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Charge transfer in surface barrier discharge[1] TOMAS HODER, LUKAS KUSYN, JAN VORAC, PETR SYNEK, Masaryk University, Czechia — We report our recent experimental results on the high-resolution high-sensitivity electrical and optical analysis of the surface barrier discharge (SBD) operated in atmospheric pressure air by sinusoidal voltage waveform. The transferred charge of the low-power discharge is carefully evaluated and it is shown that after the complete voltage period the total charge balance is approaching zero. This rather obvious result is mechanically assumed in the literature, yet it is experimentally not understood in detail. We show that continuous and pulsed micro-ampere currents measured during the negative polarity are responsible for the gradual renewal of the charge transfer equilibrium abruptly distorted by strong electrical pulses caused by positive streamers during the opposite half-period. We evidence also exceptionally large discharging events if operated at high over-voltage and reveal their sub-nanosecond development. The SBD discharging mechanisms are reviewed and updated.

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