

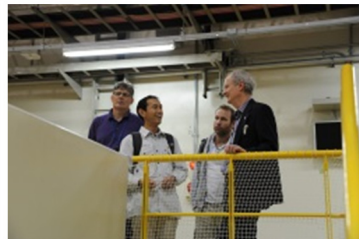


What is CROSS-Tokai?

- ➔ An independent agency appointed by the Japanese government in April 2011 to administer, support and promote the user program on the public-access neutron beamlines (Public Beamlines) at J-PARC
- ➔ A partner organization that works hand-in-hand with J-PARC to provide open and transparent access to researchers from around the world wishing to use the J-PARC Public Beamlines
- ➔ A center of neutron beam-based science and technology with a specific mandate to support strategic research initiatives of the Japanese government

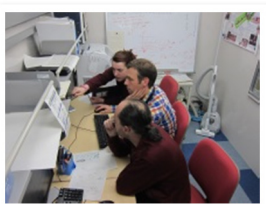
What does CROSS-Tokai do?

- ➔ Manage the proposal evaluation and beamtime allocation process for the neutron Public Beamlines at J-PARC
- ➔ Provide user support on the Public Beamlines
- ➔ Promote the use of the Public Beamlines at J-PARC through a variety of outreach activities targeting both academic and industrial research fields



What does CROSS-Tokai do this?

- ➔ With a team of 40 beamline scientists and specialist technicians dedicated to supporting the experimental program on the 7 Public Beamlines
- ➔ By operating and maintaining user and experiment support facilities such as sample preparation and characterization labs, data analysis infrastructure, meeting and conference rooms, User Lounge etc.

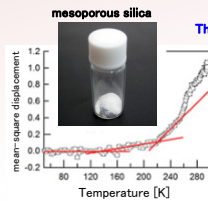
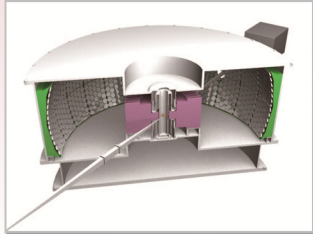


In all its activities, CROSS-Tokai works in close collaboration with the J-PARC to enable the highest quality scientific outcomes for the users of the neutron Public Beamlines.

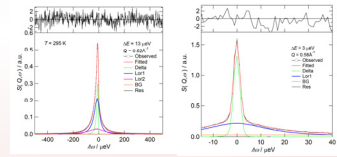
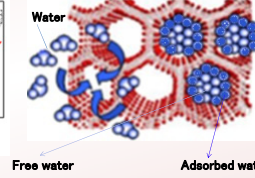
Investigated by Neutrons



Measurement of atomic motion and spin dynamics (in magnetic systems) of bio-macromolecules, soft matter and functional materials



The water in pores is not frozen even -40°C .

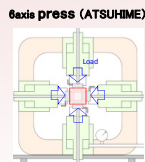


The dynamics of free water and adsorptive water can be discussed.

Specification
 Flight path length: $L_1=42\text{m}$, $L_2=4.3\text{m}$
 Final energy: $E_f=2.09\text{meV}$ (Si(111)), 7.63meV (Si(311))
 Energy resolution: $\Delta E=2.5 \mu\text{eV}$ (Si(111))
 Q range: $q=0.07\sim 1.9 \text{ \AA}^{-1}$ (Si(111))
 Analyzer bank: $-18\sim 138^{\circ}$ (horizontal), $-14.2\sim 20^{\circ}$ (vertical)
Sample size
 $\phi 14 \times 30\text{mm}^3$

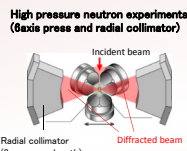
Biomolecular Dynamics Spectrometer (BL02 DNA)

Structural analysis for crystalline and liquid/glass samples under high pressure and high temperature extreme condition



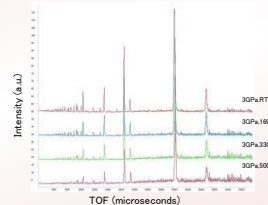
- Each ram is controlled independently by six plunger pumps.
- Max. Load: 500 tonf/axis

Compression Mode
 • 6axis compression \Rightarrow quasi-hydrostatic condition
 • Uniaxial compression \Rightarrow deviatoric stress, deformation experiments



\Rightarrow Only diffracted beam from the small sample region ($3 \times 3 \times 3\text{mm}^3$) is detected.

