

Neutron Sciences Progress at Oak Ridge National Laboratory July 2007

Summary

- The call for experimental proposals for nine instruments at High Flux Isotope Reactor (HFIR) and Spallation Neutron Source (SNS) closed on July 16, 2007 with over 200 proposals submitted.
- Registration is open for ORNL User Week, October 8-11, 2007; see the workshop web site <http://neutrons.ornl.gov/workshops/users2007/index.shtml> for details.
- HFIR Cycle 410A will run August 15-September 3; Cycle 410B will probably be September 25-29.
- SNS neutron operations resumed June 21 and will continue to September 9.

Instruments and Users

- During HFIR Cycles 408 and 409, 36 scattering experiments (out of about 46 proposals) were performed by in-house staff and 40 external users, and 545 samples irradiated in the HFIR in-vessel irradiation facilities for external users.
- HFIR user G. Ludtka [ORNL's Materials Science and Technology Division] with J. Fernandez-Baca performed the first in-situ study of phase transformation under simultaneous high magnetic field and high temperature. This proof of principle experiment began with building a high-temperature sample insert to fit inside the magnet on the WAND instrument of HFIR. The success of this new technique opens the door to greater understanding of the role of magnetic field on structure changes at high temperatures.
- At the American Crystallographic Association annual meeting in Salt Lake City, July 21-26, there were more than 30 attendees at an impromptu information meeting about the proposed Quasi-Laue Single Crystal Diffractometer, IMAGINE, at the High Flux Isotope Reactor. Contact Flora Meilleur, flora_meilleur@ncsu.edu, for more details.
- ORNL initiated the Instrument Development Fellowship Program to nurture a creative development capability in the US. This program, supported by funding from DOE/BES, will help keep the instrumentation at US neutron scattering institutions on the cutting edge and competitive worldwide. This Program will provide an environment in which a small, select group of early career scientists have the opportunity to propose creative concepts for neutron related instrumentation, and then to develop some of the more viable ideas into full instrument or component concepts under the overall guidance of recognized experts in the field. As part of the pilot program, proposals from Fellowship candidates were solicited in the fall of 2006. A small, international committee of experienced neutron scattering scientists reviewed these proposals and selected four candidates as finalists. The finalists were invited to spend the week of February 19-23, 2007 at ORNL where they met with ORNL scientists and technical specialists and participated in an international neutron scattering instrumentation workshop. During that week, the finalists were individually interviewed by a committee of international experts. One of these finalists was selected to be offered the Fellowship: Dr. Thorwald van Vuure began his Fellowship at ORNL in July 2007. He will be working on the project "A high-rate, high-efficiency 2D thermal-neutron detector for reflectometry with excellent spatial resolution".
- The SEQUOIA [SNS beamline 17] sample vessel installation and its vacuum testing were successfully completed.
- The NOMAD [Nanoscale-Ordered Materials Diffractometer, SNS beamline 1b] shutter mid-section has been received.



- At the Magnetism Reflectometer [SNS beamline 4a], a 2-dimension magnet is ready to be installed (two perpendicular magnetic fields in Helmholtz coil configuration). It can deliver several hundred Gauss in each direction and rotate the external magnetic field vector within the same plane. The cryocooler system was received and achieved <5K.during testing.
- The first neutron guide support was installed and aligned for TOPAZ [Single Crystal Diffractometer, SNS beamline 12]. In the photo below, the guide supports are filled with high density concrete.



- The final installation and alignment of the last guide sections was completed for ARCS [Wide-Angular-Range Chopper Spectrometer, SNS beamline 18]. Work continues on the construction of the control cabin; testing and certifying the personnel protection system is ongoing. The Instrument Readiness Review is scheduled for August 24 with the neutron beam to instrument to follow soon after. In the photos below, the left view is of sections 3 and 4 entering the sample chamber, looking from the source. The right view is of sections 4 and 5 inside the sample chamber, viewed from downstream.



