

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Raman spectroscopy of hot compressed hydrogen and nitrogen - implications for the intramolecular potential ALEXANDER F. GONCHAROV, Geophysical Laboratory, Carnegie Institution of Washington, JONATHAN C. CROWHURST, Lawrence Livermore National Laboratory — Raman measurements of molecular hydrogen, deuterium, and nitrogen have been made under simultaneous conditions of high temperature and high static pressure. Measurements have been made on hydrogen and deuterium to 50 GPa and 1600 K, and on nitrogen to 50 GPa and 2000 K. In all three materials the familiar molecular stretching mode (vibron) is accompanied in the high temperature Raman spectra by one or more lower frequency peaks due to transitions from excited vibrational states. We find the frequency differences between these bands decreases with pressure, implying that the anharmonicity of the corresponding part of the intramolecular potential also decreases. This is accompanied by an increase in the measured line widths of the bands that is consistent with a decrease of the depth of the potential and an approaching molecular dissociation.

Alexander F. Goncharov
Geophysical Laboratory, Carnegie Institution of Washington

Date submitted: 01 Dec 2005

Electronic form version 1.4