

PHENIX Armed for Tracking Muons at RHIC



Roger Stoutenburgh DS7 0402

Members of the PHENIX muon-arm team are gathered in front of the muon tracking detector.

Data from heavy-ion and polarized-proton collisions at the Relativistic Heavy Ion Collider (RHIC) show that the PHENIX experiment is now "armed" for detecting muons. Installed for the first time during the first full-energy heavy-ion collision run and tested again during RHIC's premier polarized-proton run, the experiment's south muon arm appears to be working well.

"A big debt of gratitude is owed to the RIKEN laboratory and the Science & Technology Agency in Japan, and the Division of Nuclear Physics in DOE's Office of Science for funding the muon program at PHENIX," said

Satoshi Ozaki, Special Assistant to the Laboratory Director at BNL. RIKEN funding helped to build and install the large magnet and sophisticated detector components of the south muon arm, which mirrors the north arm funded by DOE.

"We are still analyzing the data," said Atsushi Taketani of RIKEN and the RIKEN-BNL Research Center (RBRC), "but we expect it will reveal important details about the production of J/psi particles."

These findings will be important in both the search for quark-gluon plasma — the state of matter that RHIC's heavy-ion

(continued on page 2)

SNO Storms Ramparts Of Solar Neutrino Puzzle

On Saturday, April 19, scientists from Canada, the United States and the United Kingdom announced the results of a unique new measurement of the total number of all known neutrino types reaching the Earth from the Sun.

Using data entirely from the Sudbury Neutrino Observatory (SNO) in Canada, the SNO team, which includes a BNL contingent, is also able to determine that the observed number of electron neutrinos, the type produced by the Sun, is only a fraction of the total number.

Said Project Director Art McDonald of Queen's University, Canada, "These new results show in a clear, simple and accurate way that solar neutrinos change their type before reaching the Earth. The total number of neutrinos we observe is also in excellent agreement with calculations of the nuclear reactions powering the Sun. The SNO team is excited because these measurements enable neutrino properties such as mass to be specified with much greater cer-

tainty for fundamental theories of elementary particles."

Neutrinos are particles with no electric charge and very little mass, known to exist in three types related to three different charged particles — the electron, the muon, and the tau. The Sun emits only electron-neutrinos, which are created in the thermonuclear reactions in the solar core. Previous experiments found fewer electron-neutrinos than suggested by calculations based on how the Sun burns — the famous "solar neutrino puzzle" revealed in the early 1970s when BNL scientist Ray Davis's pioneering research in a South Dakota gold mine first documented the missing electron neutrinos.

"With all of BNL's history in studying solar neutrinos, started by Ray's work, then continued by the international GALEX collaboration in Italy, it's been particularly satisfying to be part of the SNO experiment," said Richard Hahn, who heads the Solar Neutrino Group in BNL's

(continued on page 3)

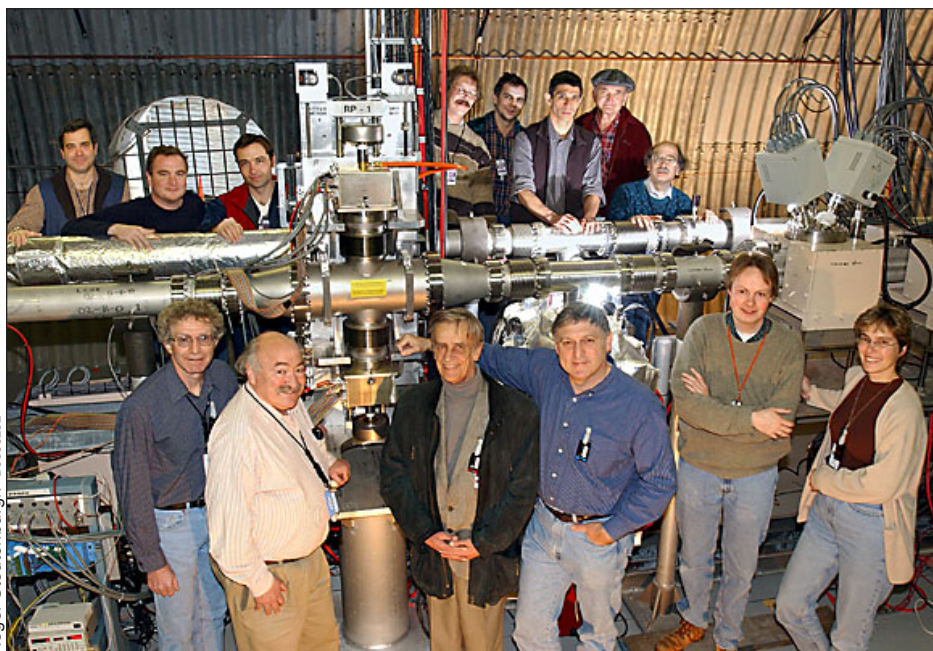
BNL "SNO-men" (from left) Richard Hahn, Min-fang Yeh, and Zheng Chang of the Chemistry Department are looking at photomultiplier tubes similar to those used in the SNO detector.



