

HIGH ENERGY DENSITY PHYSICS RELATED TO INERTIAL FUSION WITH INTENSE ION- AND LASER BEAMS AT GSI AND FAIR IN DARMSTADT

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High Energy Density (HED) states in matter can be achieved by pulsed power deposition from intense laser or particle beams. GSI-Darmstadt presently provides the most intense heavy ion beam and a high power laser (PHELIX) for interaction experiments of laser plasma and ion beams. Approximately 200 scientists from 45 institutes and 16 countries worldwide are members of the HEDgeHOB [1] collaboration. They prepare novel experiments at FAIR (Facility for Antiproton and Ion Research) to study thermo-physical, transport, and radiation properties of HED matter, generated by the impact of intense heavy ion- and laser beams on dense targets. Paramount to the success of the research project is the development of cryogenic targets for the beam plasma interaction experiments proposed by the HEDgeHOB collaboration: HIHEX and LAPLAS for the FAIR-start phase. The progress of cryo-target production will be addressed in some detail. For the research topic in general plasma phenomena, phase transitions and equation of state properties of matter are of interest. The proposed experiments will explore the region of the phase diagram which is dominated by strongly coupled plasma and warm dense Matter (WDM). The current status of the FAIR and efforts of the HEDgeHOB collaboration to prepare for the experimental phase at FAIR will be discussed with emphasis on cryo-target development

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References:

[1] HEDgeHOB Collaboration: <http://hedgehob.physik.tu-darmstadt.de>: