Modeling of Plasma Dynamics and EUV Generation for Distributed Sn Targets Irradiated with Short Laser Pulses

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Generation efficiency of EUV radiation by laser-produced plasma (LPP) sources is defined by the effective coupling of the laser radiation to Sn target. Expected that usage of the distributed targets (DT) consisting of a number of small (from one to few micrometers) droplets distributed over the volume with a total size of a few hundred micrometers allows noticeably increase laser radiation absorption and in-band conversion efficiency.

To simulate optical, atomic and hydrodynamic processes in LPP sources based on DT approach, an integrated model is being developed. The hydrodynamic plasma model includes diffusion-like radiation transport with 100 and more groups of spectral groups with well represented in-band EUV. Non-stationary ionization (recombination) processes are also included. Energy fluxes to and from a target surface are taken into account: electron and ion thermo-conductivity, radiative transfer in every spectral group, condensation and recombination of vapor and plasma. Verified atomic data are used for calculation opacity and emissivity. Results of a numerical simulation are presented for various types of DT.

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