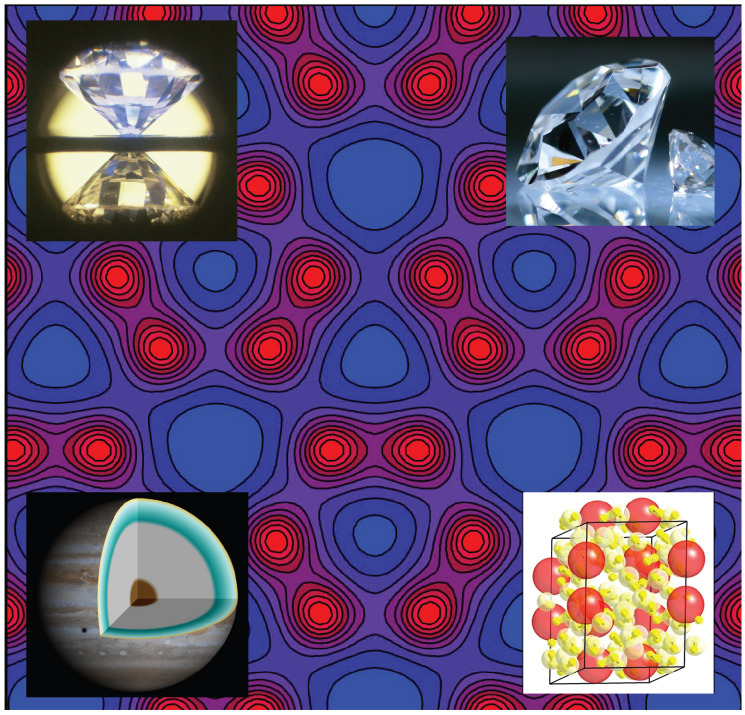
Russell J. Hemley

New Light on Materials in Extreme Environments

Extreme pressures and temperatures produce profound effects on the structure, bonding, and electronic character of atoms and molecules, molding matter to make new materials. A growing number of novel phenomena are being documented over the broad range of conditions, including both static and dynamic multi-megabar pressures, that can now be generated in the laboratory. These phenomena include unusual transitions between insulating and metallic phases of "simple" elements, new electronic materials, and remarkable changes in soft matter. The implications span chemistry, physics, planetary science, astrophysics, and even biology, and are leading to the creation of new technological materials. In this effort, new light sources, including both accelerator-based and large laser facilities are enabling new types of measurements and significantly more extreme environments to be reached in the laboratory.

Russell J. Hemley explores the nature of materials in extreme pressure and temperature environments, and the implications of those findings for diverse areas of science and technology. He received his B.A. from Wesleyan University (1977), and M.A. (1980) and Ph.D. (1983) from Harvard University, all in chemistry. He has worked at the Carnegie Institution since 1984, and is currently the Director of the U.S. Department of Energy (DOE)/Carnegie Alliance Center (CDAC) and of Energy Frontier Research in Extreme Environments (EFree), a DOE Energy Frontier Research Center. He is also a Research Physicist at Lawrence Livermore National Laboratory. His honors include membership in the National Academy of Sciences (2001), Balzan Prize in Mineral Physics (2005), Corresponding Fellow of the Royal Society of Edinburgh (2008), Honoris Causa Professor of the Russian Academy of Sciences (2008), and the Percy W. Bridgman Award (2009). He has published approximately 630 scientific papers.



Wednesday, June 8, 2016 | 3:00 p.m.

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