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Transient Model of the Metallic Plasma and Neutral Gas Interaction in a Low-Pressure ArcDiego Fernando Devia Devia¹, Pedro Jose Arango Arango², Elisabeth Restrepo Parra², Sebastian Ramirez Ramirez²¹Universidad Tecnológica de Pereira, Pereira, Colombia ²Universidad Nacional de Colombia, Manizales, Colombia

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A physical transient model and system of equations with spherical symmetry, was formulated to describe the interaction between metallic plasma ions with neutral gas, in the outer region of a multicathode spot vacuum arc operated with a background gas. The model considers the self-consistent processes for typical values of arc parameters, including the electron and ion drift velocities, the electron and neutral gas temperatures, and the electrostatic potential profiles are obtained from the border of the arc channel up to the discharge chamber wall. It is studied that values of arc parameters strongly influences the metallic plasma density and plasma potential distributions.

Keywords

ion drift velocities

ion-gas interaction

plasma potential distributions

transient model

vacuum arc