Abstract Submitted
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A direct temperature measurement of resistively heated diamond using inelastic X-ray scattering.[1] ADRIEN DESCAMPS, BENJAMIN OFORI-OKAI, SLAC National Accelerator Laboratory, ULF ZASTRAU, European XFEL, DEBBIE SENESKY, Stanford University, SIEGFRIED GLENZER, EMMA MCBRIDE, SLAC National Accelerator Laboratory, EUROPEAN XFEL COMISSIONING TEAM COLLABORATION — Warm dense matter is a system in which the electron kinetic energy is comparable to the potential energy of interaction between the electrons and the nucleus. This property makes this system hard to analyze theoretically as it is too dense to be considered as a plasma and the electron temperature is too high to be analyzed using condensed matter theory. In such systems it is then of primary interest to measure its thermodynamics properties (i.e. temperature, density) to guide the development of models. Here, we present the development of a platform using inelastic X-ray scattering in a Johann geometry to measure temperature by the use of the principle of detailed balance. The experiment was conducted at the HED beamline at the European XFEL on resistively heated single crystal Diamond at 500 K. Such a platform may be readily combined with high energy lasers to generate and probe warm dense matter.

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