High energy density physics with intense ion and laser beams

D.H.H. Hoffmann*[1,2,3], B.Yu. Sharkov[2,3], A.A. Golubev[4,2] , Y. Zhao[5], V.E. Fortov[6]

[1]Technical University Darmstadt, Hessen, Germany
[2]National Research Nuclear University, Moscow Institute of Engineering Physics (MEPhI)
[3]FAIR GmbH and GSI Helmholtzzentrum, Darmstadt, Germany
[4]State Scientific Center Russian Federation – Institute for Theoretical and Experimental Physics of National Research Center "Kurchatov Institute", Moscow Russia
[5]Jiaotong University Xi'An and Institute of Modern Physics, CAS, Lanzhou, China
[6]Institute of Thermophysics of Extreme States, Joint Institute for High Temperatures, Russian Academy of Sciences, Moscow Russia
*Corresponding author: hoffmann@physik.tu-darmstadt.de

We will present the status and perspectives of High Energy Density Physics (HEDP) with intense heavy ion beams as a tool to induce extreme states of matter. This report will emphasize the recent progress at FAIR/GSI. The development of this field connects intimately to the advances of accelerator physics and technology and aims to investigate the properties of intense heavy ion beams as a driver for inertial fusion energy. We will cover the generation of intense heavy ion beams starting from the ion source and follow the acceleration process and transport to the target. Intensity limitations and potential solutions to overcome these limitations are discussed. This is exemplified by citing examples from existing machines at the Gesellschaft fьr Schwerionenforschung (GSI-Darmstadt), the Institute of Theoretical and Experimental Physics in Moscow (ITEP-Moscow),and the Institute of Modern Physics (IMP-Lanzhou). Facilities under construction like the FAIR facility in Darmstadt and the High Intensity Accelerator Facility (HIAF), proposed for China will be included. Developments elsewhere are covered where it seems appropriate along with a report of recent results and achievements.

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