OCCURRENCE OF SCREW INSTABILITY IN THE LONG ARC

Glinov A.P., Golovin A.P., Shaleev K.V.

Institute of Mechanics Lomonosov Moscow State University, Moscow, Russia, krestytroitsk@mail.ru

On an example the long arc discharges between rod graphite electrodes in the free air environment of atmospheric pressure experimental studying of screw [1, 2] instability is spent. Different from [3], the complex studying of process of occurrence of the specified instability depending on a vector of an induction of an external magnetic field is spent, not only axial. Diagnostics system is based on the high-speed video shooting synchronised with digital registration of currents in an arch and in coils of magnetic system, and also a power failure on a digit interval. In work conditions of occurrence of the given instability in wide area of change of some factors are defined. In particular, the interelectrode distance varied within 0 - 110 mm. Digit currents made from 10 to 800 A. The currents of coils reached to 3 кА. The design of magnetic system allowed to receive both axial or azimuthal, and the combined magnetic field received by imposing of specified fields. Influence on a threshold of occurrence of instability of such factors, as topology and size of an external magnetic field, and force of a current of arc has been studied. Influence on occurrence and display of instability of currents of plasma of anode and cathodic streams is considered. Influence of movement of an anode stain on formation of screw structures is discussed. The instability speeds of development (increments) are defined also.

References

1. O. A. Sinkevich, Doklady Akademii Nauk USSR **280**, 99 (1985) [in Russian].
2. J. P. Ladikov-Roev, and O. K. Cheremnyh, *Mathematical Models of Continuous Environments* (Kiev, Naukova Dumka, 2010) [in Russian].
3. Kuzmin A.K. Helical instability of the electric arc: an increment and some characteristics of the steady state. // Author's abstract. Candidate of Diss., M: IVTAN 1984. 19 p. [in Russian].