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A Statistical Model for the Dynamics of Single Cathode Spot in Vacuum Cylindrical Cathode

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Abstract : Dynamics of cathode spot has become a major part of vacuum arc discharge with its high academic interest and wide application potential. In this article, using a three-dimensional statistical model, we simulate the distribution of the ignition probability of a new cathode spot occurring in different magnetic pressure on old cathode spot surface and at different arcing time. This model for the ignition probability of a new cathode spot was proposed in two typical situations, one by the pure isotropic random walk in the absence of an external magnetic field, other by the retrograde motion in external magnetic field, in parallel with the cathode surface. We mainly focus on developed relationship between the ignition probability density distribution of a new cathode spot and the external magnetic field.

Keywords : cathode spot, vacuum arc discharge, transverse magnetic field, random walk
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