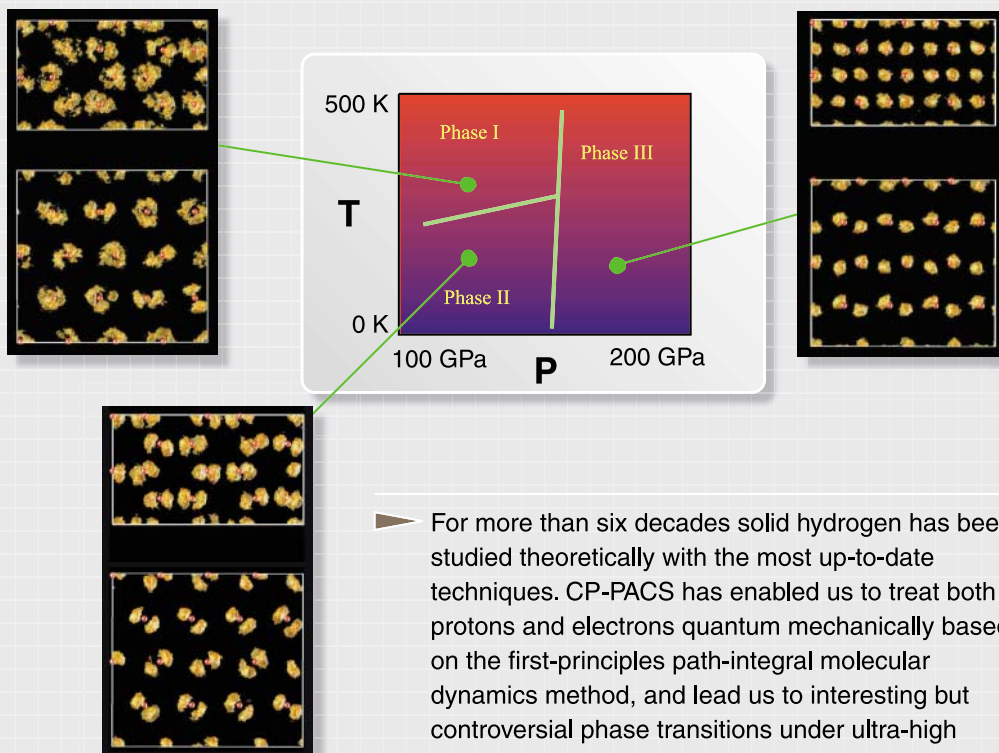




Research in Condensed Matter Physics

Simulation of solid hydrogen at high pressure



- For more than six decades solid hydrogen has been studied theoretically with the most up-to-date techniques. CP-PACS has enabled us to treat both protons and electrons quantum mechanically based on the first-principles path-integral molecular dynamics method, and lead us to interesting but controversial phase transitions under ultra-high pressure.

Nature **404**, 259-262 (Mar. 2000)

- Solid hydrogen is expected to exist in Jupiter, between the hydrogen molecule gas layer on the surface and the central core made of rocks etc. From our study, we expect a new layer structure of solid hydrogen in different phases, which may affect the global nature of Jupiter.

H₂ gas (< 100GPa)

Solid hydrogen

Core made of heavy materials (> 5000GPa)

