

3rd International Conference on

HIGH ENERGY PHYSICS

December 11-12, 2017 | Rome, Italy

Cluster ion beam for ICF: A renewal

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We presently witness a reappraisal of concern for the cluster ion beam (CIB) approach to heavy ion driven inertial confinement fusion (ICF). Our purpose is to elaborate on a very recent proposal switching from C_{60}^{n+} linear acceleration to circular acceleration of Si_{100}^{8+} ; making use of a suitable extension of the relativistic electron Microtron to GeV acceleration of very heavy particles. This program is currently developed on the KEK facility (Ibaraki, Japan). Then we intend to emphasize the specific features of the CIB dense plasma target stopping of the resulting ion debris leading to a very significant reduction of CIB ranges in pellet outer shells. As a result, the direct drive approach could be managed through a much higher hydro compression while the indirect one would highlight a much higher adiabat with radiative temperature in the 500–600 eV range. A specific attention will also be given to the pertaining cluster ion source design. We also address the very efficient laser conditioning of the Coulomb explosion.

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