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Simulation Research of Influence of Retarded Axial Magnetic Fields on Vacuum Arc in DC Interruption Process[1] LIJUN WANG, SHENLI JIA, LILAN HU, LING ZHANG, ZONGQIAN SHI, SHUWEI FAN, Xi'an Jiaotong University — In this paper, based on magnetic-hydrodynamic dynamic (MHD) model, the influence of retarded axial magnetic fields (AMFs) on vacuum arc characteristics in fast direct current (DC) interruption process was simulated and analyzed. Magnetic field calculation results showed that the faster current decreased, the more obviously AMF lagged behind arc current. On one hand, higher AMF strength can restrain the contraction of vacuum arc more efficiently, so that the distribution of current density in arc column region was more homogeneous; on the other hand, higher AMF strength restrained plasma diffusion in current zero stage, which made residual plasma density between electrodes at current zero moment keep higher value, and the possibility of arc re-ignition increased as well. By weakening AMF strength at current dropping stage, DC arc can be more easily interrupted successfully. The correctness of simulation results also was verified by experimental results. In artificial crossing-zero stage, as current decreased, the decrease of light intensity and arc diameters were consistent with those in experimental results.

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