

The banner features a blue background with a molecular lattice structure on the right and a colorful, abstract pattern of red, orange, and purple on the left. The text is in a bold, white, sans-serif font.

# Oak Ridge National Laboratory Neutron Sciences Progress Report September 2009

## Neutron Highlights

At HFIR, Cycle 423 began August 5, 2009, and ended August 29, 2009.

At SNS, neutron production will resume September 10, 2009.

**Neutron Sciences Career Development Program** was launched. See the **Employment Opportunities** section for more details.

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## Science Highlights

**Powder diffractometer study reveals cell volume difference.** A comparative study of hydrogenous and deuterated brucite done at HFIR HB-2A powder diffractometer by ORNL's Juske Horita and Bryan Chakoumakos reveals an expected difference in cell volumes, and a detailed understanding is being sought through the analysis of the refined crystal structural parameters.

**Nanoparticle spin-waves observed.** One of the very first user experiments on the Cold Neutron Chopper Spectrometer investigated low-energy dynamics of exchange-biased nanoparticles with a ferromagnetic cobalt core and antiferromagnetic CoO shell. The PI of this research is Prof. M. Aronson (Stony Brook University and Brookhaven National Laboratory). These experiments provide the first direct observation of dispersing spin waves in any nanoparticle system, originating here from the CoO shells. The spin waves are significantly different from those found in bulk systems, and it is now possible to study these fundamental excitations in a wide range of different nanoscale systems.

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## Instruments and Users

**More than 400 proposals submitted.** More than 400 proposals were received for the period December 2009–May 2010 in the recent call for proposals ending August 31. HFIR received more than 170 proposals with the two SANS instruments receiving the most requests. SNS instruments received more than 230 proposals; the Cold Neutron Chopper Spectrometer, ARCS, and SEQUOIA, and the Backscattering Spectrometer had the heaviest demand.

**HFIR instrumentation development beam line is in commissioning.** The lower 100 mm of the HFIR CG1 beam is

being used for neutron instrumentation development and has two possible paths. When doing neutron time-of-flight (TOF) measurements, the lower beam passes straight through a disk chopper which "chops" the continuous beam to produce a pulsed beam (CG1D). When a monochromatic beam (continuously adjustable between 1.8 and 6.4 Å) is needed, the lower 100 mm of the CG1 beam is intercepted by a double bounce monochromator that produces a beam parallel to the CG1 beam translated over by ~ 250 mm (CG1C). The HFIR CG1D TOF beam line started commissioning on August 28 2009. A helium-filled chamber

of variable length (1 to 5 m) encloses a rail system to permit installation of optical elements, as needed for neutron optics and imaging development. [Hassina Bilheux](#) is the contact for CG1D.

**Sample environment equipment list updated.** The equipment lists of [HFIR](#) and [SNS](#) sample environments have been updated. Please contact [Lou Santodonato](#) with your suggestions.

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## Operations

### HFIR

At HFIR, Cycle 423 began August 5, 2009, and ended August 29, 2009. Cycle 424 will begin October 14, 2009. The FY 2009 goals for HFIR include operation for six cycles with >90% predictability.

### SNS

The SNS began accelerator startup on August 31, 2009; neutron production will begin September 10, 2009, and continue through December 22, 2009.

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## Awards and Honors

Several members of the ORNL Neutron Sciences Directorate and their colleagues will be honored at ORNL's Annual Awards Night.

- **Kaye Carter**, Neutron Scattering Science Division, "In recognition of her exemplary service to visiting scientists from around the world who come to ORNL to conduct research at the HFIR and SNS facilities."
  - **Debbie U. Mann**, Finance Manager for Neutron Sciences, "For providing exceptional business management support and having a direct impact on maintaining or growing the Laboratory's business in several key areas, including neutron sciences, HFIR, Californium-252 production, IFDP, and the Recovery Act."
  - **Hugh Thomas Christie, Jackson E. Kitchens, Brad A. Lively, Mike B. Loudermilk, Robert P. McDaniel, Randy B. Parrish, Kevin D. Phillips, Gerald L. Powers, John A. Rockwell, Jerry Dean Rodgers, Gary S. Shepherd, Barry G. Whitson**, Facilities Management Division and Research Reactors Division, "For outstanding contributions and commitment to the HFIR mission of providing safe, reliable, and efficient reactor operation to support world-class neutron science."
  - **David G. Mandrus, Andrew D. Christianson, Olivier A. Delaire, Mao-Hua Du, Mark D. Lumsden, Michael A. McGuire, Stephen E. Nagler, Brian C. Sales, Athena Safa-Sefat, David J. Singh**, Materials Science and Technology and Neutron Scattering Science Divisions, "For moving quickly, comprehensively, and expertly to study the properties of a new family of high-temperature superconductors (layered FeAs) and, in so doing, establishing a clear world leadership position for ORNL."
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## Employment Opportunities

**Positions in the Neutron Sciences Directorate or related to neutron scattering.** Click on "View Open Positions" at <http://jobs.ornl.gov/> and view Position Category noted as "Science—Neutron Science":

- Clifford G. Shull Fellowship Program (Applications will be accepted until December 13, 2009)
- Research Staff Member—Heterogeneous Catalysis for Energy Conversion (Chemical Sciences Division)
- Geochemist (Chemical Sciences Division)
- Environmental Molecular-Surface Scientist (Environmental Sciences Division)
- Research Staff Member (Effects of Radiation on Structural Materials)
- Collaborative Research Visits Program, including Visiting Student Thesis Research, Visiting Postdoctoral Research, and Faculty Research Sabbaticals, see <http://neutrons.ornl.gov/crv/>.

