Contribution ID: **3177** Type: **not specified**

P1.3006 Computer simulation for an array based on capillary discharge

Monday, 8 July 2019 14:00 (2 hours)

See the full abstract here:
http://ocs.ciemat.es/EPS2019ABS/pdf/P1.3006.pdf

Pulsed plasma jets are often used in various technical and scientific applications and can be formed by using a capillary discharge with an evaporating wall (CDEW) [1-10]. The CDEW is a powerful pulsed plasma-dynamic discharge whose plasma is created in a dielectric cylindrical channel filled to facilitate electrical breakdown by a metallized powder. In this case, the pulsed electric current flows through the cylindrical channel and forms a dense hot plasma in it, which flows through the output section of the CDEW, having a high emissivity. We modelled a two dimensional plasma array based on series connected capillary discharge. Each capillary device is composed a CDEW. Numerical simulation is performed and spatial distributions of pressure, temperature, velocity and Mach number in a pulsed capillary discharge jet and a system of pulsed jets at different instants of time are obtained. The structure of an underexpanded supersonic jet that expires from the working channel of the CDEW is investigated.

This research is supported by the Russian Minobrnauki (Project No. 13.5240.2017/8.9).

References
[1]. Pashchina, A.S., Efimov, A.V., Chinnov, V.F. and Ageev, A.G., "Specific features of the radial distributions of plasma parameters in the initial segment of a supersonic jet generated by a pulsed capillary discharge," Plasma Phys. Rep. 43, 796-800 (2017)
[2]. Varaksin A.Yu., High Temperature 56, 275-295 (2018)
[3]. V.V. Kuzenov and S.V. Ryzhkov, Bull. Russ. Acad. Sci.: Phys. 80, 598 (2016)
[4]. V. V. Kuzenov, T.N. Polozova and S. V. Ryzhkov, Problems of Atomic Science and Technology No. 4 (98), 12 (2015)
[5]. V.V. Kuzenov, S.V. Ryzhkov, A.Yu. Gavrilova and E.P. Skorokhod, "Computer simulation of plasmadynamic processes in capillary discharges", High Temperature Material Processes 18, 119 (2014)
[6]. V.V. Kuzenov and S.V. Ryzhkov, Problems of Atomic Science and Technology 1, 12 (2013)
[7]. V.V. Kuzenov and S.V. Ryzhkov, Problems of Atomic Science and Technology 4 (86), 103 (2013)
[8]. S.V. Ryzhkov, Proc. 35th EPS Conf. on Plasma Physics and Contr. Fusion, EA Vol. 32D, P1.114 (2008)
[9]. V.V. Kuzenov and S.V. Ryzhkov, Journal of Physics: Conference Series 830, 012124 (2017)
[10]. Varaksin A.Yu., High Temperature 54, 409-427 (2016)

pppo

Presenter: RYZHKOV, S.V. (EPS 2019)

Session Classification: Poster P1

Track Classification: LTPD