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Electric field of streamers propagating along dielectric surfaces DIRK TRIENEKENS, SANDER NIJDAM, GERRIT KROESEN, Eindhoven University of Technology, THOMAS CHRISTEN, ABB Switzerland Ltd., UTE EBERT, CWI — In electric power devices for high voltage, the interface between solid and gaseous insulation is usually the most critical part with respect to electric discharges that may lead to breakdown. For a better understanding of the underlying fundamental physics of these discharges, we investigate the streamer propagation along dielectric surfaces, with focus on the streamer electric fields and surface charges deposited on the dielectric material. In particular, we constructed a setup that enables us to study the electric field of the streamer in situ. A positive high voltage pulse is generated using a push-pull switch and supplied to a needle close to a birefringent BSO (Bismuth Silicon Oxide) crystal, along which the streamers can then propagate. Using a power LED and polarizing optics, we are able to visualize via the Pockels effect the electric field caused by the discharge. With this, we are able to quantitatively study streamer electric fields with good temporal and spatial resolution, and can estimate lifetimes of the deposited charges.

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