The current status of neutron scattering facilities at CARR

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2009.10.28 Beijing

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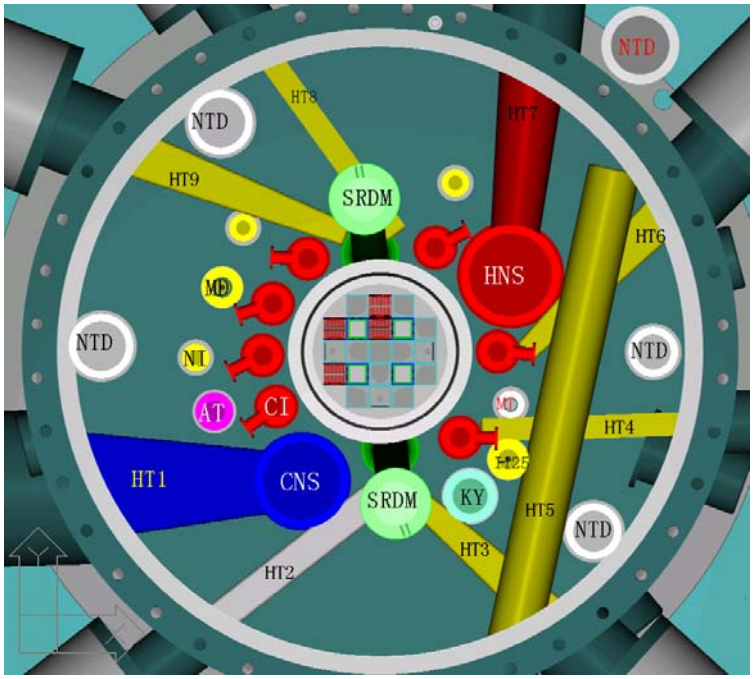
The China Advanced Research Reactor (CARR)

Key Parameters

- 60 MW
- Max undisturbed thermal neutron flux ($n \cdot cm^{-2} \cdot s^{-1}$)
  - 8×10^{14} (at heavy-water reflector)
- 19.75 wt% U^{235} enrichment

CARR is a user facility. Neutron scattering for material characterization is a major research program at CARR open to users from universities, industries and government labs.



9 horizontal beam tubes

HT1 views the LH_2 cold neutron source (CNS)

HT3-9: thermal neutron beams

HT2: A multi-filtration beam tube

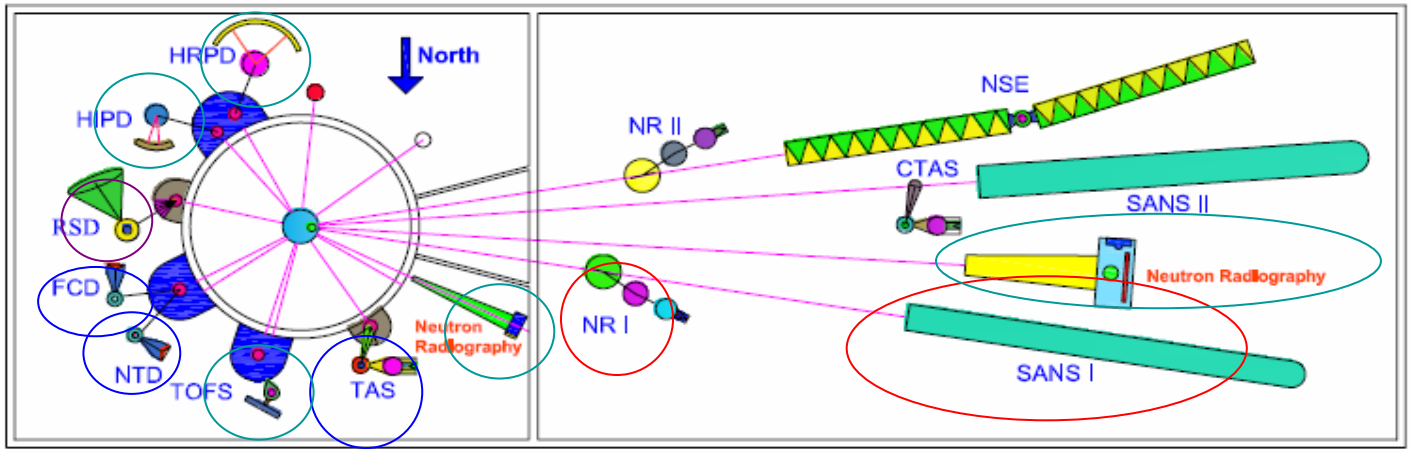
Space reserved for future hot source (HNS)

Additional 25 vertical channels

Mission of NSL is dedicated to serve neutron users from China and abroad for materials research with reliably optimized, progressively upgradable, and safely operated facilities and a devoted staff.

NSL-CARR Instrumentation and Science

Inter-Institutional and International Collaboration



A ***30-m SANS*** Instrument and a horizontal-sample-geometry ***Reflectometer***: Co-developed with Institute of Chemistry, CAS led by Prof. Charles Han, receiving gracious assistance from NIST, USA.

A ***Residual Stress Diffractometer***: Majority of components contributed by the reactor from Studsvik, Sweden in collaboration with Dr. Ru Lin Peng.

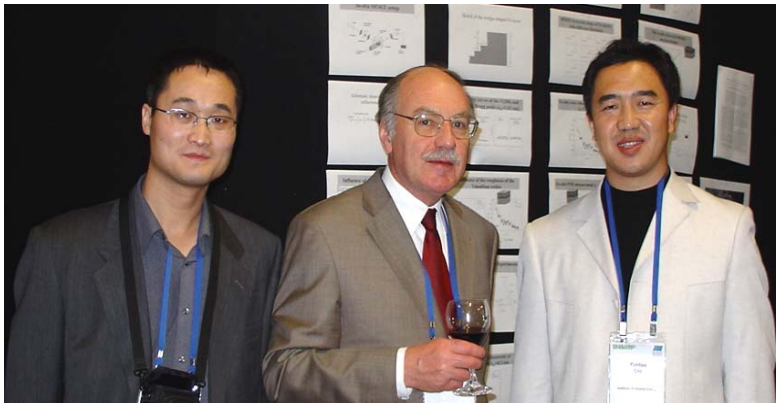
A ***Triple-axis Spectrometer***, a ***Four-circle Single-crystal Diffractometer***, and a ***Texture Diffractometer***: Cooperated from FZ-Jülich, Germany under an international agreement of cooperation.

