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Hollow laser plasma self-confined microjet generation.[1] VALERYI SIZYUK, AHMED HASSANEIN, Purdue University, West Lafayette, IN, CENTER FOR MATERIALS UNDER EXTREME ENVIRONMENT TEAM — Hollow laser beam produced plasma (LPP) devices are being used for the generation of the self-confined cumulative microjet. Most important place by this LPP device construction is achieving of an annular distribution of the laser beam intensity by spot. An integrated model is being developed to detailed simulation of the plasma generation and evolution inside the laser beam channel. The model describes in two temperature approximation hydrodynamic processes in plasma, laser absorption processes, heat conduction, and radiation energy transport. The total variation diminishing scheme in the Lax-Friedrich formulation for the description of plasma hydrodynamic is used. Laser absorption and radiation transport models on the base of Monte Carlo method are being developed. Heat conduction part on the implicit scheme with sparse matrixes using is realized. The developed models are being integrated into HEIGHTS-LPP computer simulation package. The integrated modeling of the hollow beam laser plasma generation showed the self-confinement and acceleration of the plasma microjet inside the laser channel. It was found dependence of the microjet parameters including radiation emission on the hole and beam radiuses ratio.

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