

The model of laser radiation absorption for direct-drive target simulations taking into account cross beam energy transfer and fast electron generation

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The issue of laser plasma interaction has great importance at the optimization of targets for experiments on megajoule laser facilities. The model for the propagation and absorption of laser radiation in a spherically symmetric corona of direct-driven targets are developed. It could take into account the real target irradiation geometry of multi-beam laser facilities. The model includes the following physical processes: the refraction and inverse-bremsstrahlung absorption of laser radiation in geometric-optical approximation [1], cross-beam energy transfer (CBET) [2], generation of fast electrons at the resonant and parametric absorption [3], two-plasmon decay (TPD) [4] and stimulated Raman scattering (SRS) of laser radiation in plasma [5]. Using the developed model, the influence of various processes on the absorption and scattering of laser radiation as well as on the asymmetry of absorbed laser energy distribution in the corona of direct-drive target were evaluated. The parameters of the target were taken from [6] where it was proposed for experiments on the megajoule laser facility with wavelength $\lambda = 0.53 \mu\text{m}$.

References

- [1] I.A. Khimich and V.A. Lykov, Book of abstract of ECLIM 2016, p. 113 (2016).
- [2] I.V. Igumenshchev et al., Phys. Plasmas **19**, 056314 (2012).
- [3] E.N. Avrorin et al., VANT. Metodiki i programmi, issue 2, 10-20 (1985).
- [4] S.X. Hu et al., Phys. Plasmas **20**, 032704 (2013).
- [5] A. Colaitis et al., Phys. Review E **92**, 041101(R) (2015).
- [6] S.A. Bel'kov et al., J. Exp. Theor. Phys. **121**, issue 4, 686-698 (2015).