NUMERICAL MODELING AND THEORETICAL ANALYSIS OF KELVIN-HELMHOLTZ INSTABILITY UNDER LASER EXPERIMENT [[1]](#footnote-1)\*)

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The development of hydrodynamic instabilities which lead to arising turbulent flows is the key problem in realization of a necessary compression of the laser fusion targets. Rayleigh-Taylor instability (RTI) is typical for acceleration processes under laser radiation absorption as well as for deceleration process close to collapse moment and to period of spark formation at the centre of target. Both cases a light hot gas pushes a dense cold matter, the first case inside, the second one outward. Under transition of RTI from linear to nonlinear stage the RTI development will be accompanied by Kelvin-Helmholtz instability development (KHI). This instability arises due to emerging of two opposite counter streams, which formed by “bubbles surfacing” (light matter) and “spikes fall» (heavy matter). Such type of the original instability development leads to spikes destruction, bubbles merging and so to defined saturation (or termination even) of instability growth.

Besides KHI has a direct implementation at the different laser fusion schemes. Partially, such situation takes place in impact fast ignition, where accelerated thin impactor hits the precompressed cold fuel at the target center than stimulates some kind of ignition due to considerably temperature rise. In such a case the impactor goes through a canal built in a shell, id est some slipping of impactor matter by target matter occurs. So, there are the KHI conditions take place, and intense KHI development can dramatically changes the possibilities of the fast ignition.

In the offered work the questions of experimental and theoretical KHI investigations are discussed. The dynamics of accelerated sample by the motionless other one is investigated in Laboratory of Laser Energetic, Rochester University. Such a process is investigated by the theoretical methods also. In result of 2D and 3D simulations the main regularities of KHI development were stabled, the dynamics of perturbations growth is studied as well as the character such the perturbations, a development of a mixing zone is analyzed also.

1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLVIII/It/ru/DH-Zmitrenko.docx) [↑](#footnote-ref-1)