A ***High-resolution Powder Diffractometer***: Being designed and built at CIAE.

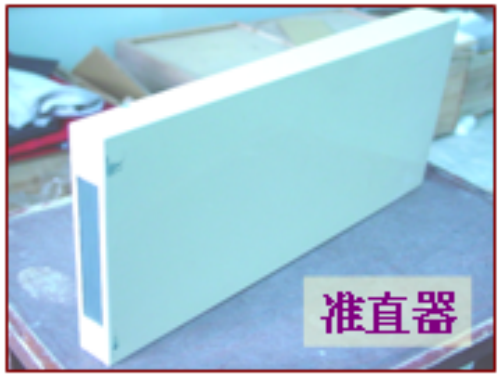
A ***cold*** and a ***thermal Neutron Radiography***: Funding will come next year.

High Resolution Powder Diffractometer

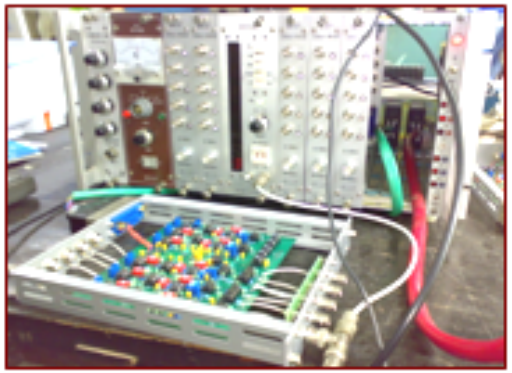
Resolution：	***$\Delta d/d=2\times10^{-3}$***
Monochromator:	***Vertical focusing Ge(115)***
Take off angle:	***120º***
Wavelength：	***0.1886 nm***
Collimator：	***C1: 10´20´open; C2: 40´ C3: 10´***
Detector：	***64 ^{3}He proportional counters***
Scattering angle：	***$5^o<2\Theta<170^o$***
Mono. to sample：	***2.4m***
sample to detector：	***0.94m***