Roger Stoutenburgh DS1 0402

Successful First Run of RHIC's 'Fifth Experiment' Polarized Proton-Proton Elastic Scattering: Highest Energy Results Obtained at RHIC

pp2pp to Probe 'Pomeron' Exchange, Make 'Normalization' Measurement



Roger Stoutenburgh DS5 0202

Standing by one of the Roman pot stations of the pp2pp elastic scattering experiment at RHIC are some of its collaborators: (background, from left) Charles Pearson, BNL; Dave Lynn, BNL; Nevzat Guler, University of Texas at Arlington; Dimitri Svirida, ITEP, Russia; Janusz Chwastowski, Institute of Nuclear Physics, Cracow, Poland; Adam Rusek, BNL; Bob Chrien, BNL; Steve Tepikian, BNL; (foreground, from left) Ron Gill, BNL; Mark Sakitt, BNL; Vadim Kanavets, ITEP, Russia; pp2pp Spokesperson Wlodek Guryn, BNL; Stephen Bueltmann, BNL; and Angelika Drees, BNL.

Although it has been called the "fifth experiment" at the Relativistic Heavy Ion Collider (RHIC), the original letter of intent to develop and build it was the very first to be submitted to the Lab, back in November 1990.

And, although the reason for RHIC's existence is to collide heavy ions at relativistic speeds in the attempt to create quark-gluon plasma for nuclear physics research, the fifth experiment requires spin-polarized protons to be collided at high energies within RHIC (see Bulletin of March 29, 2002). Its purpose is to study long-range nuclear interactions of interest to nuclear and particle physicists, and to provide a precise measurement necessary for the analysis of the four other experiment's heavy-ion data.

The "Total and Differential Cross Sections and Polarization Effects in Proton-Proton Elastic Scattering at RHIC" experiment — or pp2pp as it is known — waited in the wings until last November, when it became the last of RHIC's approved experiments to be commissioned during RHIC's first polarized-proton run. Over the three-month performance, the pp2pp experiment became fully operational within the first 60 days before taking center stage at the end of January.

Then, on the last day of the polarized proton run, pp2pp took its first physics data at 200-GeV

(continued on page 2)

April 30 Symposium Celebrates RHIC Spin Physics, the RIKEN BNL Collaboration

On Tuesday, April 30, the successful collisions of polarized protons at the world's highest energy ever, and the start of the spin-physics program at the Relativistic Heavy Ion Collider (RHIC) will be celebrated when Japan's Minister of Education & Science, Atsuko Toyama; Member of the Japanese House of Councilors, Akito Arima; and President of the Japanese Institute of Physical & Chemical Research known as RIKEN, Shun-ichi Kobayashi, visit BNL.

One of the day's highlights will be the signing of a memorandum of understanding to extend the existing spin-physics collaboration for another five years. This collaboration includes the RIKEN BNL Research Center (RBRC) at BNL. Established with an initial \$2-million provision from RIKEN in 1997 for the study of spin physics at RHIC, RBRC is directed by T.D. Lee of Columbia University, who was awarded the 1957 Nobel Prize in physics for theoretical work done while at BNL in 1956. RBRC's Deputy Director is BNL Distinguished Senior Scientist and former BNL Director Nicholas Samios.

The visitors will also tour RHIC, the PHENIX experiment, and the RBRC super-computer, and attend a special symposium to celebrate the occasion.

All the Lab community is cordially invited to the symposium, which will be held in Berkner Hall from 1:30 to 5 p.m. Organized by Special Assistant to the Director Satoshi Ozaki and chaired by Lee and RBRC Associate Director Hideto En'yo, the symposium will be opened by Arima, Samios, and Peter Rosen, Associate Director, High Energy & Nuclear Physics, in DOE's Office of Science. Talks will be given by, among others, Robert Jaffe, Massachusetts Institute of Technology; Waldo Mackay, BNL; Naohito Saito, Kyoto University, Japan; and Kazuyoshi Kurita, Rikkyo University, Japan.

Also Coming Up Pegrarn Lectures, May 13, 14 & 15

All are welcome to three free talks on "Unfashionable Thoughts About Science and Technology," by Freeman Dyson, on May 13, 14, and 15, at 4 p.m. in Berkner Hall. See Calendar, page 3, and next week's Bulletin for more information.

Calendar of Laboratory Events

- The BERA Sales Office is located in Berkner Hall and is open weekdays from 9 a.m. to 3 p.m. For more information on BERA events, contact Andrea Dehler, Ext. 3347; or M. Kay Dellimore, Ext. 2873.
- Additional information for Hospitality Committee events can be found at the Lollipop House and the laundry in the apartment area.
- The Recreation Building (Rec. Bldg.) is located in the apartment area.
- Contact names are provided for most events for more information.
- Calendar events flagged with an asterisk (*) have an accompanying story in this week's Bulletin.

