brookhaven national laboratory

newsletter

national synchrotron light source

Summer 2005

A Passion for Synchrotron Science and its Future: News from the 2005 NSLS Annual Users' Meeting

Laura Mgrdichian, NSLS Science Writer

The speakers at the main session of the 2005 National Synchrotron Light Source (NSLS) Annual Users' Meeting, held on Tuesday, May 24, at Brookhaven National Laboratory (BNL), spoke on many different topics. But they all conveyed fierce enthusiasm for the science performed at the NSLS and expressed hope that its proposed successor, the world-leading NSLS-II, would become a reality.

NSLS Users' Executive Committee Vice-Chair Peter Stephens welcomed the audience to the main meeting, setting a positive and enthusiastic tone for the day's events. He then opened the stage to BNL Director Praveen Chaudhari.

Chaudhari commended many attendees for their work to advance NSLS-II. "You've helped tell us what is needed in this new light source, including the workshop last fall that defined NSLS-II," he said. "The struggle to get NSLS-II is just beginning — we need to design it and then get funding. But once the machine is built, you'll have the best machine in the world, and we need your help to make that happen."

Chaudhari then introduced Patricia Dehmer, head of the Office of Basic Energy Sciences within the U.S. Department of Energy's Office of Science, who plays an important role in efforts to move NSLS-II forward. Dehmer elaborated further on the status of the proposed new facility and made several key points, many concerning the tough budget years ahead.

Pat Dehmer (third from right), head of the Office of Basic Energy Sciences within the Department of Energy's Office of Science, was a special guest at the 2005 NSLS Annual Users' Meeting. She stands with (from left) NSLS Associate Chair for User Science Chi-Chang Kao, incoming Users' Executive Committee (UEC) Chair Peter Stephens, NSLS Chairman and Associate Lab Director for Light Sources Steve Dierker, BNL Director Praveen Chaudhari, and outgoing UEC Chair Larry Shapiro.

The Office of Science, she said, led by Raymond Orbach, has set a philosophy in place for fiscal year 2006: making the U.S. the leader in every major field of research, regardless of the declining budgets to come.

"These are very scary times, and being bold and aggressive is probably the only way to face this," she said.

However, her talk was full of encouraging messages. NSLS-II, she said, falls into one of the "mission challenges" of the Office of Basic Energy Sciences — that is, enabling the construction of major scientific facilities.

"NSLS-II will undoubtedly be

INSIDE THIS EDITION

the world's finest synchrotron; it will be a stunning facility," she said. Soon, she added, she and Orbach will present the Laboratory's NSLS-II proposal to Deputy Secretary of Energy Clay Sell for his approval.

She spoke emphatically to NSLS-II supporters. "I think we have a very high probability for success with NSLS-II. But we need your help, too. You have to understand the realities of the budget and be sophisticated when you talk to folks in Washington. You can't rely on Congress to launch something like NSLS-II — you have to talk to the administration."

Peter Abbamonte

In her closing remarks, Dehmer left off on a very positive note. "This laboratory has a wonderful history of constructing and operating major user facilities," she said. "The run of the NSLS has been nothing short of remarkable, and NSLS-II will take that tradition and move it into the future." She also praised NSLS Chairman Steve Dierker. "Steve has been a superb leader for NSLS-II, and there's no way we could have made our case to Ray Orbach without him. NSLS-II has moved up in the DOE 20-year plan largely because of Steve's efforts."

Steve Almo

Dierker, who spoke next, showed the audience that the NSLS continues to thrive, even as third-generation synchrotrons draw more and more users. "We've held our own and then some," he said. "The number of users served by the NSLS has been stable at about 2,300 per year."

He described the NSLS as "very cost effective, highly productive, and highly reliable." Since 2001, the facility has met many key goals, such as maintaining and strengthening its user program, expanding its user base, and developing a compelling proposal for NSLS-II.

In addition, there has been a "dramatic" evolution of NSLS beamlines, including better support to several beamlines to make them more useful and modern, and many major beamline upgrades.

Looking into the future, Dierker said he looks forward to continuing user input on NSLS-II. "The community has responded very enthusiastically and vigorously," he said. "I think we have put forward a compelling design that is critically needed in order to probe materials at high-energy resolution, and at spatial resolutions on the order of one nanometer, which would be unprecedented."

"There is a host of important and exciting scientific opportunities that will be enabled by NSLS-II," he concluded. "This is something the U.S. absolutely needs to regain leadership in synchrotron radiation science."

Next, in the first scientific talk of the day, Henk Schenk of the University of Amsterdam discussed "The Structure of Cocoa Butter and the Quality of Chocolate." In this interesting presentation, Schenk described his group's work using x-ray diffraction to study the structure of cocoa butter. Cocoa butter is an essential component of chocolate that determines the chocolate's characteristic properties, such as its sheen and meltability. By studying the various phases of cocoa butter via melting-cooling processes, he and his group patented a method to produce chocolate that stays fresh longer than other chocolates, and even devised a chocolate-making machine.

Schenk was followed by a talk on safety delivered by Peter Stephens and Bob Casey, the NSLS Associate Chair for Environment, Safety, Health, and Quality.

In a back-and-forth style, Casey and Stephens discussed safety from the point of view of NSLS users and administration, particularly in the wake of the electrical incident last year at the Stanford Linear Accelerator (SLAC). The issues raised during their talk were presented in further detail, and subject to more extensive discussion, at a special "Electrical Safety in the Research Community" workshop the following day.

Speakers at the main meeting included (from left) Bob Casey (BNL-NSLS), John Rehr (University of Washington), Benjamin Chu (Stony Brook University), and Henk Schenk (University of Amsterdam).

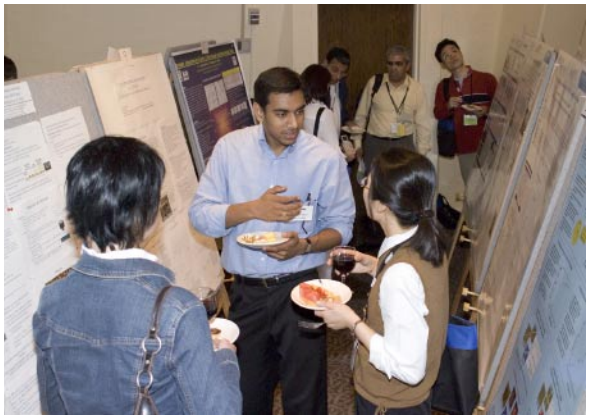
The workshop covered several topics. NSLS Safety Officer Andrew Ackerman discussed National Fire Protection Association electrical standards implemented at the NSLS. He also elaborated on a new NSLS rule that all electrical devices in the NSLS be certified by a nationally recognized testing laboratory within five years, including equipment brought in by users. He showed several photos of unsafe and/or "homemade" electrical equipment and configurations found on the NSLS floor, which illustrated the need for such rules.

