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Analysis of striations in dielectric barrier microdischarges at atmospheric pressure MARKUS M. BECKER, RONNY BRANDENBURG, TOMÁŠ HODER, DETLEF LOFFHAGEN, CHRISTIAN WILKE, INP Greifswald, Felix-Hausdorff-Str. 2, 17489 Greifswald, Germany — When studying microdischarges in asymmetric barrier discharges in argon, where one electrode only is covered by a dielectric, striated structures similar to the known relaxation structures in low-pressure glow discharges have been observed. In order to assist the experimental investigations of the striated structures and to understand the inherent processes, model calculations of the spatiotemporal evolution of a microdischarge have been performed. The hydrodynamic description comprises the particle balance equations of electrons, 11 excited argon states, Ar^+ and Ar_2^+ ions and the electron energy balance equation involving the fluxes in drift-diffusion approximation as well as Poisson's equation. The coupled system is numerically solved taking into account the effect of surface-charge accumulation at the dielectric electrode. First results of the numerical computations are presented and compared with experimental data. Depending on the applied voltage microdischarges with and without striated structures are found by experiments and model calculations. Pronounced current peaks occur in normal microdischarges (without striations), while several moderate current pulses correlate with the appearance of striated microdischarges.

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