— EACH WEEK —

Mondays: BNL Gospel Choir

5:15-7 p.m., Berkner Hall. www.bnl.gov/bera/activities/choir/.

Mon., Tues., & Thurs.: Kickboxing

\$5 per class. Mon. & Thurs. noon-1 p.m. in the gym; Tues., 5:15-6:15 p.m. in the gym; Thurs., 5:15-6:15 p.m. in Brookhaven Ctr. Registration is required. Mary Wood, Ext. 5923, or wood2@bnl.gov.

Mon., Tues., & Fri.: Tai Chi

Noon-12:45 p.m., Rec. Bldg. Scott Bradley, Ext. 5745, bradley@bnl.gov.

Mondays & Wednesdays: English for Speakers of Other Languages Classes

Beginner, Intermediate, and Advanced classes. Various times. Learn English, Make friends. Jen Lynch, Ext. 4894.

Tuesdays: Welcome Coffee

10-11:30 a.m., Rec. Bldg. Hospitality event. Come and meet friends. The first Tuesday of every month is special for Lab newcomers and leaving guests. Hospitality Chair Mimi Luccio, 821-1435.

Tuesdays: Toastmasters

Meetings are 1st and 3rd Tuesday of each month at 5:30 p.m. in Bldg. 463, Room 160. Guests, visitors always welcome. www.bnl.gov/bera/activities/toastmasters/default.htm.

Tuesdays & Thursdays: Aerobics

5:15-6:30 p.m., \$4 per class. Rec. Bldg. Pat Flood, Ext. 7886.

Tuesdays & Thursdays: Aqua Aerobics

5:15-6:15 p.m., \$2 pool fee per class or use pool pass. Mary Wood, Ext. 5923.

Wednesdays: On-Site Play Group

9:30-11:30 a.m., Rec. Bldg. Parents meet while children play. Monique de la Beij, 399-7656.

Wednesdays: BNL Music Club

noon, North Room, Brookhaven Center. Come hear live music. Joe Vignola, Ext. 3846.

Wednesdays: Weight Watchers

noon-1 p.m., Brookhaven Center South Room. Mary Wood, Ext. 5923, wood2@bnl.gov.

Wednesdays: Yoga Practice

noon-1 p.m., Rec. Bldg. Free. Ila Campbell, Ext. 2206.

Wednesdays: Stretch

5:15-6:15 p.m., \$4 per class. Rec. Bldg. Pat Flood, Ext. 7886.

Wednesdays: BNL Ballroom, Latin & Swing Dance Club Lessons

5-9 p.m., North Ballroom, Brookhaven Center. Register now for series 4 classes. Ballroom dance social: 5/18. Marsha Belford, belford@bnl.gov or Ext. 5053, or www.bnl.gov/bera/activities/dance.

Thursdays: Falun Dafa Class

noon-1 p.m., Free. Rec. Bldg. Falun Dafa refines the body and mind through exercises, meditation. www.falundafa.org.

Fridays: BNL Social & Cultural Club

7-11:30 p.m., Brookhaven Ctr., dance social. Rudy Alforque, Ext. 4733, rudy@bnl.gov.

— NEXT WEEK —

Tuesday, 4/30

VoiceStream Wireless Demo

10 a.m. - 2:30 p.m., Berkner Hall. Special rates will be presented to BNLers on VoiceStream's wireless network. Richard Goll, (516) 343-5900.

Workshops: Cholesterol & Hypertension

Cholesterol workshop: 11:30 a.m.-12:15 p.m. Bldg. 490, small Conference Room. Participants must register in advance to have blood work done prior to the workshop.

Hypertension workshop: 12:30-1:15 p.m. Bldg. 490, small Conference Room. Topics will include nutritional foods, healthy dining out, easy cooking, travel monitoring for success. Program will be facilitated by a registered dietitian. For registration information, contact Mary Wood, Ext. 5923, wood2@bnl.gov.

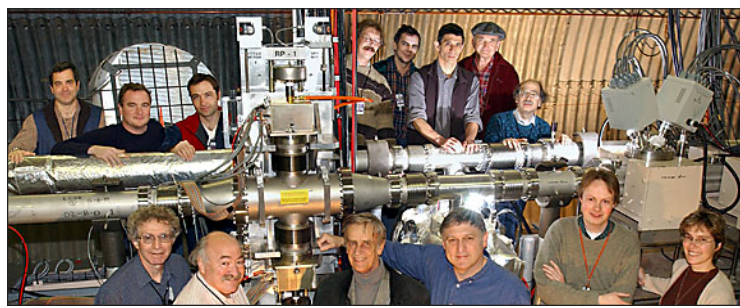
— WEEK OF 4/29 —

Wednesday, 5/1

Scharff-Goldhaber Prize Ceremony

4 p.m., Large Seminar Room, Bldg. 510. BNL Distinguished Scientist Maurice Goldhaber will present the 2002 Scharff-Goldhaber Prize to Yiing-Rei Chen, Stony Brook University, who will give a short talk on "Prediction of the Formation and Mid-Gap Features of Spin-Lattice Polarons in Electron-Doped CaMnO_3 ". Given in honor of Gertrude Scharff-Goldhaber, BNL's first woman Ph.D., this annual prize is administered by Brookhaven Women in Science. Refreshments follow the

Polarized Proton Elastic Scattering (cont'd.)