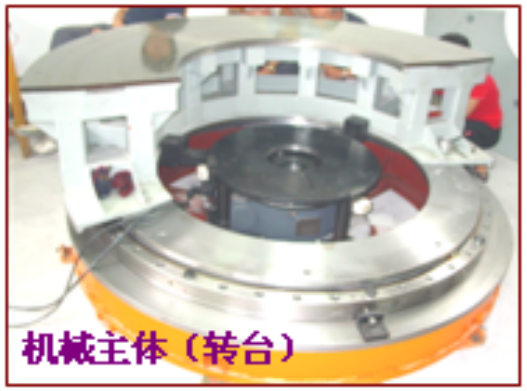


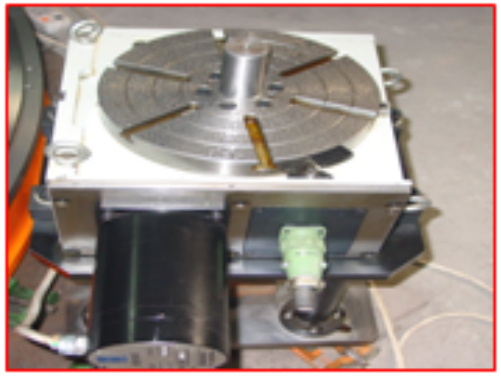
A.W.Hewat

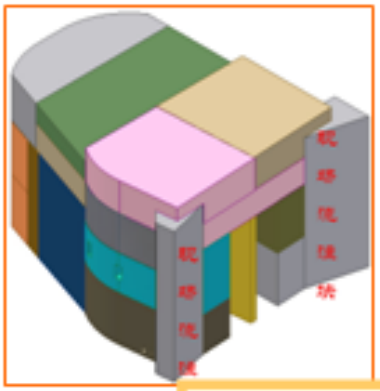

准直器


垂直聚焦单色器

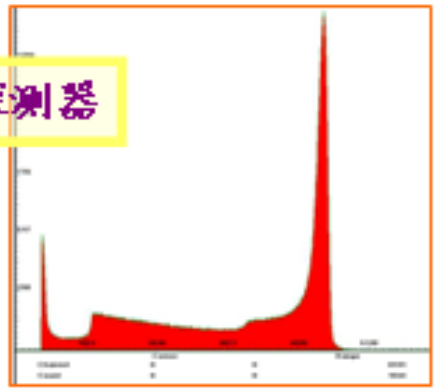

核电子学系统

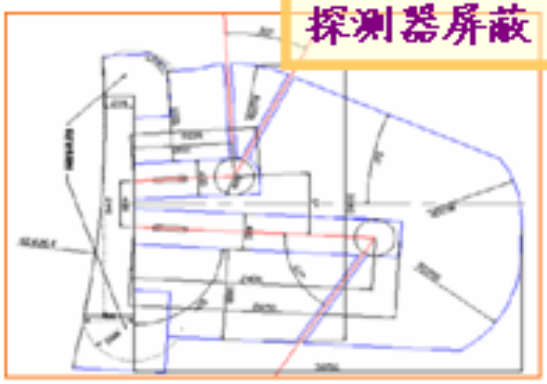

机械主体（转台）






探测器

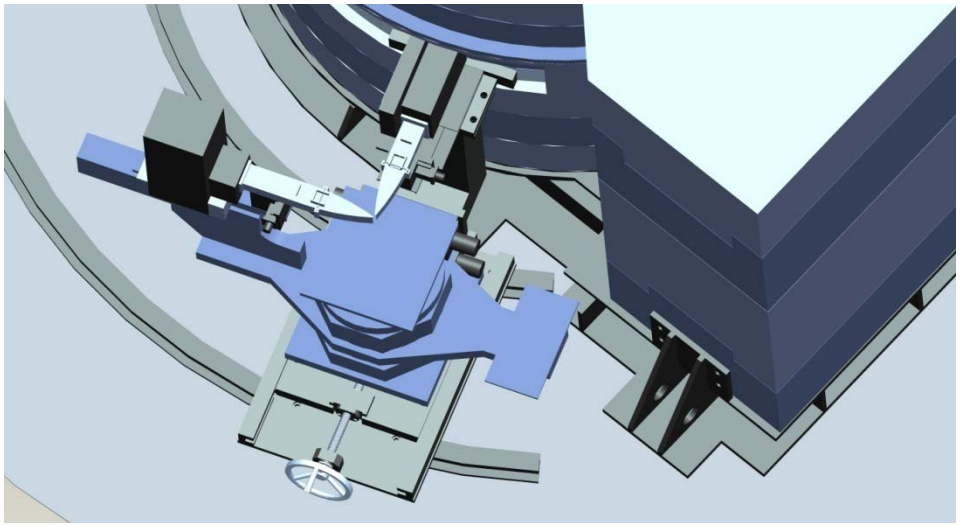


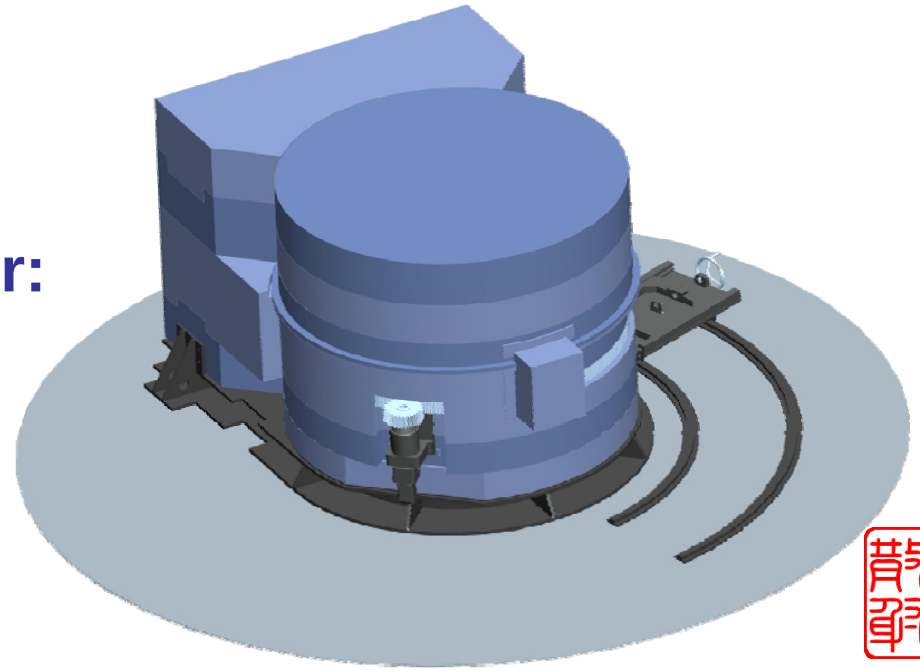

探测器屏蔽

Residual Stress Diffractometer

Technical Specification:

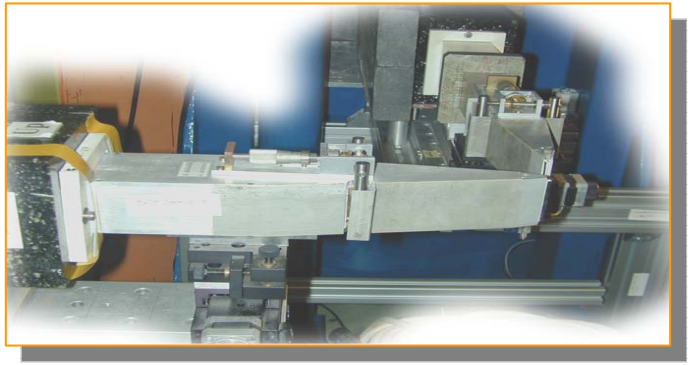
- Monochromator: Si(311)
- Wavelength: 1.1 to 2.7 Å
- Take off angle: 40° ---110°
- Detector: ORDELA 1128N
- Sample table: 200 kg load capacity
- Sample to Monochromator: 180 cm ～ 210 cm
- Sample to Detector: 60 cm ～ 110 cm





Design Specification and Fabrication

- Monochromator
- Monochromator shielding
- Sample table
- Detector
- Control software
- Slit system
- Ancillary equipments

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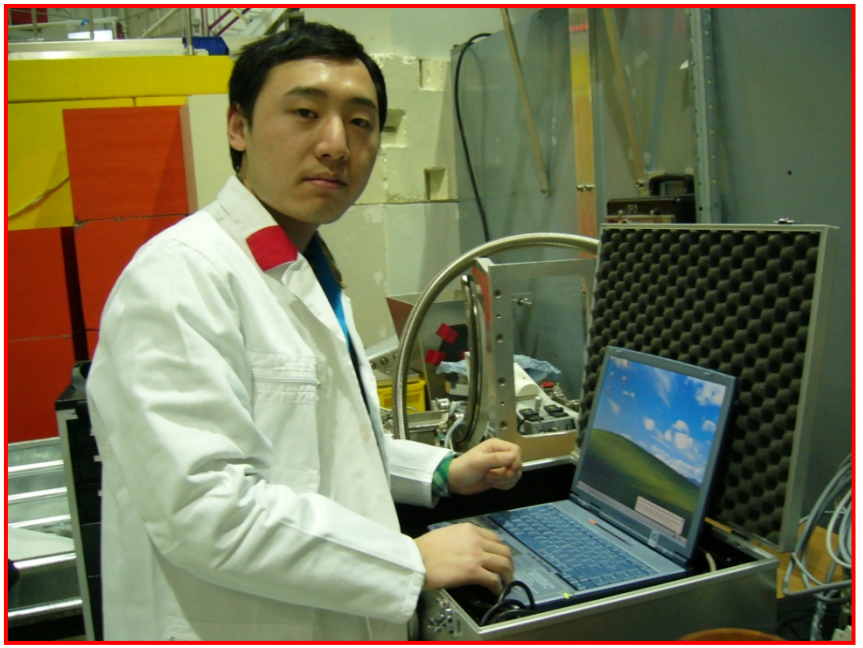

