

Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Combining X-Ray Thomson Scattering and X-Ray Raman Spectroscopy to Characterize Solid-Density Plasmas DOMINIK KRAUS, KATJA VOIGT, MIN ZHANG, KUSHAL RAMAKRISHNA, NICHOLAS HARTLEY, ANJA SCHUSTER, JAN VORBERGER, LINGEN HUANG, DENIZA CHEKRYGINA, MICHAL SMID, TOMA TONCIAN, ALEXANDER PELKA, KATERINA FALK, Helmholtz-Zentrum Dresden-Rossendorf, MARION HARMAND, ALEXIS AMOURETTI, UPMC Paris, STEFAN HAU-RIEGE, TILO DOEPPNER, LLNL, LUKE FLETCHER, HAE JA LEE, BOB NAGLER, SLAC, ROGER FALCONE, UC Berkeley, MIKAKO MAKITA, KAREN APPEL, THOMAS PRESTON, ULF ZASTRAU, European XFEL — X-ray Free Electron Lasers can produce solid-density plasmas by ultrafast isochoric heating and at the same time the brilliant X-rays allow for in situ diagnostics of unparalleled precision. Here we present experiments performed at the Linac Coherent Light Source and the European XFEL that for the first time combine X-ray Thomson scattering and X-ray Raman spectroscopy to study isochorically heated carbon allotropes and other carbon-containing sample materials. Our results provide unique insights into the isochoric heating process and the irradiance-dependent evolution of the electronic structure, while at the same time constraining temperature and ionization.

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Date submitted: 10 Jul 2020

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