Institut de Minéralogie et de Physique des Milieux Condensés
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SÉMINAIRE
Jeudi 25 octobre, 14h

Salle de Conférence, 4ème étage, Tour 22-23, Salle 1
IMPMC, Université P. et M. Curie, 4, Place Jussieu, 75005 Paris

Alex GONCHAROV

Geophysical laboratory Carnegie institute Washington D.C

Time-domain optical and x-ray measurements in diamond anvil cells

We currently lack a full understanding of the chemical and physical processes that occur in materials under extremes pressures, temperature, and high strain rate. Furthermore, there is a gap in pressure-temperature-strain rate conditions between those probed in static and dynamic experiments.
Here I will present developments of new optical and synchrotron x-ray techniques that enable studies of the dynamic phenomena in materials under a wide range of thermodynamic conditions and spatial and temporal scales. The use of pulsed laser heating technique allows very substantial reduction of the average laser power and much higher temperatures can be reached and the diffusion processes can be suppressed. Examples of combined pulse heating and optical and x-ray diffraction measurements will be presented (melting of Pt up to 200 GPa, change in the optical properties of Xe, H_2, D_2, N_2, O_2 up to 150 GPa and 6000 K, thermal conductivity of Ar to 50 GPa and 3000 K).
Also, DAC techniques have been drastically improved, allowing much higher pressures than before. I will present new results for H_2, D_2, CH_4, and NH_3.
Finally, I will report on laser-driven shocked states of D_2 precompressed in DAC.

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