

Abstract Submitted  
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**Investigations of argon hollow cathode discharge with iron cathode** J.F. BEHNKE, H. SCHEIBNER, Institut of Physics, University of Greifswald, Germany, H. KERSTEN, Institute of Low Temperature Plasma Physics, 17489 Greifswald, H. LIEDER, OSRAM GmbH, D-81536 Munich, Germany — The formation of argon metastable and resonance state densities and of iron ground state densities by ion sputtering are studied experimentally by absorption spectroscopy and LIF in the plasma of a cylindrical hollow cathode discharge (Fe,  $R = 0.4$  cm  $l = 3.0$  cm,  $p_0 = 160$  Pa argon). The intensity of iron spectral lines has been measured by means of the emission spectroscopy. The EEDF in the negative glow were determined from the second derivative of the probe characteristic and the charge carrier density from the ion saturation probe current. The densities of the sputtered iron atoms in the ground and excited states in dependence of discharge current have been calculated by a simple model of the sputter process and the excitation kinetic via measured EEDF and electron densities. The discharge current characteristics were calculated via the POISSON equation in the cathode fall region considering the electron multiplication and secondary emission of electrons by ions and resonance photons at the cathode.

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