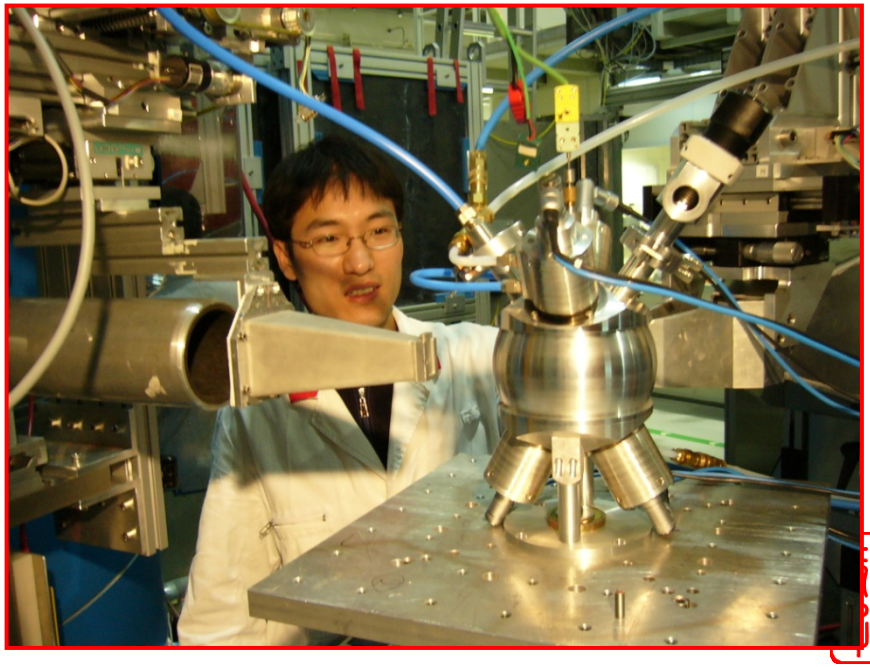


CARR Residual Stress Diffractometer Mar 09


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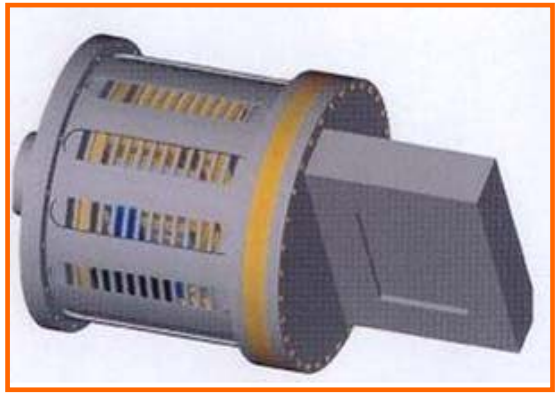
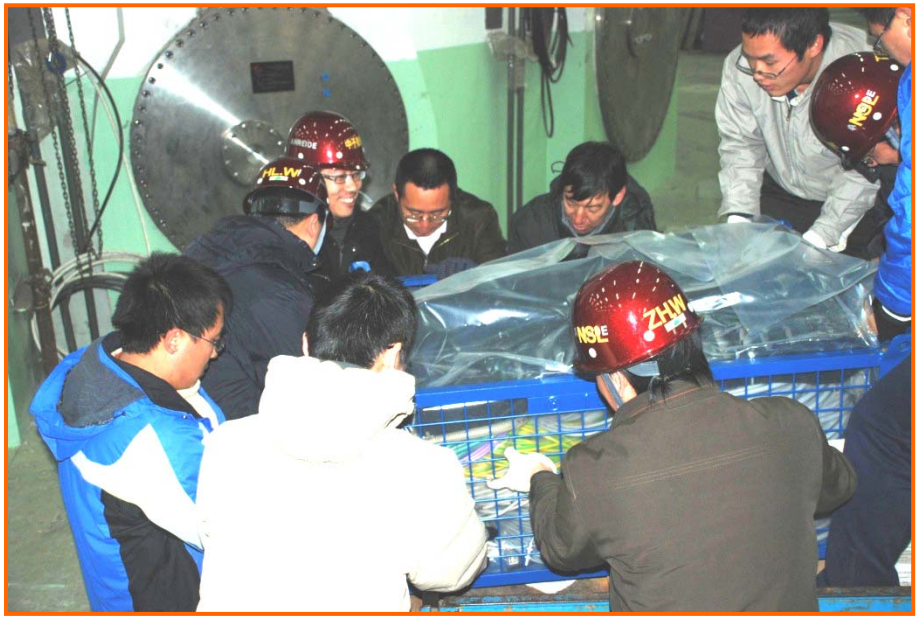
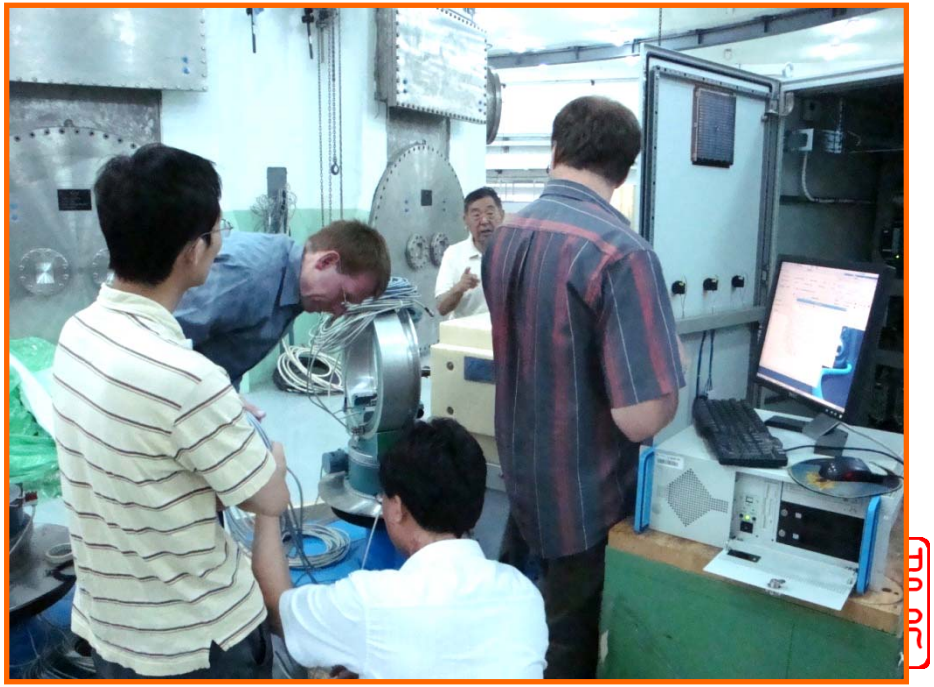


