

Keep-in-Touch meeting (May 26, 2023, 11.00am)

Modelling of low-current quasi-stationary gas discharges

Pedro Almeida

*Universidade da Madeira and Instituto de Plasmas e Fusão Nuclear, Instituto Superior Técnico,
Universidade de Lisboa, Portugal*

The seminar is concerned with the modelling of low-current quasi-stationary discharges, including the Townsend and corona discharges, as well as discharges along dielectric surfaces. An integrated approach suitable for the computation of the whole range of existence of a quasi-stationary discharge from its inception to a non-stationary transition to another discharge form, such as a transition from the Townsend discharge to a normal glow discharge, the corona-to-streamer transition, or the transition from stationary negative corona to self-pulsing regimes. This task includes three steps: (i) modelling of the ignition of a self-sustaining discharge, (ii) modelling of the quasi-stationary evolution of the discharge with increasing current, and (iii) the determination of the current range where the quasi-stationary discharge becomes unstable and the non-stationary transition to another discharge form begins. Each of these three steps is considered in some detail with a number of examples, referring mostly to discharges in high-pressure air.