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Fast 2D computations in the COST reference jet with an 1D plasma model SOTIRIS MOUCHTOURIS, National Technical University of Athens, NCSR Demokritos, GEORGE KOKKORIS, NCSR Demokritos — A novel approach for fast 2D computations in capacitively coupled atmospheric pressure plasma jets is applied to the COST reference jet [1] with He/O2 feed. The keystone of this approach is the simplification of the 2D equations for the mass and electron energy balances of the plasma fluid model by a) the assumption of negligible variation of the plasma potential along the flow direction and b) the exploitation of the high values of Peclet numbers and/or the low values of the diffusive Damkohler numbers for the species and the electron energy. These simplifications allow the solution of a small number of 1D problems instead of solving a 2D problem and reduce significantly the computational cost. The latter is further reduced by using a time-slicing technique and a simplified reaction set [2]. The results of this approach are validated through a comparison to the results of a 2D plasma model. The effect of the feed on the results is investigated and the use of 1D plasma models [3] for the COST jet is evaluated. [1] J. Golda, et al., J. Phys. D: Appl. Phys. 49, 8 (2016). [2] M. Turner, Plasma Sources Sci. Technol. 25, 1 (2016). [3] J. Waskoenig, et al., Plasma Sources Sci. Technol. 19, 4 (2010).

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