FZJ-CIAE:TAS, FCD,NTD

The German neutron instruments in FZJ

- **New commissioned thermal neutron triple axis spectrometer in 2005.**
- **Twined four circle diffractometers have been dedicated in condensed matter research steadily for more 20 years.**





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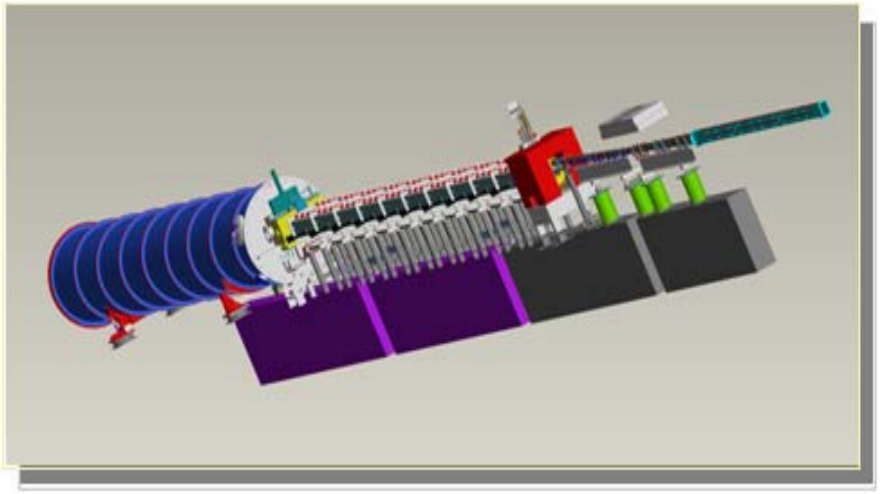
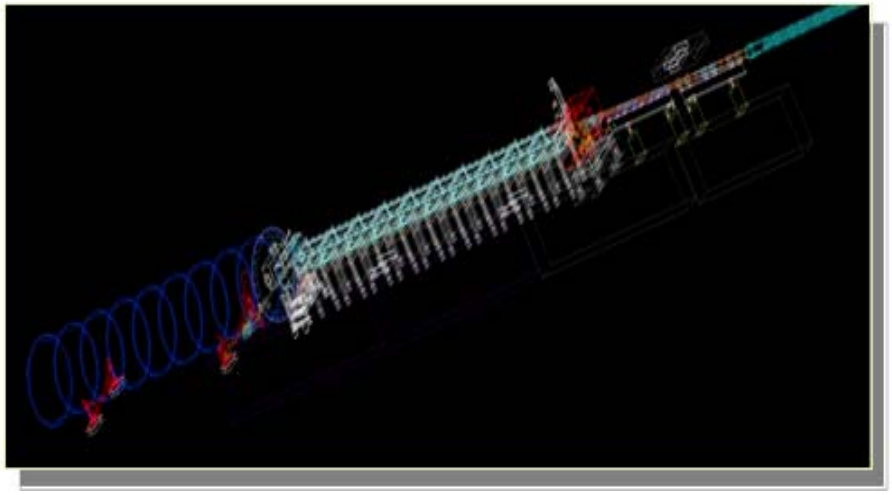
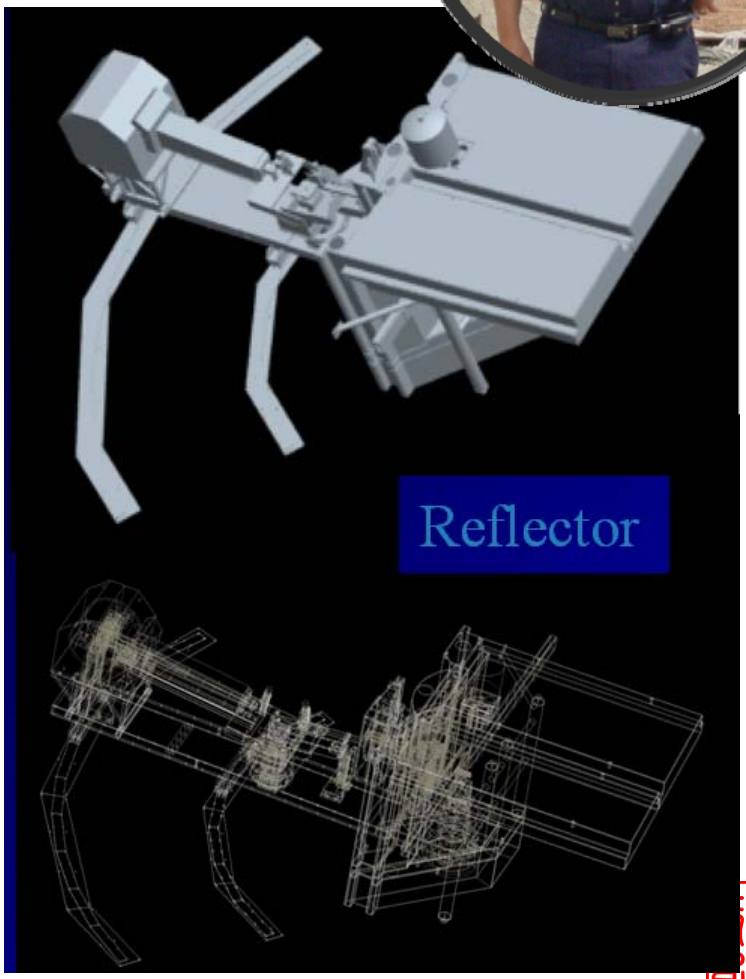
IOC-CIAE:SANS and RF





