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Modeling and Simulation of the sheath in radio-frequency driven plasmas at atmospheric pressure[1] TORBEN HEMKE, THOMAS MUSSENBROCK, RALF PETER BRINKMANN, Ruhr-University Bochum — Microplasmas at atmospheric pressure recently gained increasing attention. Due to their extraordinary characteristics new fields of applications are explored. Various aspects of the discharge mechanisms have to be considered to model and simulate microplasmas. Since microplasmas are dominated by their spatial boundaries, this particularly holds for the sheaths. In this paper we focus on the sheath of radio-frequency driven microplasmas at atmospheric pressure. To account for the chemistry of characteristic applications we set up a multi-species model of the sheath. Based on a scale analysis in time and space we discuss resulting assumptions for the fluid equations for electrons and ions. We solve for these equations self-consistently coupled to Poisson's equation for the electrostatic potential. Finally, we present the density profiles of the electrons and ions depending on various discharge parameters.

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