The 2005 NSLS Annual Users' Meeting Planning Committee: (from left) Mary Anne Corwin, Liz Flynn, Melissa Abramowitz, Ron Pindak, Lisa Miller, Dan Fischer, Gretchen Cisco, and Peter Stephens.

Bob Chmiel, the NSLS Environmental, Safety, and Health engineer, expanded on this. He displayed actual examples of unsafe electrical configurations found during routine NSLS inspections, and encouraged users to routinely check their equipment.

Finally, Casey gave a more detailed account of the SLAC incident, the many violations of procedure and practice that led to it, and lessons learned. He also went over some recent NSLS electrical incidents, and the lessons learned from them.

The second scientific talk at the main meeting was delivered by John Rehr of the University of Washington. Rehr spoke about the theory involved in interpreting x-ray data obtained from many synchrotron analysis techniques, such as extended x-ray absorption fine structure (EXAFS) and nuclear resonant inelastic x-ray scattering.



Meeting partcipants enjoyed the Monday evening poster session.

In the afternoon, Benjamin Chu from Stony Brook University talked about the polymer experiments he performs with his group at beamline X27C, using wide-angle x-ray diffraction (WAXD) and small-angle x-ray scattering (SAXS). Their end station contains several specialized instruments, such as spinning, stretching, and high-pressure devices, which allow them to investigate various properties of the polymers.

Next, Steve Almo from the Albert Einstein College of Medicine discussed "Structural Genomics in the 3rd Millenium." Almo said that scientists are solving protein structures at amazing rates, but that the future of structural biology is determining the structures of protein complexes — many proteins interacting at once. He described a new technique to study proteins, called synchrotron x-ray footprinting, which may help structural biologists look beneath cell membranes to study many cell components at once.

Finally, NSLS scientist Peter Abbamonte presented his work on antiferromagnetism, a state of magnetism in certain materials in which ions orient themselves into regions of opposite alignment, called "stripes." Antiferromagnetic materials can become superconductors, and Abbamonte and his group are trying to determine if stripes play a role — do they assist or compete with superconductivity?

At the end of Tuesday's main meeting, the outgoing NSLS Users' Executive Committee Chair, Larry Shapiro, announced the three newest members of the UEC: Chris Jacobsen of Stony Brook University (SBU), Steve Almo (AECOM), and Chris Cahill of George Washington University. NSLS scientist Lisa Miller, the poster session organizer, announced the poster sessions winners: Brandon Chapman (BNL-NSLS), Angelo Dragone (BNL-Instrumentation), Holger Fleckenstein (SBU), Ashtosh Ganjoo (Lehigh University), Meghan Ruppel (SBU), and Tejas Telivala (SBU).

Later that day, meeting participants attended the evening banquet in Berkner Hall for good food, drinks, and conversation. During dinner, photos of the NSLS and NSLS staff cycled on a large screen at the front of the room, sparking conversations. Stephens also presented the UEC Community Service Award to Tony Lenhard.

After dinner, NSLS historian Robert Crease treated everyone to a bit of history during a special presentation. In a narrative accompanied by old photos, he recounted the days before the NSLS was built, the roadblocks encountered before and during its construction, and the ultimate success of the facility.

This year's poster session winners were (from left) Tejas Telivala (Stony Brook University), Ashtosh Ganjoo (Lehigh University), Angelo Dragone (BNL-Instrumentation Division), Holger Fleckenstein (SBU), Meghan Ruppel (SBU), and Brandon Chapman (BNL-NSLS).

During the two days surrounding the main meeting, Monday the 23rd and Wednesday the 25th, several additional workshops were held at locations across the Laboratory. They were "Nanomagnetism: Materials and Probes," "Imaging Nanoscale Structure in Biominerals: New Results and Challenges," "The Impact of Cryogenic Specimen Automounters on the Future of Macromolecular Crystallography," "Spectroscopic Studies of Nanoscaled Systems," "Application of Small-Angle X-Ray Scattering to Biological Structures," and "In-situ Analyses in Environmental and Chemical Systems."

NSLS historian Bob Crease took the banquet attendees back in time during his presentation on the history of the NSLS.

Changes in NSLS User Access Policy

Steve Dierker, Associate Laboratory Director for Light Sources & NSLS Chair

Important changes to operations at the NSLS have been incorporated into the NSLS User Access Policy. We are recommending that all our users review this policy to support the NSLS in its mission to perform outstanding science in a safe and environmentally friendly manner. The document outlines the general policies for user access to the NSLS and is designed to ensure open and fair access to the NSLS by the scientific community at large, to sustain the highest standards of scientific and technical excellence, and to be responsive and adaptable to varying user needs and funding realities. The policy changes were made after consulting with the NSLS User Executive Committee and were approved by the NSLS Science Advisory Committee.

The new NSLS User Access Policy can be found at: *http://www.nsls.bnl.gov/newsroom/publications/manuals/ppm/*.

Facility Beamlines

One major change in the new policy is the creation of "facility" beamlines, which are controlled and managed by the NSLS. At least 75% of the available beam time on each facility beamline will be allocated to general users and one or more contributing users, with at least 50% of the available beam time going to general users. Policy information pertaining to facility beamlines can be found at: *http://www.nsls.bnl.gov/newsroom/publications/manuals/ppm/#Section2.1*.

A list of NSLS facility and their capabilities can be found in the table below.

Contributing Users

Another major change is the establishment of a new mode of user access, known as contributing users (CUs). CUs are individuals or groups who carry out research at facility beamlines as well as enhance the capabilities of those beamlines or contribute to their operation. CUs typically develop instrumentation in some manner, bringing external financial and/or intellectual capital into the development of the beamlines or making an external contribution to the operation of the beamlines. To encourage involvement, and in exchange for supporting the general user program, CUs may be recognized for their investments by receiving a specified percentage of beam time on one or more beamlines for a period of up to three years, with the possibility of renewal. The first group of CUs will be selected on September 1, 2005.

To learn more about becoming a contributing user, please review Section 1.2 of the NSLS User Access Policy: *http://www.nsls.bnl.gov/newsroom/publications/manuals/ppm/#Section1.2*.

Procedures for becoming a contributing user can be found at: *http://www.nsls.bnl.gov/users/userguide/mode-cu.htm*.

We urge our users to review the new User Access Policy and to assist the NSLS in maintaining its high standards of excellence.

