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Modeling of the transport phenomena for an atmospheric-pressure argon jet plasma in contact with a liquid I. L. SEMENOV, T. VON WOEDTKE, K.-D. WELTMANN, D. LOFFHAGEN, Leibniz Institute for Plasma Science and Technology, Felix-Hausdorff-Str. 2, 17489 Greifswald, Germany — Plasma-activated liquids have gained increasing interest for biomedical applications. Currently, atmospheric-pressure plasma jets are the most common plasma sources applied for the treatment of liquids. Recent numerical studies [1,2] have shown that the transport of reactive species from the plasma jet into the liquid is noticeably affected by the liquid convection and the transport phenomena in the gas-liquid boundary layer. However, a detailed theoretical analysis of this layer is still lacking. In this work we present a comprehensive two-dimensional numerical model of the momentum, heat and mass transport processes for an argon jet plasma at atmospheric pressure in contact with a liquid. The primary focus is on the description of the transport phenomena near the gas-liquid interface. We show that an accurate numerical treatment of the velocity boundary layer is required to reproduce the experimentally observed flow pattern in the liquid phase. In addition, the impact of the gas flow rate and the distance between jet and liquid on the transport of reactive species into aqueous solutions is discussed. [1] A. Lindsay *et al.*, J. Phys. D: Appl. Phys. **48**, 424007 (2015). [2] C. C. W. Verlackt *et al.*, Phys. Chem. Chem. Phys. **20**, 6845 (2018).

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