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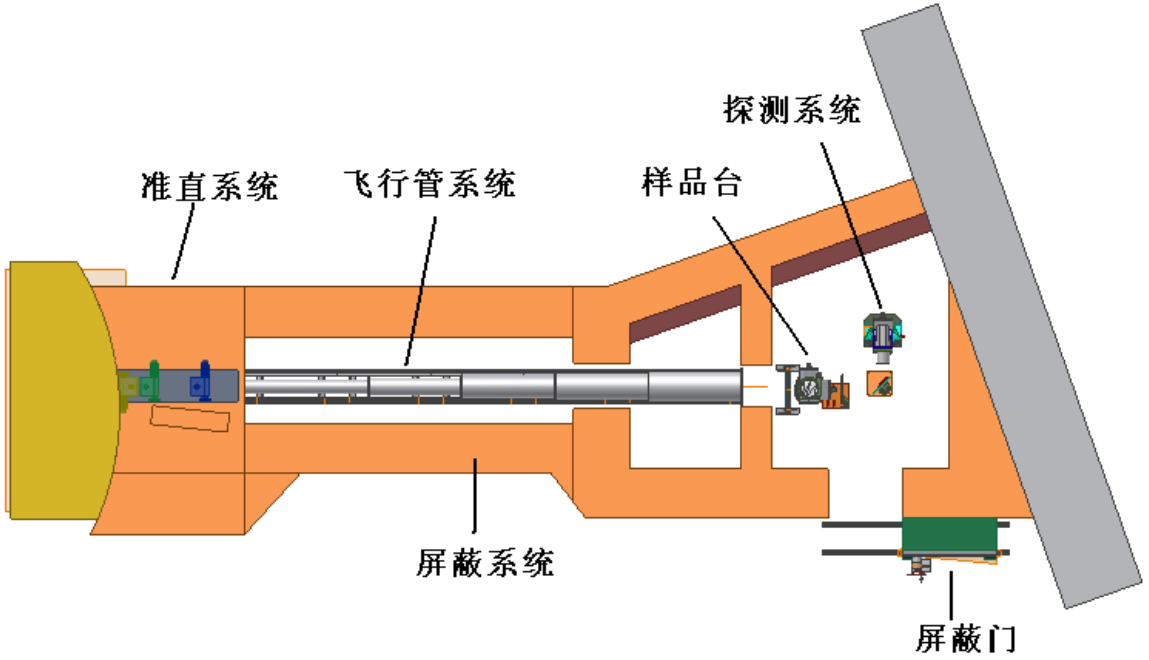
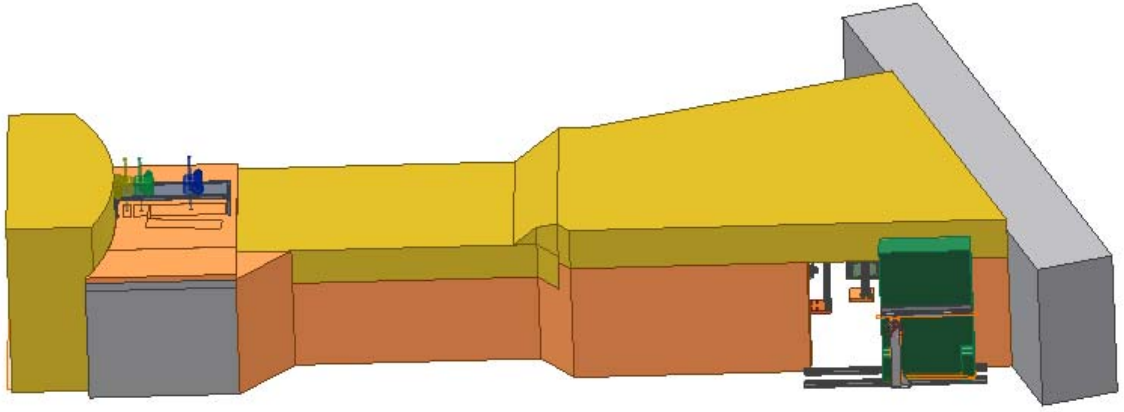
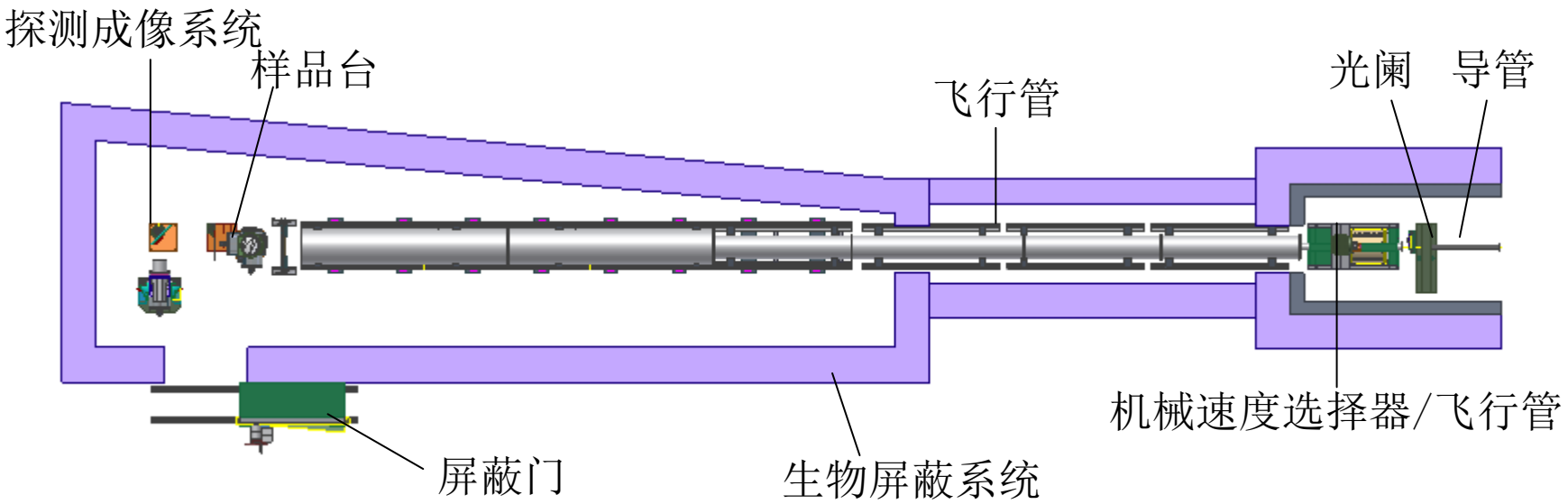
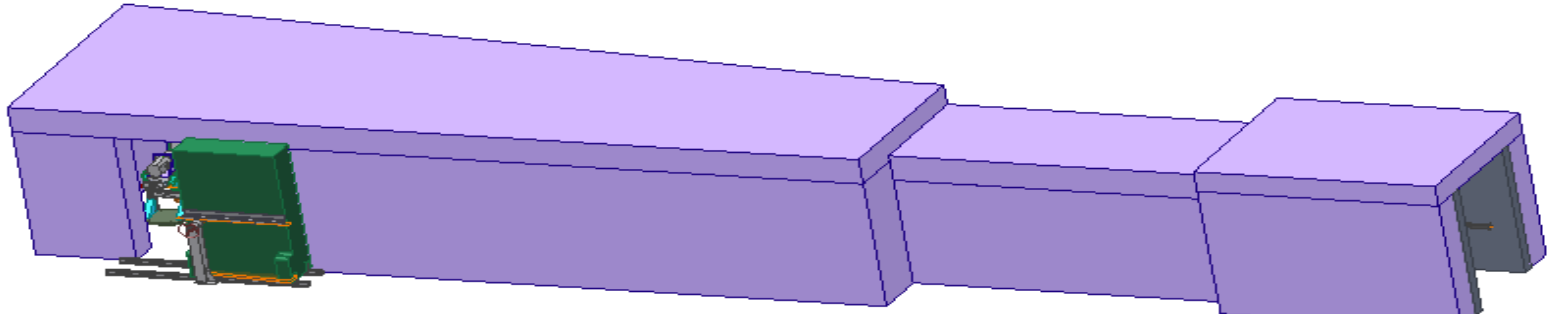
Thermal Neutron Imaging Facility