NSLS Facility Beamlines

Beamline	Energy Range	Technique
U5UA	15 - 150 eV	angle- & spin-resolved photoemission
U10B	500 - 4000 cm^{-1}	infrared microspectroscopy
U12IR	6 - 600 cm^{-1}	THz/millimeter wave spectroscopy & time-resolved spectroscopy
X1B	0.2 - 1.6 keV	coherent x-ray scattering; x-ray fluorescence spectroscopy; XPS
X6A	6.0 - 23 keV	MAD; macromolecular crystallography
X6B	7 - 19 keV	x-ray diffraction; surface x-ray diffraction; wide angle x-ray reflectivity
X13A	0.2 - 1.6 keV	resonant x-ray scattering; MCD
X13B	4 - 16 KeV	microdiffraction imaging
X15A	3 - 25 keV 10 - 60 keV	x-ray standing waves diffraction-enhanced imaging
X17B1	55 - 80 keV	powder x-ray diffraction
X18B	4.8 - 40 keV	x-ray absorption spectroscopy: XANES & EXAFS
X19A	2.1 - 17 keV	x-ray absorption spectroscopy: XANES & EXAFS; resonant x-ray scattering
X21	5 - 20 keV	resonant & magnetic x-ray scattering; SAXS; single crystal XRD
X25	3 - 28 keV	MAD; macromolecular crystallography
X27A	3.8 - 32 keV	x-ray microprobe

A Users' Perspective

Peter Stephens Users' Executive Committee Chair
Stony Brook University

It's great to be back! This is my second turn as chair of the Executive Committee of the National Synchrotron Light Source Users' Organization, and it's an entirely different landscape than my last tour of duty, in 1996-97.

Nine years ago, we were seeing the first two third-generation synchrotron sources in the U.S., the Advanced Photon Source (APS) and the Advanced Light Source (ALS), just coming on line. At that time, Stanford Synchrotron Radiation Laboratory (SSRL) and the Cornell High-Energy Synchrotron Source (CHESS) were still generally parasitic on high-energy physics experiments. The UV source Aladdin was the only other facility in the U.S. with a history of dedicated operations to produce synchrotron radiation.

In my view, those times marked the heroic age of synchrotron radiation, when it was a challenge for anybody to get access to synchrotron radiation, and most scientists viewed synchrotron radiation as the purview of a rather closed community.

Nowadays, synchrotron sources in the U.S. are widely viewed as regional assets, and many of the beamlines are operated by the facilities or other specialized groups. This paradigm shift, to synchrotron radiation as a valuable commodity, is the result of dedicated work by huge numbers of people at each facility and strong support from funding agencies, most notably the Department of Energy (DOE).

Our National Synchrotron Light Source was the first machine in which the size of the radiation source and its angular divergence were limited by the fundamental physics of synchrotron radiation rather than the haphazard orbits of the electron (or positron) beam. As such, it was the first second-generation machine. A further advance in storage ring technology, the third generation, is based on the application of undulators to produce sources brighter than the intrinsic radiation from bending magnets.

The APS, ALS, and SPEAR3 at SSRL were designed to take advantage of that opportunity. In fact, the NSLS also ranks as a third-generation machine, inasmuch as its accelerator physicists have figured out how to increase its brightness by a factor of 10,000 beyond its original design value, and how to operate the machine with the very small aperture required to make short period magnetic devices work as effective x-ray undulators. Third-generation synchrotrons have led to tremendous new opportunities, such as imaging nanoscale objects, unprecedented sensitivity for spectroscopic experiments, and extending the complexity of biological structures that can be solved.

I am sure you are aware of the proposal to build a new facility, NSLS-II, which is a very aggressive push to realize the ultimate limit of brightness from storage-ring technology. As was the NSLS twenty years ago, NSLS-II will be a truly national facility. Indeed, it is intended to be the brightest storage ring in the world, and it is difficult to imagine another machine that could displace it from that position. I do not have space here to detail the research and technology opportunities that NSLS-II will bring; instead, take a look at the information presented on its web site, *www.nsls2.bnl.gov*. We must focus of all of our efforts to make the case for constructing and operating this very expensive facility, especially in the present climate. But it will be a badly missed opportunity if we do not build on the twenty-three years of scientific progress since the dedication of the NSLS and the accumulated experience of scientists at synchrotron facilities worldwide, to bring the best possible storage-ring light source into existence. Please consider what you would be able to do with this machine, and lend your voice.

Back to the present, I think the NSLS Users' Meeting held from May 23-25 was very successful, although my opinion may be somewhat biased. We had six scientific workshops, a wide range of scientific talks, and important news from the facility, the laboratory, and the DOE Office of Basic Energy Sciences. Three new at-large Users' Executive Committee members were elected: Steve Almo of Albert Einstein College of Medicine, Chris Cahill of George Washington University, and Chris Jacobsen of Stony Brook University.

There are also eleven Special Interest Groups active in the UEC. The UEC interacts with the NSLS, Brookhaven Lab, and the DOE in various ways, but we are effective only if we can represent your interests. Therefore, please keep in touch with us. I am interested in hearing from you via email at info@nslsuec.org.

Let me close by thanking outgoing members of the UEC for their valuable service, especially my predecessor, Larry Shapiro. I am also extremely grateful to the NSLS User Administration Office for their work in organizing the annual user meeting. For the banquet, I put together a slide show of interesting pictures spanning the last 27 years of NSLS history. If you missed it (or want to see it again), you can find some of the pictures on our web site, *www.nslsuec.org*.

X18B: A New Monochromator for X-Ray Absorption Spectroscopy between 4.9 and 40 keV

Wolfgang Caliebe and Syed Khalid, BNL-NSLS

A new monochromator has been installed at beamline X18B to lower its lower energy limit from 5.6 keV down to 4.9 keV. This change might sound small, but it opens significant opportunities for research — especially in solid-state physics, materials science, and catalysis research — since the K-edges of two important 3d-transition metals, titanium and vanadium, have their energies at 4.966 and 5.465 keV, respectively.

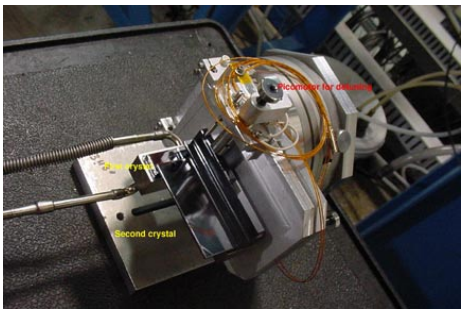


***Figure 1**. New X18B Monochromator with smaller first crystal*

Beamline X18B is optimized for hard x-ray absorption spectroscopy. The original monochromator covered an energy range between 5.7 and 40 keV (Cr – Ce K-edges, Ce – U L-edges). An overlapping lower energy range (2-7 keV) is covered by beamline X19A, which is optimized for x-ray absorption spectroscopy below 4 keV. However, several research groups, especially in the field of catalysis research, do experiments at the K-edges of several 3d-transition metals. The typical duration for one of their experiments is two to three days, including a few hours of research at photon energies below 5.7 keV (i.e. the V and Ti K-edges).