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center-of-mass energy and an estimated 25-percent beam polarization — a world record. The pp2pp experiment now also holds the energy record for data from unpolarized proton-proton elastic scattering events.

In spin-polarized proton beams, a percentage of the protons have their "spin," or intrinsic angular momentum, aligned in the same direction. The goal for future RHIC runs is to have polarized protons with center-of-mass energies of up to 500 GeV and up to 70 percent polarization. The accelerator hardware that makes colliding polarized protons at RHIC possible has been provided largely by the Japanese Institute of Physical and Chemical Research, known as RIKEN, which is also sponsor of the on-site RIKEN-BNL Research Center.

"That one day of running was the culmination of ten years of thorough preparation and hard work by this collaboration," says pp2pp spokesperson Wlodek Guryń of BNL's Physics Department.

While more than 20 pp2pp collaborators worked shifts over the three-month commissioning, which ran non-stop through Christmas and the New Year, "We could not have accomplished what we did without the assistance from the Physics Department staff who helped to build this experiment, and the cooperation of the accelerator physicists and other Collider-Accelerator (C-A) Department staff who made the polarized-proton run possible," adds Guryń.

The pp2pp experiment is funded by the Division of Nuclear Physics in DOE's Office of Science, as well as the Division of Nuclear Physics in the National Science Foundation's Math & Physical Sciences Directorate.

A total of 27 physicists from eight institutions in five countries are involved in pp2pp. Besides Guryń, those whose names were on the original letter of intent who are still working on the experiment include BNL Senior Physicist Mark Sakitt, and Michael Rijssenbeek, a professor of physics at Stony Brook University.

Other BNLers and Lab-based guests working on the experiment include: Stephen Bueltmann, I-Hung Chiang, Bob Chrien, Angelika Drees, Ron Gill, Nevzat Guler, Dave Lynn, Charles Pearson, Phil Pile, Adam Rusek, Steve Tepikian, and Susan Yeung.

Game of Billiards

Whether gold ions or protons are used at RHIC, there are always two types of particle collisions happening — elastic and inelastic — based on whether or not the particles emerging after a collision are, respectively, intact or not. A common example of an elastic collision occurs during the usual game of billiards: when the cue ball hits one or more balls, they are deflected, or scattered, but do not break apart.

While the new particles emerging from inelastic scattering of gold ions are the objects of intense scrutiny by the other four RHIC experiments, pp2pp is investigating elastic scattering of protons, to study how these particles interact at relatively long range via the nuclear, or strong, force.

The reason that pp2pp is performing elastic scattering at higher and higher collision energies and with polarized and unpolarized protons is to study how the mechanism, or exchange process, involved in proton recoil after an elastic collision depends on, respectively, proton energy and spin.

In addition, "Proton-proton data from the pp2pp experiment at RHIC will complement existing proton-antiproton data, allowing us to test implicit assumptions that there is no difference between proton-proton and proton-antiproton elastic scattering at high energies," explains particle-physics theorist Sandy Donnachie, University of Manchester, England.

Pomeron Exchange

When two protons scatter elastically, what is hypothesized to be exchanged is something called a pomeron.

For elastic scattering, the pomeron is a proposed carrier of the nuclear force, which is one of the four basic forces of nature and is the short-range "strong" force responsible for binding protons and neutrons within the atomic nucleus.

"The pomeron offers a simple and elegant explanation of high-energy elastic scattering, but we still don't know exactly what it is," explains Guryń.

Regardless, comments Donnachie, "The pp2pp experiment is allowing us to investigate the effect of multiple pomeron exchange, which is important as there is no consensus in our field on whether pomerons make a large or small contribution to the total cross section at the energies now available."

The theorist adds, "This contribution is important because it impacts directly on the interpretation of the pomeron in terms of quantum chromodynamics," or QCD, which is the theory of the strong interactions among quarks.

Cross Sections

To look for evidence of pomeron exchange, the pp2pp experiment makes exact measurements of proton-proton "total and differential cross sections."

Differential cross sections are distributions, or the rates of scattering, of particles at different angles after collision. From those, the total cross sections are derived, which measure the effective area in which the particles collide.

Guryń and his colleagues want to know if the proton-proton cross sections change as the center-of-mass energy increases — and if that change can be

PHENIX Armed for Tracking Muons (cont'd.)

the quest to understand how protons get their spin.

If quark-gluon plasma is created in heavy ion collisions, fewer J/psi particles are expected to survive the hot, dense conditions long enough to decay into muons than would be expected if the plasma did not form. So, counting muons and determining whether they came from J/psi particles will give physicists an indication of whether they have created the elusive plasma.

