

# Neutron Sciences Progress at Oak Ridge National Laboratory

## March 2008

### Summary

- HFIR Cycle 414 began March 26 and ended April 19, 2008.
- SNS resumed neutron production on April 2, 2008, and plans to finish the present run cycle on July 20, 2008.

### Instruments and Users

- Through March 2008, HFIR has 110 unique users on 7 instruments and SNS has 40 unique users on 3 instruments.
- Subscription ratios (defined as time requested divided by time allotted for the general user program) from the recent call for proposals are 296% for SNS and 390% for HFIR.
- Cold Neutron Chopper Spectrometer (CNCS, BL-5) opened its shutters and received its first neutrons on April 2, 2008. Commissioning is underway; CNCS will enter the user program in Fall 2008.
- Progress continued with the following installation activities at other SNS instruments: construction of the enclosure for the Powder Diffractometer (POWGEN3, BL-11A) and the installation of the hutch for the Single Crystal Diffractometer (TOPAZ, BL-12).
- The new shielded asymmetric magnet system has been received for use at SNS. It produces a central field of up to 5 tesla (T) with the advantages of very low stray field (less than 0.0005 T at 50 cm from the sample), an asymmetric field profile optimized for using polarized neutron beams, and a compact size. It has passed acceptance tests and is available for the next round of user proposals.
- The first paper has been published from research at SNS: E. Kharlampieva, J. F. Ankner, M. Rubinstein, and S. A. Sukhishvili, "pH-induced release of polyanions from multilayer films," *Physical Review Letters*, vol. 100, Mar 2008. The experiment was performed on the Liquids Reflectometer (BL-2).

### Operations

- HFIR Cycle 413 began February 6, 2008 and ended March 1, 2008. HFIR Cycle 414 began on March 26, 2008, and ended April 19, 2008. The goals for the High Flux Isotope Reactor in FY 2008 are operation for 6 cycles with >90% predictability. Cycle 414 is the fourth cycle this fiscal year. Availability to date is 100%. Lutetium-177 capsules were removed and shipped during the end-of-cycle 413 outage to support distributions to 9 research centers located in the U.S. and 7 foreign countries. Worldwide, this isotope is under investigation for ~30 different clinical applications including treatment of colon cancer, metastatic bone cancer, non-Hodgkins lymphoma, and lung cancer. A total of 67 in-vessel irradiation capsules are installed for Cycle 414 to support medical isotope research, fusion reactor material research, and produce commercial isotopes. Cycle 415 will run June 4-26, 2008.
- The SNS accelerator turn-on for the Operating Cycle 2008-2 began March 24, 2008, with neutron production beginning on April 2, 2008, and plans to finish the present run cycle on July 20, 2008; the operations goals for this cycle are 1489 hours of neutron production beam delivered at 85% efficiency. Beam power on April 22, 2008 is 400 kW. Beam Power is planned to peak at 750KW at the end of Cycle 2008-2.
- 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.ora.gov/orise/edu/ornl/postneeds.htm>]:
  - Postdoctoral Research Associate in Beam Instrumentation [ORNL08-70-NSSD]
  - Post-Masters Associate: Bio-SANS Beam Line [ORNL08-69-CSD]
  - Post Doctoral Fellow: Bio-SANS Beam Line [ORNL08-68-CSD]
  - Postdoctoral Research Associate in Neutron Scattering - SNAP [ORNL08-60-NSSD]
  - SNS Instrument Development Fellowship [ORNL08-51-NSSD]

- Postdoctoral Research Fellow in Neutron Scattering – ARCS [ORNL08-32-NSSD]
- Postdoctoral Research Associate: Protein Structure, Function & Dynamics [ORNL08-30-CSD]
- Postdoctoral Research Associate: Molecular Computational Modeling [ORNL08-22-CSD]
- Postdoctoral Research Associate: Virus Structure and Function, [ORNL08-21-NSSD]
- Postdoctoral Research Associate: Biopolymer Structure [ORNL08-19-CSD]
- Neutron Scattering Postdoctoral Research Fellow [magnetic nanoparticles] [ORNL08-08-NSSD]
- Computational Molecular Biophysics [ORNL08-01-BSD]
- Neutron Scattering Postdoctoral Research Fellow [Macromolecular Diffractometer] [ORNL07-82]
- Beam Instrumentation Post-Doc [ORNL07-64-NSD]
- **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.ornl.gov/orise/edu/ornl/>

### **Future meetings of interest to SNS and HFIR users**

- American Conference on Neutron Scattering, May 11-15, 2008, Eldorado Hotel, Santa Fe, NM. <http://www.lansce.lanl.gov/acns2008/index.html>
- Diagnosis and Treatment of Problem Structures: A Bruker Workshop on Single Crystal X-Ray Diffraction, May 29, 2008, Knoxville, TN. <http://neutrons.ornl.gov/workshops/scxd2008>.
- Joint Instrument Development Team meeting of MaNDi (Macromolecular Diffractometer) and TOPAZ (Single Crystal Diffractometer), May 30, 2008, Knoxville, TN, contact Christina Hoffmann, [hoffmanncm@ornl.gov](mailto:hoffmanncm@ornl.gov), for details.
- American Crystallographic Association, *Annual Meeting*, May 31-June 5, 2008, Knoxville, TN. <http://neutrons.ornl.gov/conf/aca2008/contact.shtml>
- Annual review and workshop of the DOE Experimental Program to Stimulate Competitive Research (DOE EPSCoR), July 22-25, 2008, Oak Ridge, TN.
- International Conference on Neutron Scattering, May 3-7, 2009, Knoxville, TN.