

4 Dimensional Extreme Environment (4DE²)

4DE² at NSLS-II

- Contain unique world-leading high pressure devices (200 MPa- 1000GPa)
- In-situ studies of materials under extreme conditions with both static and dynamic capability
- The continuous growth of high pressure devices combined with high brightness/low noise NSLS-II will set new frontiers in high pressure research

Examples of Science Areas & Impact

- FUNCTIONAL MATERIALS: super-hard material; complex structured alloy; highly correlated electron systems; structural material
- EARTH AND PLANETS: transport properties of rocks; dynamics of grain interaction; phase transitions; kinetics, failure strength
- GAS-FLUID-SOLID INTERACTION: waste/CO₂ sequestration; gas hydrates deposition; porous materials with micron-nanopores)



High pressure devices, Left: model for 2000 ton press (up to 30 GPa, 2000K) with dynamic capability. Right: Diamond anvil cell (1000 GPa).

Beamline Capabilities

TECHNIQUE(S): powder diffraction and imaging with energy dispersive/monochromatic beam

SOURCE: Superconducting wiggler

ENERGY RANGE/RESOLUTION: 20–100 keV / 100 eV

SPATIAL RESOLUTION: ~1 – 5 μm