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Surface charge measurements in barrier discharges on different time scales ROBERT WILD, CHRISTIAN VOLKHAUSEN, JOHANNES BENDUHN, LARS STOLLENWERK, University of Greifswald — The deposition of surface charge in barrier discharges is a process that influences the ongoing discharge significantly. This contribution presents the measurement of absolute surface charge densities and their dynamics in a laterally extended setup. An electro-optic BSO crystal is used as dielectric. The absolute charge density on its surface is deduced from the change of polarisation of light passing the crystal. Using different temporal resolutions, the behavior of charge is investigated on three different time scales. The highest temporal resolution of the technique is in the order of hundreds of nanoseconds. Therefore it is possible for the first time to observe the charge deposition process during an active discharge. On the time scale of the applied voltage period (several microseconds), the conservation mechanisms of a lateral discharge pattern is investigated. For this, the influence of surface charge and metastable species in the volume is estimated. Further, the behavior of the surface charge spots on a variation of the external voltage and gas pressure is studied. Measurements on a time scale in the magnitude of seconds reveal charge decay and transport phenomena. This work was funded by the Deutsche Forschungsgemeinschaft.

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