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Fast ignition research project; FIREX at ILE, Osaka KUNIOKI MIMA, ILE, Osaka University, FAST IGNITION RESEARCH GROUP OF OSAKA TEAM — The construction of the LFEX which is a heating laser of 10kJ/ 10ps/1.06 μ m will be completed before the end of 2007. The expected rise time of the short pulse LFEX is less than 1ps and the focus diameter is smaller than 30 μ m. As the front end of the laser, OPCPA is introduced to improve the contrast ratio to less than 10^{-8} . For pulse compression, segmented dielectric gratings will be used. The R&D for the coherent combining of the pulse compressed segmented beam has started. After the completion of LFEX, we will start the integrated experiment in 2008. Cone shell target implosion is studied by experiments and simulations for the FIREX-I target design. The detail of implosion hydrodynamics has been explored, and possibility of high density implosion was demonstrated. By the heating simulation, we found that the cone top is heated up to a few 100 keV by electrostatic and electromagnetic collective interactions between relativistic electrons and back ground electrons. This reduces the laser relativistic electron energy to enhance the stopping power and the delayed heating of the core plasma due to the energy confinement at the top of the cone continues for a long time. Those processes related to the core heated will be effective in the FIREX experiments. The scalability of these processes will be verified in the FIREX-I experiment and related theory and simulation research. The detail physics of the process, target fabrication and future FIREX-II project will be shown in this presentation.

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