Heavy ion beam illumination and implosion simulation in inertial confinement fusion[1] SHIGEO KAWATA, TETSUO SOMEYA, TAKASHI KIKUCHI, Graduate School of Eng., Utsunomiya University, A.I. OGOYSKI, Varna Technical University — In direct-driven pellet implosion, heavy ion beams (HIBs) illuminate a spherical target and deposit their energy on a target after a HIB final transport. In our study, we develop a three-dimensional HIB illumination code [1] and a target hydrodynamic implosion code for heavy ion fusion (HIF). The main objects of our study are to clarify a dependence of multi-HIB illumination non-uniformity on parameter values of HIB illumination in HIF and to calculate the target hydrodynamics during the HIB pulse by using the our HIB illumination and implosion code. In our illumination code, we calculate the HIB energy deposition. The target nuclei, target bound electrons, free electrons and target ions contribute to the HIB energy deposition. The HIB ions impinge the target surface, penetrate relatively deep into the deposition layer and deposit their energy in a rather wide region in the deposition layer: this HIB deposition feature influences the beam illumination non-uniformity. Therefore we calculate target implosion using the coupled hydrodynamic code in order to investigate the beam illumination non-uniformity influence on a fuel ignition. [1] T.Someya, et.al, Phy.Rev.STAB, 7, 044701 (2004).

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