Institut de Minéralogie et de Physique des Milieux Condensés
Unité Mixte de Recherche 7590
Code 115, 4 Place Jussieu F-75252 Paris CEDEX 05

SÉMINAIRE
Lundi 10 octobre, 10h30

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

Dylan K. SPAULDING

Département de Physique Théorique et Appliqué, C.E.A. Bruyères-le-Châtel

EXPLORING EXTRA-SOLAR PLANETARY INTERIORS WITH LASER-DRIVEN SHOCK WAVES

The physical and transport properties of silicate and oxide melts at extreme pressures and temperatures are critical for understanding early planetary evolution and the aftermath of late-stage giant impacts such as that believed to have formed the Moon. This presentation reports on a suite of laser-driven shock experiments on major mineral phases of significance to the terrestrial mantle and extra-solar rocky planets SiO_2, MgO and $MgSiO_3$. Equation of state measurements were carried out for MgO and MgSiO3 to 6.4 and 9.5 Mbar, respectively, constraining controversial predications for the ultra-high pressure melt curves. Experiments on amorphous and crystalline MgSiO3 starting materials show evidence of a liquid-liquid phase transition with a volume reduction of ~5-8% near 3.5 Mbar and over a range of temperature of at least 7000 K, suggesting the potential for unexpectedly complex chemistry in silicate liquids. Transport properties are extracted from time-resolved optical reflectivity data and imply that the distinction between silicate and metallic constituents are blurred in deep planetary interiors with potential implications for coupling across the present-day core-mantle boundary.

Tel**: 33-(0)1 44 27 42 20 --**Fax**: 33-(0)1 44 27 44 69 –**
Courriel**: catherine.dreyfus@impmc.jussieu.fr**