
Hydrogen bond symmetrisation in filled ice methane hydrates under high pressures

Richard Gaal^{*1}, Umbertoluca Ranieri², Fabio Finocchi³, Sofiane Schaack³, Philippe Deponddt³, Philippe Gillet⁴, and Livia Bove⁴

¹Earth and Planetary Science Laboratory (EPSL) – EPFL SB ICMP EPSL PH D2 435 (Bâtiment PH)
Station 3 CH-1015 Lausanne, Switzerland, Switzerland

²Institut Laue-Langevin (ILL) – Ecole Polytechnique Fédérale de Lausanne – CS 20156, 38042
Grenoble, France

³Institut des Nanosciences de Paris (INSP) – Université Pierre et Marie Curie - Paris 6, Centre
National de la Recherche Scientifique : UMR7588 – Université Pierre et Marie Curie Case 840 4 place
Jussieu 75252 Paris Cedex 05, France

⁴Earth and Planetary Science Laboratory, Ecole Polytechnique Fédérale de Lausanne (EPSL EPFL) –
Station 3, 1015 Lausanne, Switzerland

Abstract

We report the results of Raman spectroscopy measurements and molecular dynamics simulation including nuclear quantum effects on methane hydrate high pressure phases up to 150 Gpa. We have found signatures of hydrogen bond symmetrisation and new high pressure phases.

^{*}Speaker