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Stability of current transfer to cathodes of DC glow discharges[1]
M.J. FARIA, Universidade da Madeira, P.G.C. ALMEIDA, M.S. BENILOV, V.V. MIKHAILENKO — Multiple solutions in the theory of DC glow discharges have been computed recently and are presumably associated with modes with different spot patterns observed in DC glow microdischarges. In this work, stability of the axially symmetric steady-state modes against axially symmetric and 3D perturbations is analyzed numerically. Stability of the 1D mode at very low currents against 1D perturbations is investigated analytically. Simulations are based on the simplest self-consistent model, which accounts for a single ion species and employs the drift–diffusion approximation. The non-stationary term in the electron conservation equation affects the calculated spectrum very weakly; an indication that the perturbations develop on a time scale governed by drift of ions. Results on stability are given for the fundamental mode (the one that exists at all current range) and for ten further 2D modes.

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