Rather than attempt to schedule and setup experiments at both X18B and X19A, we decided to extend the lower energy range of X18B down to 4.9 keV via a simple modification of its monochromator. The monochromator at X18B is a standard channel-cut monochromator with a 3 mm gap between the two crystals. The original length of the first crystal was 34 mm, which limited the maximum usable angle of operation of the monochromator, and in turn limited the low end of the photon energy range to 5.7 keV. The 34 mm length of the first crystal was chosen in order to intercept the entire beam vertically at higher energies, where the Bragg angle, and thus the vertical acceptance of the crystal, is smaller.

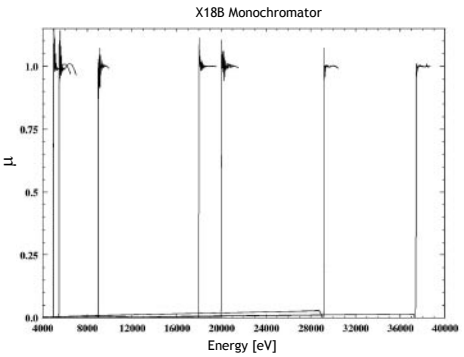


***Figure 2**. Typical x-ray absorption spectra of different metal foils and metal salts between 4.9keV (Ti) and 38keV ($BaCl_3$)*

However, as it turns out, the vertical opening angle worsens the energy resolution at higher energies, so it is better to limit the vertical beam size at high energies, thereby shortening the required length of the first crystal and increasing the usable angular and photon energy ranges of the monochromator. By optimizing both the energy resolution and intensity, the footprint of the white beam on the monochromator remains almost constant over the energy range of this monochromator. This allowed us to shrink the length of the first crystal to 16 mm, which is still enough to prevent heat-load problems like the thermal bump.

The monochromator was first mounted in the beamline in the end of April, and tested and commissioned in April and May. Some typical results demonstrating the large energy range covered by this monochromator are displayed in **Figure 2**, which shows several edges of standard metal foils between 4.9 and 30 keV.

EXAFS Course to be held September 28-30, 2005

This three-day course will partially overlap with prior EXAFS data collection and analysis courses held at the NSLS that were aimed at beginners. Participants should be familiar with the basics of EXAFS. The course will be self-contained, starting with the fundamentals and proceeding to the more advanced topics.

The course will consist of two hands-on experimental sessions on Wednesday and Thursday afternoons, three lecture sessions in the mornings (Wednesday, Thursday, and Friday), and one data-analysis session (Friday). Lectures will be taught by Edward Stern, John Rehr and Josh Kas (Univ. of Washington), Grant Bunker (Illinois Inst. of Tech.), Anatoly Frenkel (Yeshiva Univ.), Trevor Tyson (New Jersey Inst. of Tech.), Joseph Woicik (NIST), and Scott Calvin (Sarah Lawrence College).

The course is limited to 32 participants. All participants should bring PC laptops. Tutorials and links to reference information will be posted on the course web site in advance.

In addition to submitting an application form, all attendees must register in BNL's Guest Information System. Approval, which can take 30 days or more, must be granted prior to attending this workshop. For fee and deadline information, go to the course website: **http://www.nsls.bnl.gov/newsroom/events/workshops/exafs/**.

New High-Resolution Electron Energy Analyzer Installed on Beamline U13UB

Peter Johnson[1] and Steve Hulbert[2]
[1]BNL-Physics; [2]BNL-NSLS

The 1990s renaissance in the field of angle-resolved photoemission spectroscopy (ARPES) resulted from the combination of new parallel-detection (in energy and angle) photoelectron spectrometers with high-brightness VUV synchrotron beamlines. At the NSLS, such a beamline/endstation combination was constructed and commissioned at beamline U13UB in the late 1990s.

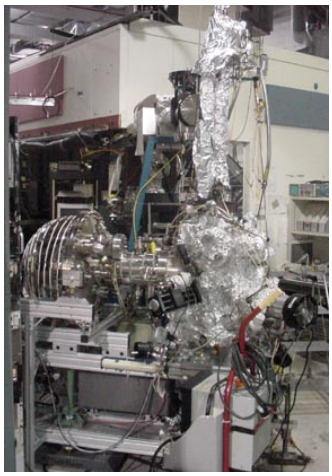


***Figure 1**. Photograph of the U13UB experimental endstation, the heart of which is a very high resolution Scienta SES200 photoelectron spectrometer.*

In 2004, the original Scienta photoelectron spectrometer that had been used since 1998 was replaced by a higher-resolution instrument from the same company. Shown in **Figure 1**, the new instrument has a measured energy resolution of 0.7 meV, which is a significant improvement over the ~5 meV resolution of the previous model. A photoelectron spectrum recorded at low temperature from an evaporated gold film in the vicinity of the Fermi edge is shown in **Figure 2**. The energy width of the Fermi edge in this spectrum is limited by the temperature of the sample.

This new instrument has been used by U13UB PRT members and general users since late 2004. The U13UB PRT members (Brookhaven Lab's Physics Department, Boston University, Boston College, and Columbia University) are using the enhanced energy resolution of this new instrument to study detailed information on the electronic structure and dynamics of complex electronic systems. In particular, a recent study of the quasiparticle scattering rates around the Fermi surface of Sr_2RuO_4 was reported in Physical Review Letters by the Brookhaven group (PRL **94**, 107003 (2005)). This study provided a microscopic picture of the origin of the crossover from non-Fermi liquid to Fermi liquid behavior observed in macroscopic transport measurements.

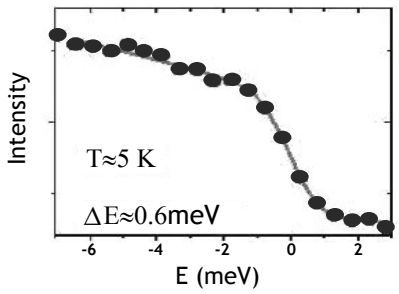
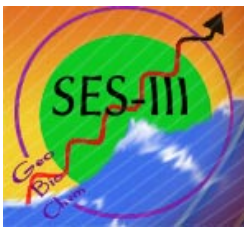


***Figure 2**. A photoelectron spectrum recorded at low temperature (~5K) from an evaporated gold film in the vicinity of the Fermi edge, demonstrating the superior (sub meV) electron energy resolution of the new Scienta photoelectron spectrometer at beamline U13UB.*



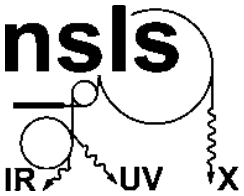
Synchrotron Environmental Science III

September 19-21, 2005
Brookhaven National Laboratory

Continuing the tradition established by previous Synchrotron Environmental Science (SES) conferences held at Argonne National Lab, SES III will bring together the diverse community of scientists who apply synchrotron-based radiation techniques to study the biological and geochemical aspects of both local and global environmental issues.

