EFFECT OF ENERGY transfer BY fast electronS ON THE direct-drive laser fusion targets gain [[1]](#footnote-1)\*)

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This talk presents as numerically as well analytically results due to investigation of the positive and negative effects onto the dynamics, ignition and burn of the shell laser thermonuclear targets onto dynamics due to a process of the fast electrons transfer, which are generated at the laser irradiation absorption. The situations we analyze are responding to the traditional laser ignition scheme, i.e. “spark ignition” [1]. The generation of the epithermal electrons has as the positive as well the negative effects. The first are the possibilities to increase an ablation pressure, so means that a region of an energy deposition is shifted into more compressed and more deep layers of a target, even more the critical density. Such situation is determined by a free pass of the fast electrons. The negative effects are completely required to an unwanted penetration of the such electrons up to target center, i.e. to a region, where the compressed substance will be formed.

The main results of the carried out analysis for a such “laser-target” system is the conclusion, that fast electrons are divided into the “warming” ones and the “wandering” ones, that have not deposit them energy to a central region of the target [2]. The “warming” fraction of the fast electrons we have determined as 12% (from the whole electrons quantity). The accurate analysis of the influence such the effect onto target gain is given within this work. In particular, it leads to the such targets constructions, that can be provide the gain more than 10, even accounting the fast electron generation and transfer.

References

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2. S.Yu. Gus’kov, P.A. Kuchugov, R.A. Yakhin, N.V. Zmitrtenko. Effect of ”wandering” and other features of energy transfer by fast electrons in a direct-drive inertial confinement fusion target. // Plasma Physics and Controlled Fusion, v. 61, no. 5, 055003 (2019).

1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLVII/It/ru/CB-Gus'kov.docx) [↑](#footnote-ref-1)