Physicists at CERN, the European laboratory for particle physics, reported such a deficit of J/psi particles during heavy-ion experiments at much lower collision energies than have been achieved at RHIC. Measurements at RHIC will therefore be crucial for understanding the underlying physics.

In the spin program, J/psi particles may be formed from collisions between individual gluons within the colliding protons. The experiments may help scientists understand this mechanism, and the number of J/psi particles produced might help to determine the spin orientation of the colliding gluons.

Finally, detection of muons both north and south of the collision zone will allow scientists to detect both W and Z bosons. This is another class of particles that will help to reveal the spin direction of the antiquarks within colliding protons — which has never been accessible before — and which may also help to unravel the proton spin puzzle.

"These experiments would not have been possible without the south muon arm," Taketani said. He and the rest of the muon

explained by pomeron exchange. As Gurin explains, "We are aiming for an error of less than one percent, to obtain data precise enough to test the pomeron hypothesis properly at the higher energies now available at RHIC."

Also, by making these measurements with both polarized and unpolarized protons, pp2pp is attempting to distinguish what are called the spin dependent and spin-independent phenomena involved in pomeron exchange.

In addition to looking into QCD physics, the proton-proton total cross sections measured by the pp2pp experiment will allow the four heavy-ion experiments at RHIC to "normalize" their heavy-ion data with respect to proton-proton data.

In other words, this will help the heavy-ion experiments to differentiate between the nuclear effects in heavy-ion interactions versus those due to proton-proton interactions.

Roman Pots

To make these measurements, the pp2pp collaborators built



Atsushi Taketani is seen in front of the muon identifier (see box).

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How the muon arm works

The south muon detector has three parts: 1) The large green magnet arm, which causes the paths of charged particles to curve in the magnetic field. 2) The detector inside the arm measures the degree of deflection to separate positive from negative particles and measure momentum. 3) Five layers of muon identifier detectors alternating with steel absorber panels show which of the charged particles are indeed muons. Only muons can penetrate all the layers to reach the rearmost detector panel. Then, by tracing the tracks back through the detector arm, scientists can measure each muon's momentum vector and charge.

arm team — 200 scientists from 30 institutions in the U.S., Japan, France, South Korea, China, Russia, and India — are "looking forward to collecting more data and seeing where the physics takes us."

— Karen McNulty Walsh

their experiment near the BRAHMS heavy-ion experiment at 2 o'clock on the RHIC ring.

What differentiates the fifth experiment's setup from the other four RHIC detectors are vessels called Roman pots. Designed in C-A and fabricated in the Central Shops Division, each of the now four and soon-to-be eight Roman pots holds four high-resolution silicon detectors, which were designed and fabricated in BNL's Instrumentation Division. The Roman pots allow these detectors to be moved in and out of a beam pipe.

During the commissioning run, pp2pp performed beyond expectations, thanks to the interplay of experimenters and accelerator physicists. The outcome of this was that the experiment was given an extra six hours of run time while the collider operated at the special "tune" that the experiment required.

The result: data were collected on one million events, approximately half of which are elastic and are now being analyzed. — Marsha Belford

SNO Storms Solar Puzzle

(cont'd.)

Chemistry Department and announced the SNO results at the Lab. Hahn's group members who participated in this work include: John Boger, now at DOE; Minfang Yeh and Zheng Chang, both of Chemistry; and Keith Rowley, now retired.

Funded by the DOE's Office of High Energy & Nuclear Physics in the Office of Science, BNL's main role in the experiment is to ensure that SNO's heavy water (D₂O), a critical part of the neutrino detector, and the surrounding light water (H₂O) remain ultrapure, both chemically and in terms of naturally occurring radioactive contaminants, and unaffected by environmental factors.

SNO uses the unique properties of heavy water, where the hydrogen has an extra neutron in its nucleus, to detect not only electron-neutrinos through one type of reaction, but also all three known neutrino types through a different reaction.

The results presented on April 19 at the Joint American Physical Society/American Astronomical Society meetings in Albuquerque, New Mexico, show that the number of electron-neutrinos observed is only about one-third of the total number reaching Earth. This demonstrates unambiguously that electron-neutrinos emitted by the Sun have changed to muon- or tau-neutrinos before they reach Earth.

As Andre Hamer of Los Alamos National Laboratory said at the meeting, "In order to make these measurements, we had to restrict the radioactivity in the detector to minute levels and determine the background effects very accurately, to show clearly that we are observing neutrinos from the Sun. The care taken throughout this experiment to minimize radioactivity and the careful calibration and analysis of our data enabled us to make these neutrino measurements with great accuracy."

In June 2001, results from the detection of electron-neutrinos in SNO first indicated, with a certainty of 99.9 percent, that neutrinos change type on their way from the Sun, thus solving the long-standing problem. However, these conclusions were based on comparisons of results from SNO with those from a different experiment, the Super-Kamiokande detector in Japan.

