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Reduction of pre-formed plasma inside a cone target for fast ignition ATSUSHI SUNAHARA, TOMOYUKI JOHZAKI, HIDEO NAGATOMO, HIROYUKI SHIRAGA, Institute of Laser Engineering, Osaka University, FIREX PROJECT TEAM — Reduction of pre-formed plasma inside a cone target for fast ignition of inertial confinement fusion is a crucial problem, since the number of fast electrons that heat the imploded core is reduced by the interaction of short pulse laser with the pre-formed plasma [1]. Three causes for generation of pre-formed plasma are considered; (1) existence of pre-pulse of short pulse laser, (2) break-through of shock wave from the implosion plasma in the cone tip, and (3) simultaneous occurrence of (1) and (2). To suppress cause (2), in particular, we propose pointed cone tips. To investigate propagation of the shock wave from an imploding core to the interior of the pointed cone tip of the cone target, we have conducted 2D radiation hydrodynamic simulations for a variety of materials and cone shapes. Our simulation results show that the optimized pointed cone tip can delay the shock traveling time through the Al pointed cone tip, by 20-30 ps in the typical implosion condition of FIREX experiment at the institute of laser engineering Osaka University. We will present our optimized design of the pointed cone tip.

[1] H. B. Cai, K. Mima, A. Sunahara, T. Johzaki, H. Nagatomo, S. Zhu and X. T. He, Phys. Plasmas, 17, (2010) 023106-1-8.

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