Two days of topical sessions will address innovative synchrotron methods in environmental science along with applications in bioavailability and remediation science. The third day will include a workshop on microbeam methods and an EnviroSync organizational meeting. Environmental science researchers new to synchrotron radiation are encouraged to attend. Tours of the National Synchrotron Light Source will be arranged.

For registration and abstract submission visit: **http://www.cems.stonybrook.edu/ses-iii**.



X-Ray Ring Long-Range Schedule

September 2005

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				1 0000 Maint.	**2** 0000 Maint.	**3** 0000 Maint.
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11 0000 Maint.	**12** 0000 Maint.	**13** 0000 Maint.	**14** 0000 Maint.	**15** 0000 Maint.	**16** 0000 Maint.	**17** 0000 Maint.
18 0000 Maint.	**19** 0000 Maint.	**20** 0000 Maint.	**21** 0000 Maint.	**22** 0000 Maint.	**23 Lab Holiday** 0000 Maint.	**24** 0000 Maint.
25 0000 Maint.	**26 Lab Holiday** 0000 Maint.	**27** 0000 Maint.	**28** 0000 Maint.	**29** 0000 Maint.	**30** 0000 Maint.	**31** 0000 Maint.

VUV-IR Ring Long-Range Schedule

September 2005

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1 0000 Ops.	**2** 0000 Ops. 1800 Studies	**3** 0000 Ops.
4 0000 Ops. 1200 Studies	**5 Lab Holiday** 0000 Ops.	**6** 0800 Maint.	**7** 0000 Maint.	**8** 0000 Ops.	**9** 0000 Ops. 1800 Timing	**10** 0000 Ops.
11 0000 Ops.	**12** 0000 Ops. 1800 Timing	**13** 0000 Ops.	**14** 0000 Ops.	**15** 0000 Ops.	**16** 0000 Ops. 1800 Studies	**17** 0000 Ops.
18 0000 Ops.	**19** 0000 Ops.	**20** 0800 Studies	**21** 0000 Studies	**22** 0000 Ops.	**23** 0000 Ops.	**24** 0000 Ops.
25 0000 Ops.	**26** 0000 Ops. 1800 Timing	**27** 0000 Ops.	**28** 0000 Ops.	**29** 0000 Ops.	**30** 0000 Ops. 1800 Studies	

October 2005

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1 0000 Ops.
2 0000 Ops. 1200 Studies	**3** 0800 Maint.	**4** 0000 Maint.	**5** 0000 Ops.	**6** 0000 Ops.	**7** 0000 Ops. 1800 Timing	**8** 0000 Ops.
9 0000 Ops.	**10** 0000 Ops. 1800 Timing	**11** 0000 Ops.	**12** 0000 Ops.	**13** 0000 Ops.	**14** 0000 Ops. 1800 Studies	**15** 0000 Ops.
16 0000 Ops.	**17** 0000 Ops.	**18** 0800 Studies	**19** 0000 Studies	**20** 0000 Ops.	**21** 0000 Ops.	**22** 0000 Ops.
23 0000 Ops.	**24** 0000 Ops. 1800 Timing	**25** 0000 Ops.	**26** 0000 Ops.	**27** 0000 Ops.	**28** 0000 Ops. 1800 Studies	**29** 0000 Ops.
30 0000 Ops. 1200 Studies	**31** 0800 Maint.					

November 2005

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1 0000 Maint.	**2** 0000 Ops.	**3** 0000 Ops.	**4** 0000 Ops. 1800 Timing	**5** 0000 Ops.
6 0000 Ops.	**7** 0000 Ops. 1800 Timing	**8** 0000 Ops.	**9** 0000 Ops.	**10** 0000 Ops.	**11 Lab Holiday** 0000 Ops. 1800 Studies	**12** 0000 Ops.
13 0000 Ops.	**14** 0000 Ops.	**15** 0800 Studies	**16** 0000 Studies	**17** 0000 Ops.	**18** 0000 Ops.	**19** 0000 Ops.
20 0000 Ops.	**21** 0000 Ops. 1800 Timing	**22** 0000 Ops.	**23** 0000 Ops.	**24 Lab Holiday** 1900 Maint.	**25 Lab Holiday** 0000 Maint.	**26** 0000 Maint.
27 0000 Maint.	**28** 0000 Maint.	**29** 0000 Maint.	**30** 0000 Maint.			

December 2005

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1 0000 Maint.	**2** 0000 Maint.	**3** 0000 Maint.
4 0000 Maint.	**5** 0000 Maint.	**6** 0000 Maint.	**7** 0000 Maint.	**8** 0000 Maint.	**9** 0000 Maint.	**10** 0000 Maint.
11 0000 Maint.	**12** 0000 Maint.	**13** 0000 Maint.	**14** 0000 Maint.	**15** 0000 Maint.	**16** 0000 Maint.	**17** 0000 Maint.
18 0000 Maint.	**19** 0000 Maint.	**20** 0000 Maint.	**21** 0000 Maint.	**22** 0000 Maint.	**23 Lab Holiday** 0000 Maint.	**24** 0000 Maint.
25 0000 Maint.	**26 Lab Holiday** 0000 Maint.	**27** 0000 Maint.	**28** 0000 Maint.	**29** 0000 Maint.	**30** 0000 Maint.	**31** 0000 Maint.

NSLS Accelerator Complex Update

Erik Johnson, Associate Chair for Operations and Engineering

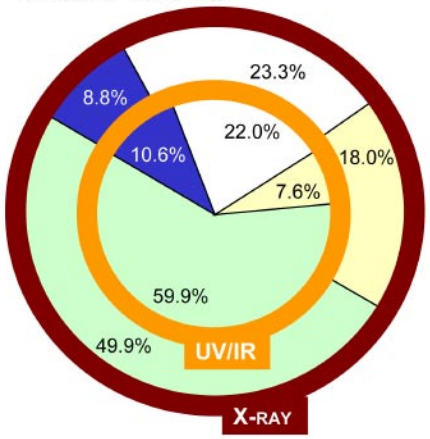
As the expression goes, "so far so good." As of June 1 the reliability of both the VUV and x-ray rings continues to exceed 95% for fiscal year 2005. The spring shutdown was filled with a lot of unglamorous, mostly unsung maintenance activities that make this kind of performance possible. There are still four months left in the fiscal year, and many fiscal years still left in the NSLS, so continuing vigilance and ongoing maintenance is essential. The shutdown also included a few large installations and some equipment information upgrades to help us work more safely and efficiently for the long haul.

NSLS Machine Activities

(Status as of June 1, 2005)

Activity /Hours	UV/IR	X-ray
Operations	3491.1	2912.3
Unscheduled Operations	617.2	512.6
Maintenance	1281.0	1357.6
Other	442.7	1049.5

YTD 5832 Hrs 100 Hrs= 1.7%



User Metrics	UV/IR	X-ray
Reliability	99.2%	95.7%
Availability	116.7%	112.5%

Maintenance on the power substation revealed five trip coils that did not function properly when tested. The trip coils provide a key protective function by actuating the 13.6 kV circuit breakers in the event of an over-current condition. Three coils were replaced and two were repaired in place to restore this important protective function for our switchgear. The X17 cryogenic system liquefier was rebuilt and we made modifications to the power feed to the compressors to ensure the required performance.

