TARGET DESIGN FOR THE CYLINDRICAL COMPRESSION OF MATTER DRIVEN BY HEAVY ION BEAMS

A. R. Piriz, M. Temporal, R. Portugues, J. J. Lopez-Cela, ETSII, UCLM, 13071 Ciudad Real, Spain.
N. A. Tahir,, GSI Darmstadt, Planckstarsse 1, 64291 Darmstadt, Germany
N. Grandjouan, LULI, University Paris VI, Palaiseau, France
D. H. H. Hoffmann, TU Darmstadt, Germany

The compression of a cylindrical sample of cryogenic hydrogen contained in a hollow shell of Pb or Au has been analyzed in the framework of the experiments to be performed in the heavy ion synchrotron SIS100 to be constructed in the Gesellschaft für Schwerionenforschung (GSI) Darmstadt [1,2]. The target implosion is driven by an intense beam of heavy ions and, in order to avoid the direct heating of the sample, it has a ring shaped focal spot.

In this work we report the results of a parametric study of the final state of the compressed matter in terms of the target and beam parameters [3]. Then we consider the generation of the annular focal spot by means of a radio frequency wobbler that rotates the beam at extremely high frequency and we determine the required frequency in order to accommodate symmetry constraint [4,5]. Besides, the sample parameters that can be achieved with a Gaussian focal spot (non rotating beam) has also been studied as well as the possibility to use a mask as an alternative way to avoid the direct heating of the sample [6]. Finally we report the analysis of the hydrodynamic instabilities that affect the implosion and the mitigating effects of the elastoplastic properties of the shell [7].

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