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X-Ray Diffraction of Diamond on the Double-Shock Hugoniot DANAE POLSIN, University of Rochester, MOHAMED ZAGHOO, Laboratory for Laser Energetics, GILBERT COLLINS, RYAN RYGG, XUCHEN GONG, GRIGORY TABAK, ZAIRE SPROWAL, University of Rochester, PETER CELLIERS, DAYNE FRATANDUONO, YUAN PING, JON EGGERT, DAVE MUNRO, AMY JENEI, Lawrence Livermore National Laboratory, DAMIEN HICKS, Swinburne U. of Technology, TOM BOEHLY, Laboratory for Laser Energetics — The high-pressure equation of state of carbon is integral to inertial confinement fusion and the modeling of gas giants such as Uranus and Neptune. Numerous studies have investigated the compression and melting curve along the principal Hugoniot, where the liquid–solid coexistence regime exists between 6 and 10 Mbar. Here we explore the secondary Hugoniot of dynamically compressed diamond using velocity interferometry and optical pyrometry. Simultaneous x-ray diffraction measurements are performed to determine the crystal structure and to detect the onset of melting at higher pressures than those accessible by a single shock. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0003856.

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