ABOUT INFLUENCE OF THE EXTERIOR MAGNETIC FIELD ON STABILITY OF THE ELECTROELECTRIC ARC

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Experimental researches of influence exterior, usually axial, a magnetic field are often spent for the analysis of possibility of stabilisation of single electric arcs, in particular, in plasma generators [1, 2]. Theoretically influence of an exterior axial magnetic field was spent in [3] at examination of a corkscrew instability of an electrical arc. Importance of the analysis of a traversal magnetic field on discharge processes is scored in [4,5]. Influence of an exterior traversal magnetic field on voltage reduction in vacuum breakers is studied in [6]. The experimental research of radiative performances of arcs of different length (from 5 cm to 2 m) in the presence of a traversal exterior magnetic field, parallel a natural magnetic field of the discharge, is spent in [7]. Thus (unlike explored magnetic system) the linear coils of a biasing joined parallelly the discharge. As a result magnetic field influence in [7] was a little: Im = I / N, where Im, I – currents in coils and an arc, N – number of coils.

In the present paper on the basis of system of the linear currents included consistently with the discharge, the magnetic system for making of the exterior magnetic field oriented or in a direction of a magnetic field, generated by a natural current of initially unperturbed pole of an arc, or against it is made and debugged. As a result of Im = I as the discharge and a magnet are connected to one cell.

Experimental researches are grounded on diagnostics and the analysis of oscillograms of a current and a voltage on a discharge gap and on visualisation of discharge processes at a velocity video shooting (1200 f/s, an exposure ≥ 25 mcs). The observational and settlement-theoretical examination of dynamics of the shape and arc motion is conducted in the dense atmosphere in the imposed magnetic field. Experiments for discharges only between rod electrodes are discussed, at currents to 400 A, and interelectrode gaps to 5 cm. In particular, examples, both stabilising, and destabilising action of an exterior magnetic field on the discharge are given. Statistical distribution functions of resistance and power of an arc of various modes of the discharge are gained. Influence of an exterior magnetic field on a motion of the arc pole, the sizes and velocities of travel of its basic stains and dynamics of streams from them is studied.

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