~Diffraction Patterns from $\text{Ca}(\text{OD})_2$ ~
 (by 6axis press)

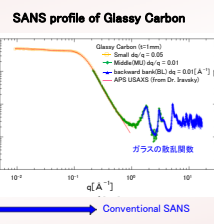
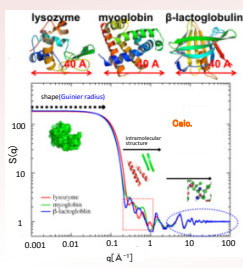
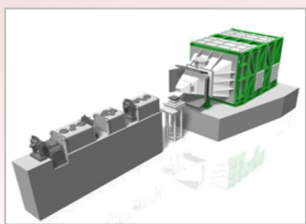


- Main High Pressure Devices**
- 6axis Multi-Anvil press (ATSUHIME): 10 GPa
 - Opposed anvils press (Paris Edinburg Press): 30 GPa
 - Diamond Anvil Cell: Now loading

Specification
 Max. load: 1,500t
 Flightlength: $L_1=25\text{m}$, $L_2=1.5\text{m}$
 D range: $d=0.21\sim 4.1 \text{ \AA}$
 Resolution: $\Delta d/d < 0.5\%$
 Max. q value: $q_{\text{max}}=30 \text{ \AA}^{-1}$
Sample size
 $0.1\sim 10\text{mm}^3$

High-Pressure Neutron Diffractometer (BL11 PLANET)

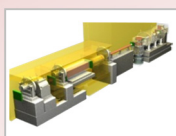
The structural analysis of sub-nano to a micron scale is possible.



Specification
 Flight path length: $L_1+L_2=20\text{m}$ (max)
 Scattering angle: $2\theta=0.2\sim 50^{\circ}$ (small, middle angle bank)
 $150\sim 175^{\circ}$ (high angle bank)
 Wavelength band: $\lambda=0.5\sim 7.8 \text{ \AA}$
 Q range: $q=5 \times 10^{-3}\sim 6.6 \text{ \AA}^{-1}$ (small, middle angle bank)
 $1.5\sim 15 \text{ \AA}^{-1}$ (high angle bank)
 Polarization of incident neutron beam: $P>99\%$
Sample size
 $8 \times 8 \times 1\text{mm}^3$

Small and Wide Angle Neutron Scattering Instrument (BL15 TAIKAN)

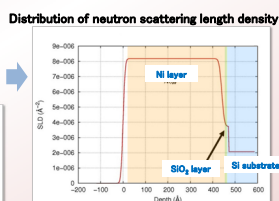
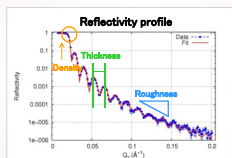
Surface/interface analysis for thin and multiple layer structure



Sample: Ni layer on Si
 Sample Size: $\phi 3\text{inch}$
 $Q_z < 0.2 \text{ \AA}^{-1}$

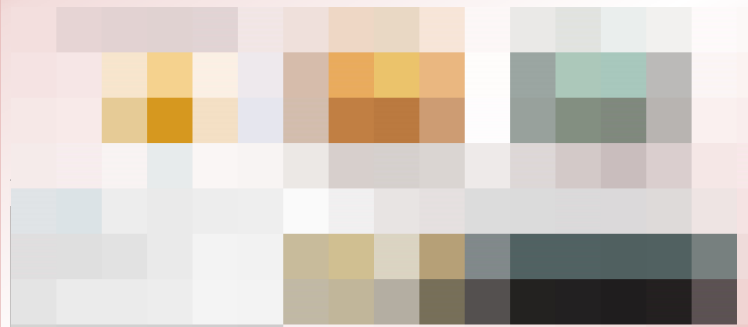
powerful tool for surface/interface structure studies

Specification
 Flight path length: $L_1=15.5\text{m}$, $L_2=2.5\text{m}$
 Wavelength band: $\lambda=2.0\sim 8.4 \text{ \AA}$ (polarized mode)
 $1.0\sim 8.8 \text{ \AA}$ (unpolarized mode)
 Q range: $q=0.01\sim 1.2 \text{ \AA}^{-1}$ (polarized mode)
 $0.005\sim 2.5 \text{ \AA}^{-1}$ (unpolarized mode)
 Scattering angle: $2\theta=0\sim 23^{\circ}$
 Detector: ^3He gas type 0-dimensional detector
Sample size
 $10 \times 10\sim 30 \times 30\text{mm}^2$



Polarized Neutron Reflectometer (BL17 SHARAKU)

Energy resolved neutron imaging technique enables us to visualize distributions of crystalline structure, nuclear species, temperature and magnetic field.



Energy Resolved Neutron Imaging System (BL22 RADEN)



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