The new results, obtained entirely from SNO, are so accurate that it is 99.999 percent probable that solar neutrinos change type before reaching Earth. The results, which have been submitted to *Physical Review Letters*, are of great importance because the way in which the neutrinos, for many years believed to be massless particles, change types is thought to be linked to neutrino mass and mass differences between various neutrino types.

Said Hamish Robertson, University of Washington, "It was a dramatic moment when we first saw the neutrons being produced by this type of neutrino interaction and realized there were three times as many as you would get if only electron neutrinos were coming from the Sun. There's absolutely no question the neutrino type changes and now we know quite precisely the mass differences between these particles." Hahn agreed. "These results are exciting because they demonstrate the full potential of the SNO neutrino detector," he said. "All the collaboration's hard work over many years is really paying off now."

Collaborating institutions on the SNO experiment are, from Canada: Queen's University, Carleton University, Laurentian University, University of Guelph, University of British Columbia, Chalk River Laboratories (until 1996); from the U.S.: Lawrence Berkeley National Laboratory, Los Alamos National Laboratory, University of Pennsylvania, University of Washington, Brookhaven National Laboratory, Princeton University (until 1992), University of California at Irvine (until 1989); and from the U.K.: Oxford University. For more information about SNO, go to <http://www.sno.phy.queensu.ca/>.

**Not for Retirees Only
Federal Occupational-Illness Compensation**

The Energy Employees Occupational Illness Compensation Program Act, which went into effect on July 31, 2001, provides \$150,000 in lump-sum compensation, as well as related medical expenses, to workers who are seriously ill or died from exposure to beryllium, silica, or radiation while working for DOE or its contractors and subcontractors.

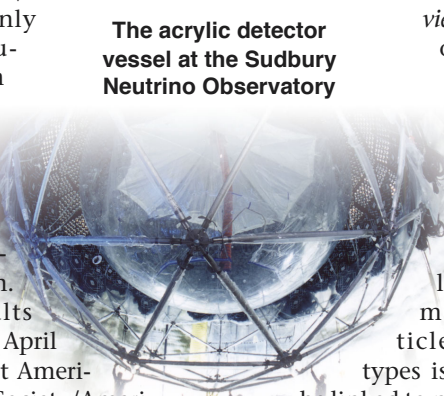
Diseases covered include cancer caused by radiation, chronic beryllium disease, and chronic silicosis. Medical monitoring is provided for workers with beryllium sensitivity.

In December 2001, Congress enacted legislation that broadens the eligibility requirements for children of affected workers. The amendment now changes the definition of survivor to include adult children.

The Department of Labor is processing claims for compensation and medical benefits and has primary responsibility under the law. Those filing claims work with other agencies as follows:

- DOE's Office of Worker Advocacy helps workers file state workers' compensation claims and list facilities where workers were exposed.
- The Department of Health & Human Services establishes guidelines for estimating radiation doses and the likelihood that they caused a worker's cancer, and estimate radiation doses when necessary.

Information packets, including claim forms, are available from Jack Ellerkamp, Safety & Health Services Division, Bldg. 129, Ext. 7493, ellerkamp@bnl.gov. Claim forms are also available on the Department of Labor's web site at www.dol.gov, or may be obtained by contacting an Energy Employees Compensation Resource Center. The nearest location is Portsmouth, Ohio, which may be reached via the toll-free phone number: 1-866-363-6993.



The acrylic detector vessel at the Sudbury Neutrino Observatory

Symposium Honors Richard Watson

**Friday, May 3, 2 p.m.
Large Seminar Room
Physics Building, 510**



Richard Watson in 1979

To honor the Physics Department's Richard Watson and his contributions to understanding the electronic and magnetic structure of various metals and alloys, a symposium will be held on Friday, May 3, in the large seminar room, Physics Bldg. 510, from 2 p.m.

The agenda includes 30-minute talks by: Larry Bennett, National Institute Standards & Technology; Michael Weinert, University of Wisconsin; Malcolm Stocks, Oak Ridge National Laboratory; Gayanath Fernando, University of Connecticut; and Jan

Herbst, General Motors Corporation.

At 6 p.m., a piano concert will be given in Berkner Hall by Sam Carr, to be followed by a reception in the lobby with a cash bar, and dinner at 7:30 p.m., with remarks by Martin Blume, American Physical Society and BNL.

For more information or to attend the reception and dinner, contact Sharon Smith, Ext. 3995 or slsmith@bnl.gov, by Wednesday, May 1.



**Noon Recital, 5/1, Seminar Room, Bldg. 463
Music of the Renaissance and Baroque Periods**

Tenor James Brown and lutenist James Smith will introduce and perform music of the Renaissance and Baroque periods, from Italy, Germany, and England.

