

Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

HEDgeHOB: High Energy Density Matter Generated by Heavy Ion Beams at the Future Facility for Antiprotons and Ion Research at Darmstadt NAEEM TAHIR, GSI Darmstadt, A. SHUTOV, I.V. LOMONOSOV, V. KIM, V.E. FORTOV, IPCP, Chernogolovka, Russia, A.R. PIRIZ, G. WOUCHUK, UCLM, 13071 Ciudad Real, Spain, D.H.H. HOFFMANN, GSI, Darmstadt, Germany — A novel method for studying high-energy-density (HED) matter that involves isochoric and uniform heating of matter by intense ion beams has been proposed. The Gesellschaft fuer Schwerionenforschung (GSI), Darmstadt is a unique laboratory world wide whose heavy ion synchrotron (SIS-18) delivers intense heavy ion of different species including uranium. The construction of the new Facility for Antiprotons and Ion Research (FAIR) will lead to an increase in beam intensity by two orders of magnitude and it will deposit hundreds of kJ/g specific energy in solid material. This will open up the way to study equation-of-state (EOS) properties of different phases of HED matter including strongly coupled plasmas^{1,2}. Use of a hollow beam with an annular focal spot³ will allow low entropy compression of materials like hydrogen to create physics conditions that are expected to exist in the interiors of giant planets^{4,5}. References ¹N. A. Tahir et al., Phys. Rev. Lett. 95, 035001 (2005). ²N. A. Tahir et al., High Energy Density Physics 2, 21 (2006). ³A. R. Piriz et al., Plasma Phys. Controlled Fusion 45, 1733 (2003). ⁴N. A. Tahir et al., Phys. Rev. E 62, 016402 (2001). ⁵A. R. Piriz et al., Phys. Rev. E 66, 056403 (2002).

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Date submitted: 31 Jul 2006

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