# Neutron Sciences Progress at Oak Ridge National Laboratory
# September 2008

## Summary

- **HFIR** Cycle 417 began September 24, 2008.
- **SNS** neutron production cycle began August 21, 2008, and will end January 3, 2009.
- **Dynamics of Soft Matter Workshop** will be held December 4-6, 2008, in Boston MA, as a satellite event of the MRS annual meeting. Sessions on complex fluids, biology, polymers, and surfaces are planned. See the website http://neutrons.ornl.gov/conf/dsm2008/index.shtml for more information.
- The first annual report of ORNL's Neutron Sciences Directorate "Neutron Sciences Annual Report 2007", including HFIR and SNS activities, is posted at http://neutrons.ornl.gov/nscd_2007_annual_rpt.pdf.

## Instruments and Users

- The 10th United States National School on Neutron and X-ray Scattering was held September 24-October 11, 2008, at Argonne and Oak Ridge, with the ORNL portion September 28 to October 2. During their visit to ORNL, the 46 graduate students attended lectures and each performed three neutron scattering experiments with two at HFIR and one at the SNS. Additional information on the School is available at the websites http://www.dep.anl.gov/nx/ and http://neutrons.ornl.gov/conf/NXS2008/. A few of the pictures are included below.

- The Fine Resolution Fermi Chopper Spectrometer (SEQUOIA, SNS BL 17) opened its shutter on October 7, 2008. SEQUOIA will provide unprecedented, high-resolution neutron scattering studies of the dynamics of atoms and molecules in materials. Researchers in the condensed matter and materials sciences will experience unprecedented ability to analyze and understand the dynamics behind high-temperature superconductors, quantum and molecular magnetism and ferroelectric, piezoelectric and thermoelectric materials.
- The Fundamental Neutron Physics Beam Line (SNS, BL 13) opened its shutter to receive neutrons and its construction was completed in September 2008. This instrument will address the details of the internal structure of the neutron as well as the way in which the free neutron decays. Such experiments have important implication for fundamental questions in particle physics and cosmology. See the story in Science Daily at http://www.sciencedaily.com/releases/2008/10/081009144321.htm
- The first peer-reviewed article resulting from research utilizing the Wide Angular-Range Chopper Spectrometer (ARCS, SNS BL-18) appeared in *Physical Review Letters*, October 8, 2008 [volume 101, issue 15, article 157003]. Led by Andrew Christianson of ORNL, the experimental team used ARCS to probe iron-arsenic compounds.
- The goal of Joint Institute for Neutron Sciences (JINS) is to promote the use of neutron scattering in various fields of research, including biological and life sciences and in energy sciences by hosting workshops and supporting visitors, and to facilitate collaboration between the University of Tennessee (UT) and the Oak Ridge National Laboratory (ORNL). Recently JINS was awarded the Department of Energy's Experimental Program to Stimulate Competitive Research (DOE EPSCoR) implementation award ($3M over three years). This award will provide travel fellowships to the neutron facility (SNS and HFIR) users from the EPSCoR states. Users from these states are strongly encouraged to apply for the fellowship, soon after the beam time is allocated. Also a limited funding is available for supporting sabbatical leaves at the SNS and HFIR. For details please contact Jayme French (jfrench2@utk.edu).

The DOE award also seeds research collaboration among core participants at UT and researchers at the ORNL.

- The JINS building is presently under construction at the SNS site on Chestnut Ridge, adjacent to the SNS Central Laboratory and Office building, and is scheduled for completion in January 2010. JINS will house some UT researchers, SNS scientists, and other ORNL researchers, but a significant portion of the space will be devoted to temporary visitors and facility users.
- Through September 2008, HFIR has 258 unique users on 7 instruments and SNS has 165 unique users on 4 instruments.
- User publications: users are requested to provide lists of their publications from 2007 to present resulting from research at HFIR and SNS. Please click on the hyperlink below to submit bibliographic citations: <Bibliographic Citations>

## Operations

- The end-of-cycle 416 outage that began on August 6, 2008, continued until reactor startup for cycle 417 on September 24, 2008. Cycle 417 was the seventh cycle to begin in FY2008. Cycle 417 continues as the month of September concludes having accumulated 552.36 MW-days supporting neutron scattering experiments and the neutron scattering school; 69 in-vessel irradiation capsules; and irradiation of 29 neutron activation analysis samples. At the end of September, HFIR had produced 12,576 MW-days in fiscal year 2008; well above the goal of 11,220 MW-days.
- The SNS accelerator turn-on for the Operating Cycle 2008-3 began August 19, 2008, with neutron production beginning on August 21, 2008. The SNS Run 2008-3 transitioned to Run 2009-1 on September 30, 2008, with no interruption of the beam delivery cycle. The maximum beam power delivered in September was 628 kW. The beam availability for September was 75.6%. There were a total of 196 MW-Hours of beam delivered for neutron production in September. Neutron production for Run 2009-1 will end on January 3, 2009.
- The SNS schedule in the coming months may be perturbed by the planned, but undetermined, end of life of the first mercury target. This foreseen operational event will cause the shutdown of SNS for about two weeks while a new target is installed. Users will be notified as soon as possible and rescheduled to a future time. Our goal is to predict the target end of life and schedule future target replacements within normal maintenance periods.