### **Neutron Sciences Career Development Program** <http://www.ornl.gov/neutrons/>

The Neutron Sciences Career Development Program was founded to nurture the creative development of neutron scattering science and instrumentation at ORNL. This initiative is viewed as a critical part of keeping the neutron scattering instruments at ORNL on the cutting edge of design and scientific functionality, keeping them competitive worldwide. This program is designed to provide an environment in which early-career scientists and technicians can be a part of innovative concepts for neutron-related research and instrumentation, while helping end users develop proposals, conduct experiments, and analyze data.

- Neutron Scattering Instrument Scientist
- Neutron Scattering Instrument Associate
- Neutron Scattering Technician

**Fellowship Positions with ORNL through Oak Ridge Associated Universities.** Descriptions are available at <http://www.ornl.gov/orise/edu/ornl/postneeds.htm>. Recently announced open positions are

- Postdoctoral Research Associate Position: Neutron Scattering (FIRST-04-ORNL)
- Post-Master's or Post-Bachelor's Neutron Scattering Instrument Associate (ORNL09-73-NSSD)
- Mechanical Engineering/Experimentalist—Post-Master's (ORNL09-99-NFDD)
- Scientific Computing Researcher (ORNL09-94-NSSD)
- Scientific Computing Associate (ORNL09-93-NSSD)
- Postdoctoral Research Associate for Developing the Spin-Echo Grazing Incidence Scattering (SERGIS) (ORNL09-92-NFDD)
- Postdoctoral Research Associate in Instrument Development (ORNL09-89-NFDD)
- Postdoctoral Research Associate in Neutron Scattering Studies of Fluids and Polymers Under Confinement (ORNL09-88-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.ornl.gov/orise/edu/ornl/>.

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## Meetings of Interest to SNS and HFIR Users

**September 16–17, 2009.** Center for Nanophase Materials Sciences (CNMS) and Shared Research Equipment User Facility (SHaRE) Joint User Meeting. <http://cnms.ornl.gov/workshops/2009/announcement.shtm>.

**October 25–29, 2009.** Materials Science & Technology 2009 Conference & Exhibition, MS&T09, Pittsburgh, PA. Joint booth with ORNL's High Temperature Materials Laboratory.

**October 25–29, 2009.** International Conference on Neutrons in Biology, Santa Fe, NM. <http://lansce.lanl.gov/neutronsbiology/>

**November 4–5, 2009.** [Neutron Spin Echo Workshop](#), Oak Ridge, TN. <http://neutrons.ornl.gov/conf/NSE2009/index.shtml>. Accepting contributed talks and posters, deadline September 15.

**June 13–18, 2010.** 20th Annual VM Goldschmidt Conference, Knoxville, TN. This is the foremost meeting of the year for the worldwide geochemistry community. <http://www.goldschmidt2010.org>.

**June 26–30, 2010.** American Conference on Neutron Scattering, Ottawa, Ontario, Canada. <http://www.cins.ca/acns2010/>

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## Neutron Science in the News

[Protons on target: new imaging system in place at SNS \(Atomic City Underground, 9/7\)](#)

The Spallation Neutron Source at Oak Ridge returned to action with a bang this weekend following a long summer maintenance period. Among the highlights was installation of a new Target Imaging System that's designed to get a picture of the proton beam smashing the target in pulses 60 times a second. The new camera is reportedly much sturdier than an earlier version and tough enough to survive the environment as power load begins to approach the SNS design capability of 1.4 megawatts and beyond.

[ORNL reactor coming down for 47 days. \(Atomic City Underground, 8/29\).](#)

The High Flux Isotope Reactor is expected to shut down between noon and 2 p.m. today and remain out of operation until mid-October. The fall outage is one of the two biggest of the year (the other being in the spring), and a long list of maintenance tasks and upgrades is planned, according to ORNL's reactors director Ron Crone.

[Everything's on 'target' at SNS \(Atomic City Underground 8/13\).](#)

I wrote a column a year ago about a little betting pool (no money involved) taking place at the Spallation Neutron Source, where employees were trying to predict when the research facility's target vessel would fail. And, to many folks' surprise, it never did—at least it didn't before SNS managers decided to replace the stainless-steel vessel during the current outage, rather than risk the chance that it might interrupt this fall's important research session.

The most up-to-date news articles featuring neutron science performed at ORNL are available at [http://neutrons.ornl.gov/news/current\\_news.shtml](http://neutrons.ornl.gov/news/current_news.shtml). You can sign up for an RSS feed [here](#) for ORNL Neutron Sciences. To receive ORNL news via twitter, use <http://twitter.com/oakridgelabnews>.