The UV RF1 temperature-control system was completely rebuilt and upgraded in place, substantially improving the thermal response of the system. This is important because the old system could not adjust quickly enough to keep up with the change in load from injection at maximum rate, and hence extended the minimum fill time for the VUV ring. After the shutdown, with the new system in place, one fill was completed from 0 to 1000 mA in 1:35 (yes that's *under* two minutes)!

In the injection system, enhanced diagnostics were installed to allow us to track its performance. Wall-current monitors were installed on existing ceramic breaks to follow current loss from the linac through the transport lines. Improved flags installed in key areas will provide better imaging of the electron beam to help with machine tune-up. These upgrades are part of an ongoing effort to reduce lost charge and the radiation it produces around the facility.

Posting informational signs sounds like a mundane activity, but it was actually an important milestone in our program to enhance worker safety around the facility. During the shutdown, more than two thousand warning signs were placed on equipment around the facility, much of it in use since the start of NSLS operations. This activity required a bottom-up assessment of the stewardship and hazards of all NSLS equipment, capturing the information in a systematic manner, and providing suitable warning signs with information pointing to the correct procedures for servicing the equipment. This monumental investment of effort is worthwhile since we anticipate continuing use and development of the facility for years ahead.

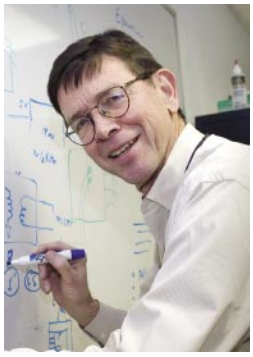
During the upcoming winter shutdown, two significant installations are already planned: the last new RF cavity in the X9 straight section, to pave the way for an insertion device program at X9, and a new mini-gap undulator for X25. Other significant installations are in the planning stages out to 2008 and beyond. All things being equal, there is a lot of interesting work to be done at the NSLS before NSLS-II comes on line.

The X23/X24 front-end in the x-ray ring showing the new equipment information tags installed during the Spring 2005 shutdown

Of course, the near-term is important as well. After the December shutdown, we need to run the machine, and exactly what that schedule looks like depends on input from you. The Winter 2006 schedule will be set in September 2005; therefore, if there are any special scheduling considerations please let me know by late August.

NRTL and its Implication to Electrical Equipment Used at the NSLS

Bob Casey, Associate Chair for ESH/Q



In the past year, an issue of considerable interest has developed regarding the use of "listed" electrical equipment at the NSLS. Under the terms of its contract with the Department of Energy (DOE), Brookhaven National Laboratory (BNL) is obligated to ensure that all such equipment is "approved" or "certified" by a nationally recognized testing laboratory (NRTL) or otherwise found to be safe for its intended use by the local authority having jurisdiction. All of you are familiar with the labels that are found on common electrical equipment in your home or office (e.g. the U.L. label on a coffee pot), but you may not be aware that much of the commercial equipment used in your experiments is quite likely not labeled. In particular, all "home-made" equipment obviously will not bear the approval of a NRTL. Hence the dilemma posed for us all: How are we to satisfy the requirements in the BNL-DOE contract?

The complete answer to this question has not yet been developed. However, we do know the direction that the program will take. For example, for BNL staff, all new equipment purchases must be accepted, certified, listed, or labeled by a NRTL. There is one exception. Custom-made equipment not certified by any NRTL may be purchased if:

- it is determined to be safe for its intended use by the *manufacturer*
- that determination is made on the basis of test data
- the test data is kept by BNL

There is obviously a considerable amount of equipment currently in use at the NSLS that has not been approved by a NRTL. BNL is developing an inspection program to review this equipment and determine if it is safe to use. We expect that this inspection program will take five years to complete.

Specialized equipment that is made at your institution and brought to the NSLS for your experiment will need to be carefully constructed and may be subject to inspection prior to use. On your SAF, you are asked to identify equipment that you plan to bring to the NSLS. We are particularly interested in your "home-made" equipment. In recent months we have not allowed some equipment to be used because of inadequate design or assembly practices. Although criteria have not been fully developed at this point, there are some obvious issues that you will need to consider if you plan to use non-commercial "home-made" equipment during your visit to the NSLS. To avoid issues with your equipment, ensure that you have:

- provided a robust and non-combustible enclosure
- eliminated exposed conductors or energized parts that can be touched
- provided proper grounding
- used NRTL-listed parts
- provided proper strain relief and grommets for electrical cords
- established an adequate fuse for short-circuits and over-currents
- used proper-gauge and double-insulated wiring
- considered heating effects, arcing effects, wire bending and connection space, and suitability of use

We will keep you advised as this program is more fully defined. In the meantime, please contact John Aloi (aloi@bnl.gov) or Andrew Ackerman (ackerman@bnl.gov), if you have questions or want to discuss this further.

lightsources.org

A New Website for News and Information on the World's Light Sources

Lightsources.org is the first website dedicated to providing the media, general public, and scientific community with the latest news and information on the world's accelerator-driven light sources and the science they produce. Visit the site for the latest news releases on cutting-edge areas of advanced light source applications for science and technology.

The website also includes an image bank of light source-related photos and graphics, clippings of news stories, links to light source facility websites, and relevant articles and presentations. Educators will find links to websites relating to light sources, and researchers can find information regarding each light source facility, including job opportunities and events.

What's New at User Administration

Mary Anne Corwin, NSLS User Administrator

PASS Update

Online for more than a year, the NSLS Proposal, Allocation, Safety, and Scheduling (PASS) System has proven to be extraordinarily robust. Our users and staff have been instrumental in making recommendations to improve its user friendliness and capabilities.

Beamline Information in PASS

Beamline spokespersons have the ability to update staff members, PRT institutions and members, experimental techniques, and funding-agency information for end-of-year reporting. PASS provides an automatic feed of some of this information for the respective beamline webpage.

To meet new requirements in cyber security and foreign visits and assignments, a new beamline staff position will be added to each beamline. All beamlines have a computer systems administrator or someone who maintains their systems and is familiar with its networking capabilities. By listing this person in the beamline pages, we can more easily prepare documents requiring this information.

Safety Approval Forms

Safety approval forms (SAFs) are submitted within the PASS System. NSLS policies require that a lead experimenter be designated in each SAF to ensure that all ES&H requirements have been met and the experiment is performed in a safe manner. Over the last year, the role of lead experimenter has become increasingly important to the safety of the facility, its users, and staff. After noticing a large number of experiments requesting start-up without a lead designated, PASS was modified to require this designation at the time of submission of the safety approval form and links for this information have been made more prominent in the system. For more information about the lead experimenter role, please refer to: *http://www.nsls.bnl.gov/organization/ESH/safety/r2a2.htm#Lead*.