## Employment Opportunities

Positions in the Neutron Sciences Directorate or related to neutron scattering are available for browsing. Click on “View Open Positions” at http://jobs.ornl.gov/.

- **Neutron Scattering Postdoctoral Fellowship Positions with ORNL through Oak Ridge Associated Universities** [description available at http://www.orau.gov/orise/edu/ornl/postneeds.htm. Recently announced open positions are listed below.
  - Postdoctoral Research Associate in Accelerator Physics, [ORNL08-125-RAD]
  - Postdoctoral Research Associates in Condensed Matter Science, [ORNL08-124-NSSD]
  - Postdoctoral Research Associates in Neutron Scattering with Triple Axis Instrumentation, [ORNL08-107-NSSD]
- **Other Postdoctoral Fellowships**
  - **Clifford G. Shull Fellowship** – The goal of the Shull Fellowship is to attract new scientific talent to ORNL for the development of its neutron science program. We are looking for candidates with exceptional ability who are capable of developing innovative research programs and who show the promise of outstanding science leadership. **Applications will be accepted July 1 – December 12, 2008.** For additional information about the Fellowship, see http://neutrons.ornl.gov/shullfellowship/ or contact Bob Martin at martinrg@ornl.gov.
  - **Instrument Development Fellowship -** This fellowship opportunity is for the development of novel neutron instrumentation and instrument components to be used for neutron science at ORNL or other U. S. neutron centers. For additional information, see the website at http://www.orau.gov/orise/edu/ornl/postneeds.htm for position ORNL08-51-NSSD**.**
- **Educational and Research Experiences**: ORNL has educational programs covering many scientific disciplines with the education continuum from pre-college through postgraduate including teachers and faculty. The main link to all of these programs is http://www.orau.gov/orise/edu/ornl/

## Meetings of interest to SNS and HFIR users

- User Meeting of the Center for Nanophase Materials Sciences and Shared Research Equipment user facilities, September 24-26, 2008, Oak Ridge, TN. N [250 attendees] http://www.cnms.ornl.gov/upcoming_events/events.shtm
- 10th United States National School on Neutron and X-ray Scattering, September 24-October 11, 2008, Argonne National Laboratory and Oak Ridge National Laboratory. http://www.dep.anl.gov/nx/ and http://neutrons.ornl.gov/conf/NXS2008/. [46 attendees]
- Neutron Imaging at the Spallation Neutron Source, November 3, 2008, Oak Ridge, TN. http://neutrons.ornl.gov/conf/nisns2008/index.shtml [Registration closed]
- Dynamics of Soft Matter, December 4-6, 2008, Boston MA. This is a satellite of the Fall 2008 MRS annual meeting. http://neutrons.ornl.gov/conf/dsm2008/index.shtml.
- The U.S. Particle Accelerator School (USPAS) is offering a program of graduate-level courses sponsored by Vanderbilt University and held in Nashville from January 12-23, 2009. Two short courses are of special interest: "Design and Engineering of Neutron and X-Ray Beamlines for Accelerator-Driven Sources" by R. Kent Crawford, held January 12-16 and "High Power Beam Targets (and Collimation)" by John Haines and Phil Ferguson, held January 19-23. Please visit http://uspas.fnal.gov for full course descriptions and an electronic application form. For further information please contact the USPAS Office at 630-840-3896 or uspas@fnal.gov.
- Physics Diversity Summit and the Joint Annual Conference of the National Society of Black Physicists and National Society of Hispanic Physicists, February 11-15, 2009, Nashville, TN. http://www.nsbp.org/conference/
- The Minerals, Metals, and Materials Society (TMS), February 15-19, 2009, San Francisco, CA. Symposium on “Emerging Applications of Neutron Scattering in Materials Science and Engineering,” http://cmsplus.tms.org/CMS/CMSPlus.nsf/layout2?OpenFrameSet&Frame=main&Src=%2FCMS%2FCMSPlus.nsf%2FWeb%2520Views%2FUpcomingConferences%2F91ebf2c3c9c57919852572730050bb89%3FOpenDocument%26AutoFramed. Contact Xun-Li Wang, wangxl@ornl.gov, for details.
- International Conference on Neutron Scattering, May 3-7, 2009, Knoxville, TN. http://neutrons.ornl.gov/conf/icns2009/index.shtml.
- 20th Annual VM Goldschmidt Conference June 14-18, 2010, Knoxville, TN.