

Abstract Submitted  
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**Breakdown and operational regimes of low-pressure water vapour discharges** NIKOLA SKORO, DRAGANA MARIC, GORDANA MALOVIC, ZORAN PETROVIC, Institute of Physics, Belgrade, Serbia, WILLIAM GRAHAM, Centre for Plasma Physics, Queen's University Belfast, UK — We present our results on breakdown and different regimes of dc discharges in water vapour at low pressures. The discharge is established between parallel plate electrodes: copper cathode and transparent conductive anode, 5.4 cm in diameter with adjustable gap in-between. Discharge chamber allows side-on view so axial discharge profiles could be recorded. Water vapour is brought into the system from a test tube with water sample. Measurements of Paschen curves (breakdown voltage vs. pressure x electrode gap dependence) and Voltage-Current characteristics of the discharge were conducted for various  $pd$  conditions and with water samples of different purity. Together with measurements of electrical properties axial discharge profiles were recorded. One of the most interesting features of the Paschen curve for water vapour is an inflection point around 2 Torr cm which appears for smaller gaps ( $d \leq 1$  cm) and higher pressures. The origin of the inflection point is not clear yet. Measurements with different water samples (bi-distilled and deionised water and tap water) produced the same values of breakdown voltages. Recorded profiles have shown that processes of excitation and ionization by heavy particles (probably by fast hydrogen atoms) dominate at  $pd$  values lower than 0.5 Torr cm.

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