Brown has sung in three opera premieres and in two Monteverdi operas including *Poppea*, recently staged at Stony Brook University, in which he sang the role of Nero. Other opera credits include the Tulsa Opera, New Orleans Opera, and the Opera Company of Philadelphia. He is an enthusiast of early music and has devised a program to illustrate the wealth of early repertoire for voice and lute.

James Smith is a member of the New York Continuo Collective and of the New York Baroque. He teaches at the Tilles Center's Arts and Culture Institute, and is currently a doctoral student in early music performance at Stony Brook. Smith will play the lute and its bass relative, the chitarrone-fore-runner of the bass guitar.

The recital by pianist Eric Sun, originally scheduled for this date, has been postponed owing to closure of the Berkner Hall Auditorium stage for emergency repair work.

Alzheimer's Study

Mounting evidence indicates that plaque formation in the brain is an early marker for the development of Alzheimer's disease. A study is planned at the Positron Emission Tomography (PET) Facility on site to see if PET imaging can detect plaque formation in the brain at very early stages.

The goal is to have a predictive marker that can be used to determine whether new therapies are effective against disease progression.

For part of this study, normal, healthy volunteers, 55 to 85 years of age, will be recruited. These volunteers will need to be medicated for two weeks with a memory-enhancing drug commonly used in treating Alzheimer's, in order to see if this drug interferes with the PET measurement. For more information, contact Naomi Pappas, Ext. 5015.

**One-on-One
Retirement Planning**

The Vanguard Group invites you to spend 30 minutes one-on-one with a licensed Vanguard representative at the Lab to talk about financial issues. Meet with a representative from 9 a.m. to 5 p.m. on Wednesday, May 22.

You may learn about: investing for long-term goals such as retirement; selecting funds for your savings; and making the most of the services and investment tools available to you.

Schedule your 30-minute session by calling Vanguard, 1-800-662-0106, Ext. 69000.

Arrivals & Departures

Arrivals

Hong Piao Chemistry

Departures

Lars Ewell Physics
Peter Louie NSLS
Thomas Yanuklis Physics

Badging, Vehicle Registration: New Hours

**Mondays & Wednesdays 8:30 a.m.-5 p.m.
Tues., Thurs., & Fridays 8:30 a.m.-1 p.m.**

Beginning Monday, April 29, the Badging & Vehicle Registration Office at Bldg. 30 will be open from 8:30 a.m. to 5 p.m. on Mondays and Wednesdays, and from 8:30 a.m. to 1 p.m. on Tuesdays, Thursdays, and Fridays. The Safeguards & Security Division made these changes to consolidate resources and facilitate new operational needs.

If you have any questions or need badging assistance in an emergency, contact the Badging Office, Ext. 8451 or 5149.

Calendar

(continued)

presentation.

Thursday, 5/2

Cycletrons Motorcycle Club Meeting
4:45 p.m., Brookhaven Center. For more information, contact Frank Dusek, Ext. 2022, or visit www.mcycle.bnl.gov.

BERA Bridge Club
7 p.m., Berkner Hall Cafeteria. Morris Strongson, Ext. 4192, mms@bnl.gov.

— WEEK OF 5/6 —

Friday, 5/10

***BERA Spring Fling**
6:30 p.m.-midnight at the Rockhill Country Club. \$15 per person includes hot and cold buffet and music by DJ Johnny. There will also be a 50/50 raffle and a cash bar. Purchase tickets at the BERA Sales Office, weekdays from 9 a.m. to 3 p.m. or from Laurie Pearl, Ext. 5520, Louie Nieves, Ext. 4897, or John McCaffrey, Ext. 2075.

Saturday, 5/11

***Atlantic City Bus Trip**
\$24 per person, over 17 yrs. only, \$10 cash back. Bus to the Showboat Hotel departs Brookhaven Center at 8 a.m., returns at 11 p.m. Tickets available at the BERA Sales Office, Berkner Hall, 9 a.m. to 3 p.m. Andrea Dehler, Ext. 3347, or M. Kay Dellimore, Ext. 2873.

— WEEK OF 5/13 —

Mon. - Wed. 5/13-15

Pegram Lecture Series
Physicist and prize-winning author Freeman Dyson will explore "Unfashionable Thoughts About Science and Technology" in three talks. These free talks will be given at 4 p.m. in Berkner Hall. All are welcome.

Monday, 5/13

Pegram Lecture
4 p.m., Berkner Hall. Freeman Dyson will present "Thought Experiments: Exploring the Limits of Quantum Mechanics." This talk is primarily intended for physicists. All are welcome.

Tuesday, 5/14

Pegram Lecture
4 p.m., Berkner Hall. Freeman Dyson will present "Looking for Life in Unlikely Places." This talk is designed to be presented to a general audience with some knowledge of astronomy. All are welcome.

Wednesday, 5/15

Pegram Lecture
4 p.m., Berkner Hall. Freeman Dyson will present "World Economic Forum Debates: The Future of Science & Technology." This talk is geared toward a general audience. All are welcome.