Proprietary Proposals

Brian Bindert, our applications developer, has just completed the large task of incorporating proposals for proprietary use into PASS.

A change in the method of charging for proprietary research, requested by our users, has been approved. Proprietary research will be charged based on actual beam time used plus a specified amount for start-up and closeout. Actual beam time used will be determined based on the elapsed time.

Another major change taking place is automatic billing for proprietary usage. Principal Investigators will no longer have to submit reports each cycle. Since charges will be based on actual beam time, the billing process will be simplified and more up-to-date.

All proprietary proposals against general user time are reviewed by the requested beamline for feasibility and safety, followed by the User Science Division head, and then forwarded to the Beam Time Allocation Committee. The submission deadlines are the same as all other general user proposals. However, we will accept proprietary proposals at any time. Those received after allocation may be allocated provided adequate beam time exists on the requested beamline.

Proposals against PRT time are reviewed by the beamline for feasibility, safety, and for approval to use PRT time, and then routed for safety approval and scheduling.

Policies related to proprietary proposals can be viewed at: *http://www.nsls.bnl.gov/newsroom/publications/manuals/ppm/#Section1.5*

Procedures can be viewed at: *http://www.nsls.bnl.gov/users/userguide/BT-proprietary.htm*.

The next large development phase will focus on rapid access to beam time to allow users to request beam time in the current cycle. Improvements to the scheduling process will also be incorporated in this fiscal year.

Weekly NSLS Activities

For more information about the following activities visit: http://www.nsls.bnl.gov/newsroom/events/weekly_meetings.htm

Tuesday

Bi-Monthly Symposia: 10:30 to 11:30 a.m., Seminar Room. See URL below for Symposium calendar: *http://www.nsls.bnl.gov/newsroom/events/seminars.htm*

Wednesday

Joint VUV and X-Ray Users' Meeting: 11:30 a.m., Seminar Room

Student/Postdoc Pizza Get-Together: Every other Wednesday, 1:30 p.m, Library on the UV floor (or if the weather permits the picnic tables outside on that side of the building)

Coffee for Users and Staff: 3:30 p.m., NSLS Lobby

Friday

Friday Lunch Seminars: 12:00 to 1:00 p.m., Seminar Room

Tony Lenhard Honored for Service to the NSLS Community

Peter Stephens, UEC Chair

The fourth UEC Community Service Award was presented to Tony Lenhard at the NSLS Users' Meeting in May. This award is given for service, innovation, and dedication to users of the NSLS, based on nominations from the user community and discussion within the UEC. (As an aside, please be thinking of who should be so honored next year.)

Peter Stephens (UEC Chair) presents the 2005 NSLS User Community Service Award to Tony Lenhard at the 2005 Users' Meeting.

Tony is a Senior Technical Supervisor in the User Science Division at the NSLS, a position he has held essentially since the NSLS began operating. He has overseen all of the technical work on every NSLS-operated beamline — x-ray, ultraviolet, and infrared — including the insertion device beamlines. Since many of the experimental stations built and operated by participating research teams look to NSLS-constructed equipment for technical guidance, Tony's mark is on essentially every experiment performed at the NSLS.

The nominations we received for Tony contained many glowing testimonials from users: "Tony is always ready to advise on the mechanical design of users' experimental apparatus, even under acute time pressure;" "Tony is a treasure house of technical knowledge and skill in setting up beamlines and experiments;" "I don't believe the community properly appreciates his contributions to the many experiments that otherwise would have been delayed;" "Tony may be one of the most underappreciated treasures in the NSLS. He is often on the spot when users arrive and need to make some quick modification to equipment to allow them to complete an experiment;" "Tony plays a crucial role in assisting NSLS users while they are performing experiments. Every user facility needs a person like Tony: someone who knows how to build or modify any mechanical part in a short amount of time, and someone who is kind enough to help guide experimenters in the right direction."

Those comments came from people who have benefited directly from Tony's help in setting up new experiments, but that is probably not a majority of the current users. The Community Service Award partly serves to recognize people whose contributions may not be clear to the entire NSLS community. Tony's selection is therefore particularly appropriate because an increasing fraction of NSLS users come and work without directly interacting with the people who have designed and built the beamlines. We are all fortunate to benefit from his skill and experience and, on behalf of the UEC, I am happy to acknowledge his contributions.

Congratulations Tony, and thanks for a job well done!

Current UEC Members and SpIG Representatives

Term May 2005-2006

Users' Executive Committee

Chair	Peter Stephens (Stony Brook Univ.)
Past Chair	Larry Shapiro (Columbia Univ.)
Vice Chair	TBD
Member	Hao Wu (Cornell Univ.)
Member	Chris Cahill (George Washington Univ.)
Member	Trevor Tyson (NJIT)
Member	Chris Jacobsen (Stony Brook Univ.)
Member	Steve Almo (AECOM)
Ex-Officio	Chi-Chang Kao (BNL-NSLS)
Ex-Officio	Mary Anne Corwin (BNL-NSLS)
Ex-Officio	Lisa Miller (BNL-NSLS)

Special Interest Groups

Bio. Scattering	Ann Stock (Univ. of Med. & Dent. NJ)
Imaging	Sue Wirick (Stony Brook Univ.)
Industrial	Paul Stevens (Exxon Mobil Res.)
Infrared	Randy Smith (BNL-NSLS)
Nuclear Phys.	Mahbub Khandaker (TJLab)
Students/Postdocs	Meghan Ruppel (BNL-NSLS)
Time Resolved	John Sutherland (BNL-Biology)
Topography	Michael Dudley (Stony Brook Univ.)
UV Photoemission	Jeff Keister (SFA, Inc.)
XAFS	Paul Northrup (BNL-Envi. Sci. Dept.)
X-Ray Scattering	Ben Ocko (BNL-Physics Dept.)

Crystallographers Bloom at RapiData 2005

Laura Mgrdichian, NSLS Science Writer

Once again this spring, nearly 50 budding crystallographers from around the world gathered at Brookhaven National Laboratory for RapiData 2005, a week-long course designed to introduce students to the best people, newest equipment, and latest techniques in the field of macromolecular x-ray crystallography.

Participants in RapiData 2005

The course is offered annually by Brookhaven's Biology and National Synchrotron Light Source (NSLS) departments, and is always a successful event for participants and instructors alike. This year, it ran from April 5 to 11.

The course began with two days of lectures and tutorials taught by scientists from Brookhaven, industry, academia, and other national labs. Then, the instructors and other participants guided the students through a marathon, 60-hour data-collection session on eight NSLS beamlines. Half of the 48 students came with their own specimens to analyze, while the other half learned as observers. Six students left with solved structures that may be publishable in scientific journals.

