

Cylindrical Targets in HIF.

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Annotation:

“Fast ignition” of the DT fuel by a superpower heavy ion beam ($J_m \sim 4 \cdot 10^6$ TW/g) was a main peculiarity of the ITEP prospects for HIF system at HIF-2002 Symposium (Moscow). Low entropy compression of the DT fuel ($\rho_{DT} \sim 100$ g/cc) was achieved by direct irradiation with a heavy ion pulse: ion energy $\epsilon \sim 100$ GeV, target energy input $E_0 \sim 10$ MJ [1]. The next step of the investigations to obtain the more reliable system may be in an employment of the relativistic heavy ion driver proposed by D.G.Koshkarev [2]. Ion energy $\epsilon \sim 1000$ GeV creates new possibilities in the HIF system without a superpower ignition beam, but with a high level of the energy input $E_0 \sim 100$ MJ. A complex but a reliable form of the irradiation is employed to compress the fuel to the density $\rho_{DT} \sim 100$ g/cc and to ignite DT. The perfectly well results of the Zabrodins group in Keldysh IAM (Moscow) with the “low entropy compression” [3] were as a starting-point to consider a multi-layered design of the cylindrical target. Energy gains ≥ 50 were obtained in the two-dimensional simulations by MDMT code for this DT cylindrical target. Some set of the investigations was fulfilled also for the deuterium fuel by the driver energy at the level $E_0 \sim 1000$ MJ.

- [1] Medin S.A., Churazov M.D., Koshkarev D.G., Sharkov B.Yu., Orlov Yu.N. “Evaluation of Power Plant Concept for Fast Ignition Heavy Ion Fusion”, *Laser and Particle Beams*, (2002), 20 (3), p.419-422.
- [2] Koshkarev D.G., “Power Heavy Ion Driver”, Preprint ITEP 21-03, (2003).
- [3] Dolgoleva G.V., Zabrodin A.V., “Non-shock targets compression”, Preprint N-53, Keldysh IAM (Moscow), 1999.