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Direct-heating of the imploded plasma by ultra-intense laser in the fast ignition scheme ATSUSHI SUNAHARA, ILT, TOMOYUKI JOHZAKI, Hiroshima Univ., HITOSHI SAKAGAMI, NIFS, HIDEO NAGATOMO, ILE, KUNIOKI MIMA, GPI, YASUNOBU ARIKAWA, SHINSUKE FUJIOKA, HIROYUKI SHIRAGA, HIROSHI AZECHI, ILE, FIREX PROJECT TEAM — For improving the energy coupling from the heating laser to the imploded core in FIREX project, we are trying to use laser-accelerated ions for heating plasma in addition to the heating by fast electrons. To estimate the core temperature heated by both fast electrons and fast ions, we have developed 1D integrated model. In our model, the electron transport and its energy deposition to the plasma are calculated by the ray-tracing method. The slope temperature of fast electrons is assumed to be function of the laser intensity. The conversion efficiency from the laser to forward fast electrons is assumed to be 40%. For fast ions, the conversion efficiency and particle energy are calculated by the hole-boring model by S. C. Wilks PRL 69 (1992) 1383. We calculated the stopping power of each ion particle and its energy deposition on the core plasma. Our calculation show that ion heating can contribute to the heating of plasma core, and its contribution to the increase of the core temperature is not so small compared to that of fast electrons, since the ions has relatively short stopping range. We will show the dependence of core temperature on the heating laser energy, pulse duration, the divergence angle of particles, and the core density, respectively.

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