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Colloquium **Recent advances in high-pressure physics**

Date and Time: 2 May 2008 (Friday), 4:00 – 5:00 p.m.

Venue: Lecture Theatre L2, Science Centre, CUHK

Abstract: *High-pressure physics research is booming with new discoveries and methodological developments. Several topics will be discussed: (1) prediction of stable crystal structures, (2) quantum-mechanical calculation of phase diagrams, (3) pressure calibration in diamond anvil cells. This talk will outline the principles and applications of new methods.*

Lecture **Predicting crystal structures from scratch**

Date and Time: 8 May 2008 (Thursday), 3:30 – 5:00 p.m.

Venue: Lecture Theatre L2, Science Centre, CUHK

Abstract: *Predicting the stable arrangement of atoms inside a solid is a formidable problem, when no information is available on the topology of the structure. Solving this problem is important for materials design and for studies of matter at extreme conditions (ultrahigh/ultralow pressures and temperatures). Several methods have been proposed, but turned out to be computationally very expensive. Recently, important progress was achieved thanks to the development of the evolutionary algorithm USPEX (Oganov & Glass, 2006). This lecture will describe this method and several of its recent applications.*

Seminar **Computational mineral physics: Exploring matter inside planets**

Date and Time: 15 May 2008 (Thursday), 3:30 – 5:00 p.m.

Venue: Lecture Theatre LT3, Lady Shaw Building, CUHK

Abstract: *Deep planetary interiors are not directly accessible, and quantum-mechanical modelling is one of the main tools to explore planet-forming materials at high P-T conditions relevant to planets. Several topics will be covered: (1) recent discovery of the post-perovskite phase of MgSiO_3 and its properties (elasticity, plasticity, electrical conductivity), (2) stability of carbonates at ultrahigh pressures, (3) materials of giant planets at ultrahigh pressures.*

ALL INTERESTED ARE WELCOME