-ACE+). We treat the electrons kinetically to build a look-up table for its transport coefficients and include a HeO_2 reaction chemistry scheme. We discuss basic insights into the fundamental mechanisms of the μ-APPJ. Finally we present a brief discussion of the results of the 3D simulation compared with a simplified analytical model.

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