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Long-gap pulse discharge in air at atmospheric pressure.¹

JIRI SCHMIDT, ALEXANDR FROLOV, PETR HOFFER, KAREL KOLACEK, JAROSLAV STRAUS, Institute of Plasma Physics of CAS — Nowadays experimental works show that not only lightning flashes in thunderstorms but also long high-voltage (HV) discharges in air under laboratory conditions generate high-energy radiation and particles. The processes in these types of discharges are not satisfactorily explained and are still the subject of research. We have designed and assembled an experimental device which helps us to investigate the time evolution of long HV discharges in the air. Our designed apparatus consists of oil insulated 8-stage Marx generator (pulse voltage up to 1.5 MV), water-filled pulse forming line which is connected by a spark gap to HV electric bushing. Firstly, basic measurements of voltage (based on capacitor-resistor divider) and current (by Pearson current monitor) were re-calibrated. In the next step, we have generated short gap discharges (from 5 up to 35 cm long). These discharges were observed optically by a digital photo camera with the suitable filter. Measurements of X-ray emission (with the help of scintillators and photomultipliers) have been in a progress as well. In this paper we will present a description of our experiment with long-gap laboratory HV discharge at atmospheric pressure and its recent results.

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Jiri Schmidt
Institute of Plasma Physics of CAS

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