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Numerical modeling of distribution of conducting and nonconducting matter in the discharge channel upon electrical wire explosion[1]
SVETLANA TKACHENKO, DMITRI BEZNOSOV, Moscow Institute of Physics and Technology, Dolgoprudny, Moscow Region, Russia, ALEXEY BOLDAREV, VLADIMIR GASILOV, OLGA OLHOVSKAYA, Keldysh Institute of Applied Mathematics RAS, Moscow, Russia, MOSCOW INSTITUTE OF PHYSICS AND TECHNOLOGY, DOLGOPRUDNY, MOSCOW REGION, RUSSIA TEAM, KELDYSH INSTITUTE OF APPLIED MATHEMATICS RAS, MOSCOW, RUSSIA TEAM — Distribution of matter in the discharge channel formed upon a nanosecond electrical explosion of micron wire was studied. The simulations of electrical wire explosion were performed by means of Lagrangian–Eulerian MHD code based on Braginskii two–temperature model. The radiation energy transport was simulated in multigroup spectral approximation with the use of diffusion model. Heat– and electro– conductivity anisotropy in magnetic field is taken into account. The code allows utilization of data tables for thermal and optical matter properties. We have investigated the influence of initial data (in particularly "cold start" simulation) and the radiation energy transfer upon the evolution of matter parameters and current density distribution in the discharge channel. Several variants with differing amounts of spectral groups were evaluated. The numerical results are compared with experimental data.

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