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Investigation on the voltage characteristic of vacuum arc under different axial magnetic field distributions ZONGQIAN SHI, XIAOCHUAN SONG, SHENLI JIA, XINTAO HUO, LIJUN WANG, Xi'an Jiaotong University, APPLIED PLASMA GROUP OF XI'AN JIAOTONG UNIVERSITY TEAM —
Axial magnetic field (AMF) is widely used in vacuum interrupters as an effective arc control technique. In this paper, the voltage characteristic of vacuum arc under different AMF distributions is investigated. Experiments with arc current of 10kA (RMS) and gap distance of 6-26mm were conducted with five pairs of specially designed electrodes generating conventional bell-shaped AMF profile and different saddle-shaped AMF distributions. Arc column and cathode spot images were photographed by a high speed digital camera with exposure time of 2 microseconds. The average amplitude and high-frequency oscillation of arc voltage was analyzed based on the light intensity at different positions of arc column, and the dynamic and distribution of cathode spots. Experimental results indicate that saddle-shaped AMF can control vacuum arc much more efficiently than bell-shaped AMF, particularly, at large gap distance.

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