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Investigation of a gas discharge switch based on a Lorentz drift M. IBERLER, A. FEDJUSCHENKO, J. JACOBY, J. OTTO, T. RIENECKER, CH. TESKE, University of Frankfurt, Institute for Applied Physics — Fast switches are very important tools for pulsed power applications. Basically, there are two complete different principles used to realise a high power switch. One is based on the use of semiconductors, where as the other is based on a triggered breakdown in gases or in vacuum. This contribution gives an introduction in a new kind of gas discharge switch, which consists of a coaxial electrode geometry. The insulated electrode acts initially as an anode, whereas the coaxially arranged electrode is used as cathode. This switch device is called, based on its underlying effect, as Lorentz Drift Switch (LDS). The Lorentz Drift Switch discharge is a low low pressure gas discharge, which is positioned on the left branch of a breakdown voltage curve, similarly to the Paschen curve. Using an external triggering the gas breakdown is initiated and forms a conductive plasma sheath which closes the external electric circuit. The main circuit consists of a capacity as an energy storage system in connections with the switch. To determine the working point of the switch the Paschen break down voltage of the electrode systems was determined. Further investigations were accomplished to improve the understanding of the voltage and current behaviour depending on the loading parameter like the maximum voltage and the external capacity.

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