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Mutual exchange of charged particles in high voltage dc devices insulated by high vacuum

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The mutual exchange of charged particles is a phenomenon which could justify the onset and the temporal evolution of microdischarges during the high voltage conditioning in high vacuum. Localized heating has been observed in unexpected positions on anodic surfaces at the High Voltage Padova Test Facility. Experimental evidences concerning the existence of accumulation points during occurrence of micro-discharges have been observed and simulated numerically by ray tracing method. The position of the accumulation points depends only on electrode shape and the ratios of applied voltages. It has been demonstrated in a double polarity configuration that a perturbation of the trajectories position by altering the voltage distribution has been sufficient to initiate the micro discharge occurrence.

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