

Experience in numerical analysis of surface charge on insulators exposed to high voltage in vacuum

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Abstrak

This paper deals with the electrical insulation of a gap bridged by a solid dielectric between a pair of electrodes in a vacuum, where the dielectric is a model of an insulating spacer holding electrodes in various vacuum devices. Such gap configuration is typical as a model for studying physical mechanisms of an electrical breakdown or a flashover in a vacuum, in which the insulation ability is considerably lower than a gap without any insulating spacers. Many researchers have long investigated the mechanisms of flashover, and it is believed that the charging of the insulator surface is the primary drive of such weakness. One of the effective approaches for studying mechanisms is to analyze the characteristic of charge accumulated on the insulator surface both by experiments and by numerical analyses. This paper reviews previous works conducted by the author's research group and demonstrates the difficulties we have encountered upon conducting the numerical analyses.