Employment Opportunities

- The following positions are in the Neutron Sciences Directorate or are related to neutron scattering: Click on “View Open Positions” at <http://jobs.ornl.gov/> for additional details
 - Reactor Trainer, ID 2501
 - SNS Instrument Installation Supervisor Electrical, ID 2499
 - Nuclear Reactor Controller, ID 2490
 - Neutron Scattering Science User Administration Lead, ID 2489
 - SNS Scientific Systems Programmer, ID 2478
 - SNS Electrical Design Engineering Specialist, ID 2473
 - Software Engineer, ID 2459
 - SNS CNCS Instrument Scientist, ID 2455
 - SNS ARCS Instrument Scientist, ID 2454
 - SNS Neutron Scattering Instrument Scientist, ID 2453
 - SNS Control Room Shift Supervisor, ID 2448

- Associate Laboratory Director - Neutron Sciences, ID 2432
- SNS Structural Design Engineer, ID 2431
- Polymer Morphologist , ID 2415
- SNS HFIR Instrument Support Manager, ID 2410
- SNS Controls Group Leader, ID 2391
- SNS Controls Team Leader, ID 2389
- SNS HVAC / Piping Design Engineer, ID 2382
- SNS Research Accelerator Division Computing Integration Group Leader, ID 2350
- Neutron Scattering Instrument Scientist (Magnetism Reflectometer), ID 2262
- SNS Vacuum Engineer, ID 2202
- SNS Mechanical Designer , ID 2194
- **Neutron Scattering Postdoctoral Fellowship Positions with ORNL through Oak Ridge Associated Universities** [description available at <http://www.ornl.gov/orise/edu/ornl/postneeds.htm>]:
 - Beam Instrumentation Post-Doc [ORNL07-64-NSD]
 - Neutron Scattering Postdoctoral Research Fellowship [ORNL07-62-NSSD]
 - Neutron Scattering Postdoctoral Fellowship [ORNL07-61-NSSD]
 - Dynamic Nuclear Polarization at SNS [ORNL07-46-NSSD]
 - Control System Programmer [ORNL07-32-SNS]
- **Research Assistant: Molecular & Structural Biochemistry** with North Carolina State University and SNS. To apply for this posting, please visit <https://jobs.ncsu.edu> and search for position 01-57-0706.

Operations

- The High Flux Isotope Reactor (HFIR) began Cycle 409 on June 27 and ended July 20. HFIR Cycle 410A began August 15 and will continue to September 3; the exact dates of Cycle 410B will be determined later this week, but probably will be September 25-29.
- Neutron production at the SNS began again June 21. SNS continues to increase its operating power with high levels of predictability and reliability (~88%) of neutron production in July 2007. Down time for all SNS beam delivery (both neutron production and accelerator physics) decreased to 12%. The planned ramp to higher power and increased reliability is well ahead of schedule.

Future meetings of interest to SNS and HFIR users

- Meeting to explore formation of an Instrument Development Team for a high resolution cold neutron inelastic spectrometer at HFIR, August 23-24, 2007, Oak Ridge. Contact Lori Frye, fryela@ornl.gov, for meeting details.
- *SKIN2007 - Studying Kinetics with Neutrons* (joint with NMI3), September 27-28, 2007, University of Göttingen, Germany; http://neutron.neutron-eu.net/n_nmi3/n_networking_activities/SKIN2007
- *Residual Stress Summit*, October 2-4, 2007, Oak Ridge, TN; <http://batman.mech.ubc.ca/~residualstress/>
- **ORNL Users Week, October 8-11, 2007**
<http://neutrons.ornl.gov/workshops/users2007/index.shtml>
 - *SNS-HFIR Users*, October 8-10, 2007, Oak Ridge, TN
 - *Center for Nanophase Materials Sciences Users*, October 10-11, 2007, Oak Ridge, TN
 - *SHaRe Users*, October 10-11, 2007.
- Sessions on biointerphases and magnetism during the AVS-54 International Symposium, October 13 – 18, 2007, Seattle, WA, <http://www.avs.org>.
- Materials Research Society Fall Meeting, November 26-30, 2007, Boston, MA, http://www.mrs.org/s_mrs/sec.asp?CID=4749&DID=164574
- American Crystallographic Association, *Annual Meeting*, May 31-June 5, 2008, Knoxville, TN,
- 2008 annual meeting of the DOE Experimental Program to Stimulate Competitive Research (DOE EPSCoR), proposed for Oak Ridge, summer 2008.
- International Conference on Neutron Scattering, May 3-7, 2009, Knoxville, TN.