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Optical Properties, Raman Scattering, and Radiometry of Diamond under Shock Compression. R. STEWART MCWILLIAMS, DYLAN K. SPAULDING, RAYMOND JEANLOZ, University of California Berkeley, JON H. EGGERT, PETER M. CELLIERS, DAMIEN G. HICKS, GILBERT W. COLLINS, Lawrence Livermore National Laboratory — We have studied the optical transparency, luminescence, index of refraction, and elastic-plastic relaxation of diamond shocked to pressures in excess of its elastic limit. Techniques include VISAR velocimetry, optical pyrometry, and spontaneous Raman scattering on quasi-steady shock compressions in crystallographic orientations (100), (110), and (111) driven by the kiloJoule Janus laser at Lawrence Livermore National Laboratory. We extend the pressures to which diamond, or any material, has been studied using Raman scattering, and explore the development of two-wave, elastic-plastic compression near the Hugoniot Elastic Limit. This work was performed under the auspices of the U.S. Department of Energy. by Lawrence Livermore National Laboratory under contract No. W-7405-Eng-48.

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