Cold Neutron Imaging Facility





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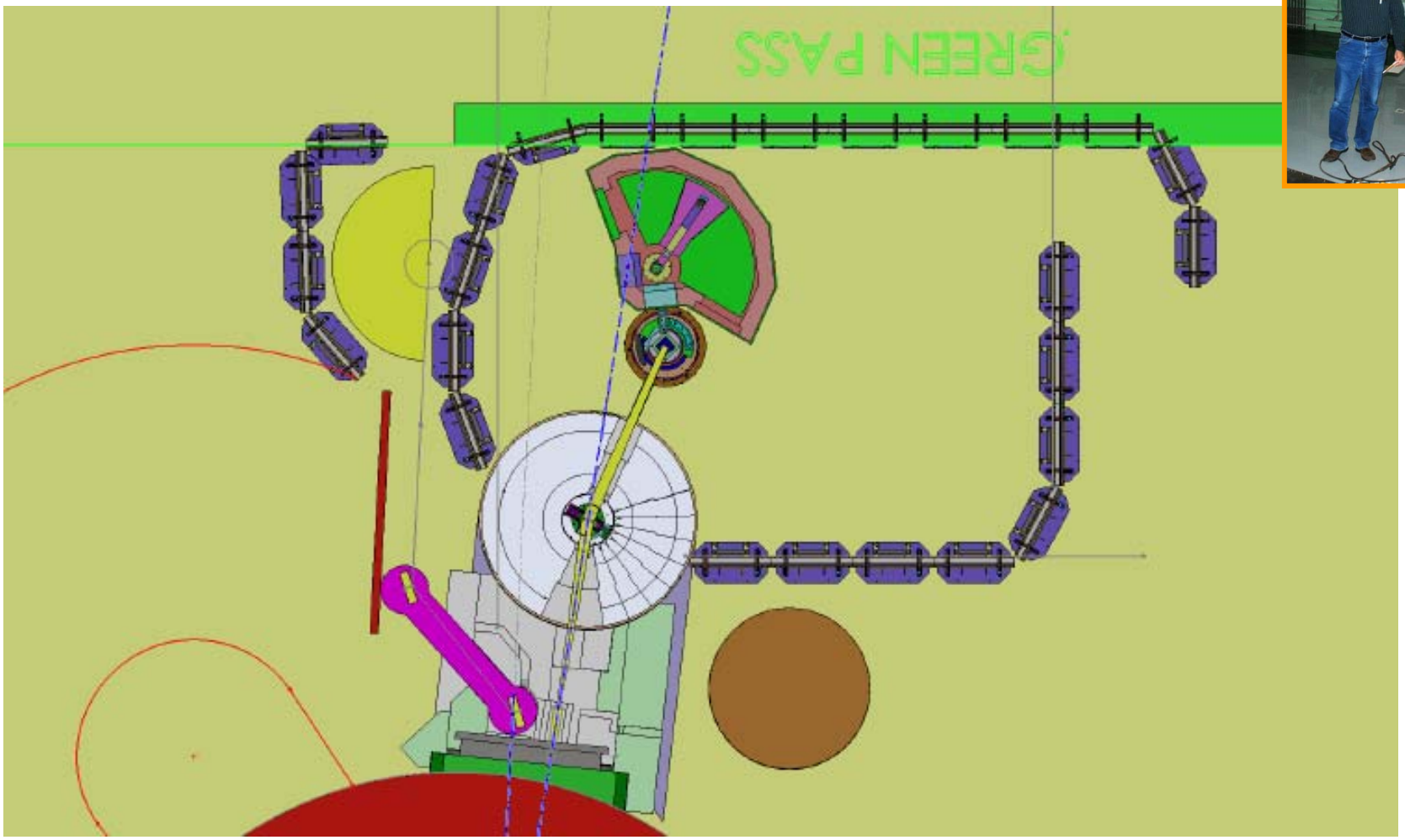
IOP-CIAE TAS



