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Experimental and theoretical studies of the DC breakdown voltage in argon at micrometer separations MATEJ KLAS, STEFAN MATEJCIK, Department of Experimental Physics, Comenius University, Mlynská dolina F2, 84248 Bratislava, Slovakia, MARIJA RADMILOVIC-RADJENOVIC, BRANISLAV RADJENOVIC, Institute of Physics, Pregrevica 118, Belgrade, Serbia, DEPARTMENT OF EXPERIMENTAL PHYSICS, COMENIUS UNIVERSITY, MLYNSKÁ DOLINA F2, SLOVAKIA TEAM, INSTITUTE OF PHYSICS, PREGREVICA 118, BELGRADE, SERBIA TEAM — The microdischarge is not only interesting due to its potential applications, but also as an ideal system to test the scaling laws in the electric discharges. One of the most common scaling laws is the "Paschen law" that describes the dependence of the DC breakdown voltage U on the pd product. The validity of the Paschen Law was confirmed for variety of DC discharge conditions (pressures, distances, electrode materials). At micrometer separations, however, the pd scaling could be affected by phenomena like field emission, phase transitions in the gas at high pressures, tunnelling effects and a few more. The DC breakdown voltage in argon has been measured in discharge system consisting of two parallel planar Cu electrodes at separations from 20 to 500 μm, while the pressure was varied between 6 mbar up to 920 mbar. The analysis of the experimental data has been carried out in terms of semi empirical Paschen law and the dependence of secondary electron yield γ on the reduced electric field has been estimated based on the experimental data.

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