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Characterisation of a DBD plasma in dependence of its supply parameters for surface modification

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For surface modification in industry, a dielectric barrier discharge (DBD) under atmospheric pressure with air as carrier gas is feasible and cost efficient, see [1]. However, a stable and reproducible plasma is required for industrial applications. To fulfil the industry specifications, the plasma ignition shall be analysed under the following aspects: pulse form, edge steepness, pulse width, pulse repetition rate, transferred power, electrode area and time resolved optical properties.

The in house rectangle pulse generator (DC-330 kHz, ± 8 kV) based on a series circuit of MOSFETs in push/pull mode will be compared to the sine pulse generator "Minipuls" from GBS electronics. It will also be analysed whether the voltage overshoot depends on the oscilloscope sample rate. Measurements have already shown that the pulse form has an influence on the ignition behaviour (ignition duration: rectangle pulse ~300 ns, sine pulse ~30000 ns). The time resolved optical and current measurements indicate correlations, which are under further investigation.

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[1] Atmospheric pressure plasmas: A review, C. Tendero et. al., Spectrochimica Acta Part B: Atomic Spectroscopy, Vol. 61 2-30, Jan 2006

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