By courtesy of Dr. Shiliang LI and Dr. Peter LINK

User Meetings

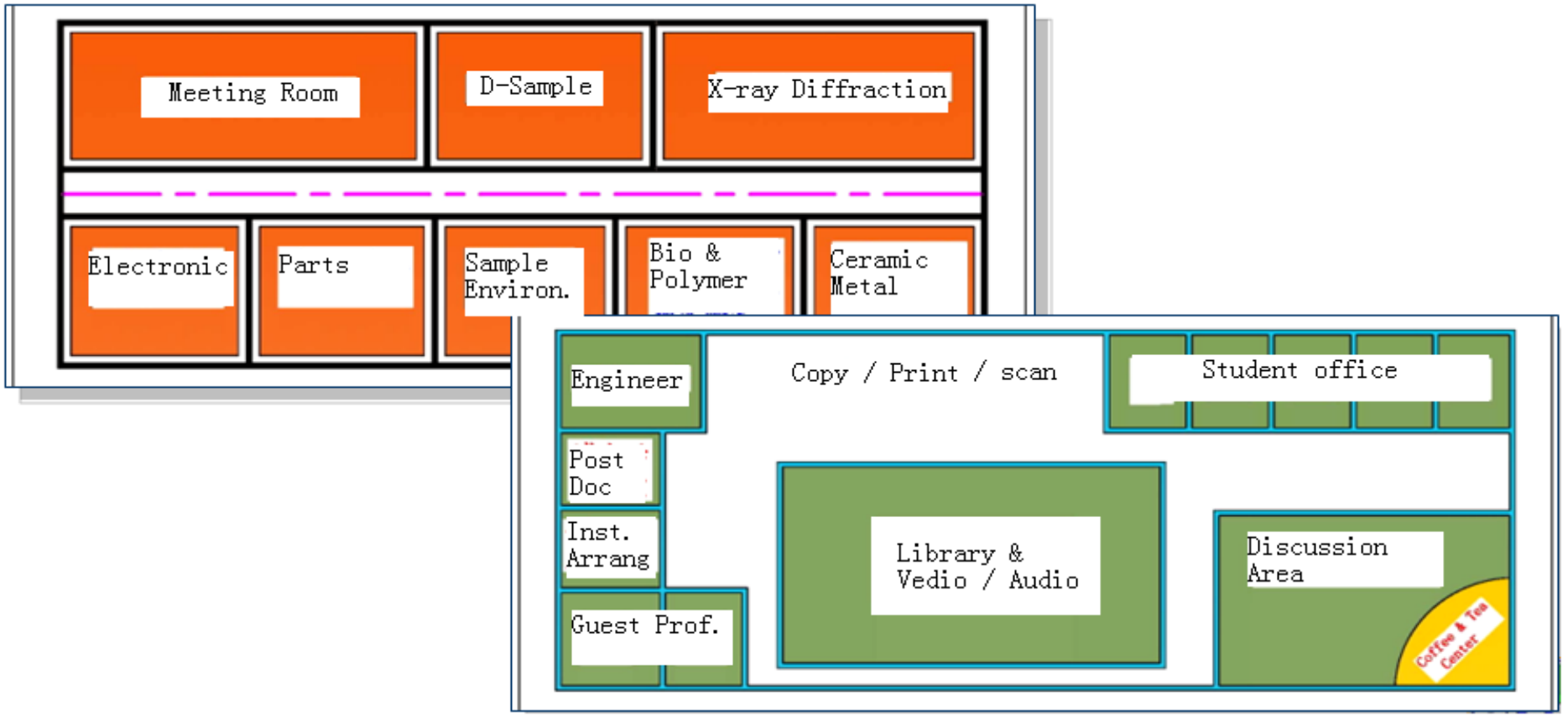
Since 2004, user meeting and neutron school were held every year

Domestic Advisory Committee

meeting on April 5-6, 2007 in CIAE, Beijing, China

- **Jianhua LIN, Chair** ***(Peking University),***
- **Charles HAN** ***(Institute of Chemistry, CAS)***
- **Wenquan WANG** ***(Jilin University),***
- **Biao WANG** ***(Zhongshan University),***
- **Jiyang WANG** ***(Shandong University),***
- **Chunlin ZHANG** ***(Jinan University),***
- **Yuanbai CHEN** ***(Institute of high energy physics, CAS),***
- **Haiqing LIN** ***(Hongkong Chinese University)***

Neutron Scattering User building (3000m^2)



Guest House will also be rebuilt !

1 st US-China NS Workshop

The US-China Workshop Series on Neutron Scattering Science and Technology: The Inaugurating Meeting

November 12-15, 2006
Beijing, China

Sponsored by US National Science Foundation
China Institute of Atomic Energy
Chinese Academy of Sciences

This inaugurating meeting and the subsequent reciprocal meeting in the

International Meeting on
Neutrons and Grand Challenges of Nanoscience, Energy Research, and Computation

November 16-18, 2006
Xi'an, China

Hosted & sponsored by Hebei University of Technology
Co-sponsored by China Institute of Atomic Energy

International Advisory Committee

meeting on September 21-22, 2007 in Liangxiang, Beijing, China

- Chun-Keung Loong, Chair *(Argonne, USA),*
- Sow-Hsin Chen *(MIT, USA),*
- Yasuhiko Fujii *(J-PARC, Japan),*
- Alan J. Hurd (Los Alamos, USA),
- Winfried Petry (FRM II, Germany),
- Roger Pynn (U. Indiana, USA),
- Uschi Steigenberge (ISIS, UK), and
- Michael Steiner (HMI-Berlin, Germany).
- Kenneth W. Herwig (*Oak Ridge, USA*), Shane J. Kennedy (*Bragg Inst., Australia*), and Dan A. Neumann (*NIST, USA*), could not attend the meeting

Thank you for your attention !

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