Generation of radio emission in the centimeter range in a laboratory pulsed megavolt discharge at the stage of growth and collision of streamers

Baidin I.S.[1,@], **Shpakov K.V.**[1] **and Oginov A.V.**[1]

[1] Lebedev Physical Institute of the Russian Academy of Sciences, Leninsky Avenue 53, Moscow, 119991, None

[@] i.baydin@lebedev.ru

The paper demonstrates a radio interferometry system based on four ultra-broadband antennas, which makes it possible to localize microwave radiation sources in an extended (up to 1 m) high-voltage (up to 1.2 MV) laboratory spark discharge with centimeter accuracy and to investigate the temporal and spatial characteristics of microwave and their correlation with discharge structures [1]. In the report, we show that high-frequency radio emission has a complex spectral and temporal structure and manifests itself in the form of many short (lasting less than 1 ns) bursts. These bursts are observed at the stage of voltage growth in the discharge gap and when it reaches its maximum values. We also present the results of radio interferometric measurements, during which the discharge regions associated with the appearance of high-frequency radio emissions were localized. Our study shows a close relationship between radio emission and the intensive development and reproduction of multiple streamers of opposite polarity in the dischargecite [2] [3].
The work was carried out with the financial support of the Russian Science Foundation (grant 23-19-00524).

[1] V P E and [et al] 2023 *Phys. Rev. E* **108**(2) 025201
[2] V P E and [et al] 2023 *Journal of Applied Physics* **134**(15)
[3] V P E and [et al] 2024 *Journal of Applied Physics* **136** 173301