The course was organized primarily by Bob Sweet and Denise Robertson of Biology. However, they emphasize that its success depended on enthusiastic help from most of the 24 members of the PXRR (the Biology and NSLS Macromolecular Crystallography Research Resource), NSLS staff, and several outside teachers.

The majority of the funding for the course comes from the National Institutes of Health's National Center for Research Resources and the Office of Biological & Environmental Research within the U.S. Department of Energy's Office of Science. Additional support is provided by the NSLS and several equipment vendors and drug companies. For more information, go to: *www.px.nsls.bnl.gov/RapiData2005/*.

Strain-Mapping Workshop Marked by Enthusiasm and Idea-Sharing

Laura Mgrdichian, NSLS Science Writer

Useful, lively discussions characterized the recent workshop on Strain Mapping in Engineering Materials with High-Energy Synchrotron X-Rays, held at the NSLS from April 18-19. The workshop brought together researchers in the field of strain mapping to discuss their work and talk about how to advance NSLS strain-mapping capabilities. Some of the talks are summarized below.

Asuri Vasudevan, from the U.S. Navy's Office of Naval Research, discussed how he works to extend and predict the life of aircraft and helicopters by studying "residual stresses" — the stresses within a material left over after a single or repeated use, which are caused by temperature or the material's chemical environment. Residual stresses can cause cracks on surfaces that may be unstable. Vasudevan said that the available tools limit the size of the crack he can study as well as the sample's thickness and composition.

Participants in the Strain-Mapping workshop

Mel Roquemore and Ruth Sikorski from the Air Force Research Laboratory addressed the potential applications of strain mapping to evaluate jet engine components. Their aims include using the stresses that occur within the components to predict and model how complicated engine systems will respond to duty-cycle loading, which will help them determine how to increase the life of the components.

Another key speaker was Roger Klaffky, who runs the X-Ray and Neutron Scattering Facilities program within the U.S. Department of Energy's Office of Science. He spoke about the DOE's mission to advance nanoscience research for energy needs, and the advantages of x-ray diffraction in this respect.

Additionally, an overview of the

NSLS beamlines and user community was presented by NSLS scientist Chi-Chang Kao. He laid out the NSLS three-to-five year plan, which aims to continue the growth of life and geo/environmental science user groups, and attempts to reverse the decline in materials and chemical science users. Other initiatives are to advance the biomedical imaging program here and develop a new nanoscience user base. But in the area of strain mapping using high-energy x-rays, Kao said the NSLS needs to win funding for a new end station dedicated solely to that field.

The scheduled discussion period at the end of the workshop, and the several smaller discussions in between, produced many ideas and ways to bolster the strain-mapping program at the NSLS. The participants compiled a "wishlist" of capabilities they would like to see at X17B1, which is where strain-mapping research is now performed, and described current limitations to their research. For example, they discussed how to decrease the time it takes to make a strain map, which is one limitation may now prevent industrial users from coming to the NSLS.

The group also talked about potential future beamline X17A, which could free up X17B1 to become a strain-mapping-only beamline. Currently, high-energy x-ray scattering and medical researchers share the limited beamtime at X17B1 with strain-mapping scientists.

NSLS Daughters and Sons are Forensic Scientists for a Day

Laura Mgrdichian, NSLS Science Writer

On April 28, approximately 30 daughters and sons of NSLS staff members questioned suspects, analyzed crime-scene evidence, and caught a thief — all in one morning. The activities were part of the national Take our Daughters and Sons to Work Day. This year at the NSLS, the day had a theme: forensic science.

Participants in the NSLS Sons and Daughters Day

First, the children gathered in the NSLS seminar room to hear a brief safety talk by Nick Gmur, and then learned about light in its different forms from NSLS scientist Lisa Miller, in her talk, "What Kind of Light?"

After the talk, the main event began. Lisa introduced the crime — The Case of the Missing iPod — and presented the "evidence" found at the scene: a white powder, a black powder, a strand of hair, and a piece of notebook paper. In a nearby trash basket, there was also a soda can with a drop of "blood" on it.

The "victim," NSLS student researcher Meghan Ruppel, then told her story. She was studying for a test in the library, got up to talk to friends, and returned to find her iPod missing. Her story revealed several possible suspects: Adele Wang, Meghan's friend; Michael Appel, the library's janitor; Laura Mgrdichian, the librarian; and Steve Giordano, a library patron. The suspects filed in, told their own stories, and were questioned by several of the children.

Then, the daughters and sons split into groups to analyze the evidence. They tested the "blood" on the soda can to determine the blood type, and dusted the can and the victim's notebook paper for fingerprints. They compared their results with the suspects' blood types and fingerprints.

Next, the children went down to the NSLS experimental floor. There, NSLS scientists Tony Lanzirotti and Bill Rao helped them analyze hair samples from the suspects using x-rays, which measure the levels of trace elements (such as zinc, copper, and calcium) that are present in the hair. The analysis yielded a unique "signature" for each sample, which was compared to the signature of the strand of hair found at the crime scene. The group also analyzed the powders with a synchrotron infrared microscope. They determined that the white powder was powdered sugar and the black powder was ground coffee.

With all the evidence properly analyzed, the daughters and sons returned to the seminar room, knowing who had taken the iPod.

And who was the culprit? Laura the librarian! She took the iPod "because iPods are not allowed in the library." In her introductory story, she only revealed that she made coffee and ate a powdered doughnut that morning. Caught, however, she further explained that she noticed a soda can on Meghan's desk and, because food and drinks are not allowed in the library, went over to throw it way. She cut her finger on the top, leaving a blood drop. Then she noticed the iPod, another forbidden item. She took it, but left behind coffee and sugar powders, a strand of hair, and many fingerprints. The NSLS daughters and sons successfully analyzed these clues to catch the true "thief."

NSLS Information and Outreach Office
Brookhaven National Laboratory
NSLS Building 725B
P.O. Box 5000
Upton, NY 11973-5000

Call for NSLS General User Proposals

For Beam Time in Cycle	Deadline
January-April 2006	Friday, September 30, 2005

General User Proposal and Beam Time Request Forms with instructions can be found at:
http://www.nsls.bnl.gov/users/usersguide/BT-gu.htm
Proprietary Proposal Forms with instructions can be found at:
http://www.nsls.bnl.gov/users/usersguide/mode-prt.htm

Safety Approval Forms

Safety Approval Forms (SAFs) are required for every experiment. Your SAF must be submitted online **at least one week before** your scheduled beam time. To submit, go to:

https://pass.nsls.bnl.gov/

NSLS User Administration Office

User Information, Registration, and Training:
Phone: (631) 344-USER Fax: (631) 344-7206

User Administrator	
Mary Anne Corwin	corwin@bnl.gov
Annual Users' Meeting	
Gretchen Cisco	cisco@bnl.gov
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http://www.nsls.bnl.gov/