Thursday, 5/16

Celebration of Nicholas Samios' 70th Birthday

All are invited to attend a symposium organized by BNL in celebration of the 70th birthday of BNL Distinguished Senior Physicist Nicholas Samios, former Laboratory Director. The program will be held in Berkner Hall and will include a full day of talks followed by a reception and dinner. See www.bnl.gov/bnlweb/samios70.htm.

BAC Meeting
12:30-1 p.m., Berkner Hall, Room C. Brookhaven Advocacy Council Meeting, Open Session. www.bnl.gov/bac.

BERA Bridge Club
7 p.m., Brookhaven Ctr. South Room. Morris Strongson, Ext. 4192, mms@bnl.gov.

Saturday, 5/18

BNL Ballroom, Latin & Swing Dance Club: 10th-Anniversary Celebration Social

8 p.m.-midnight, special evening of contemporary ballroom, hot Latin, and retro swing. 10:30 p.m. awards ceremony. Marsha Belford, belford@bnl.gov or Ext. 5053.

— WEEK OF 5/20 —

Monday, 5/20

IBEW Meeting
6 p.m., Knights of Columbus Hall, Railroad Ave., Patchogue. A meeting for shift workers will be held at 3 p.m. in

Note: This calendar is updated continuously and will appear in the Bulletin whenever space permits. Submissions must be received by the preceding Friday at noon to appear in the following week's Bulletin. Please enter the information for each event in the order listed above (date, event name, description, and cost) and send it to bulletin@bnl.gov. Write "Bulletin Calendar" in the subject line.

Editorial Position
Physical Review E

AN ALTERNATIVE SCIENCE CAREER: *Physical Review E* seeks a dynamic and personable colleague to join its editorial staff in Ridge, New York (near Stony Brook and Brookhaven). Duties will include participation in all aspects of the peer-review process by which manuscripts are selected for publication. Candidates should possess a Ph.D. in physics, an excellent command of written and spoken English, and familiarity with research publication. Postdoctoral experience is desirable. No prior editorial experience is required for this entry-level position — we train all new editors to develop the necessary skills. As experience is gained, this position will evolve into independent responsibility for a subset of submitted manuscripts. We offer career stability, a competitive salary, and an outstanding benefits package to a qualified individual ready to start a non-traditional career in physics. Send your resume plus cover letter containing salary requirements and timetable of availability to: Joseph Ignacio, Director of Human Resources American Physical Society, One Research Road, Box 9000 Ridge, NY 11961; e-mail: edresumes@aps.org; or fax: 631-591-4155. For general information about the American Physical Society and its journals, see www.aps.org.

Classified Advertisements

Placement Notices

The Lab's placement policy is to select the best-qualified candidate for an available position. Candidates are considered in the following order: (1) present employees within the department/division and/or appropriate bargaining unit, with preference for those within the immediate work group; (2) present employees within the Laboratory; and (3) outside applicants. In keeping with the Affirmative Action Plan, selections are made without regard to age, race, color, religion, national origin, sex, disability or veteran status. Each week, the Human Resources Division lists new placement notices, first, so employees may request consideration for themselves, and, second, for open recruitment. Because of the priority policy stated above, each listing does not necessarily represent an opportunity for all people. Except when operational needs require otherwise, positions will be open for one week after publication. For more information, contact the Employment Manager, Ext. 2882; call the JOBLINE, Ext. 7744 (344-7744), for a list of all job openings; use a TDD system to access job information by calling (631) 344-6018; or access current job openings on the World Wide Web at www.bnl.gov/HR/jobs/default.htm.

OPEN RECRUITMENT — Opportunities for Laboratory employees and outside candidates. TB3080. PLUMBER A (reposting, term appointment) — Under minimum supervision lays out, constructs or installs, repairs, and maintains water and gas distribution systems, related facilities, and auxiliary equipment and equipment utilizing water, gas and heat distribution services. Plant Engineering Division.

TB3082. ELECTRICIAN — Under minimum supervision, lays out, constructs, installs, maintains, repairs and operates (in accordance with the national electrical codes, or as otherwise directed), electrical systems, equipment, controls and related devices. May be required to perform similar duties on other than maintenance division equipment and facilities. Plant Engineering Division

TB2327. PRINCIPAL TECHNICIAN (TW-4, term appointment, ERAP eligible - \$500.) — Requires a bachelor's degree in a physical science (physics, chemistry, engineering), or equivalent experience, excellent communication skills and a demonstrated ability to learn to operate complex apparatus and computer software. Experience in the operation of UNIX computer operating systems, electromechanical debugging and troubleshooting is desirable. Under minimum supervision will assist users of the NSLS in the execution of x-ray diffraction experiments. Additional responsibilities include the maintenance and repair of apparatus, as well as the performance of routine computer operations. National Synchrotron Light Source Department.

Car Rentals With On-Site Convenience

New BNL Enterprise Rent-a-Car Office, Bldg. 355



Roger Stoutenburgh B57569402

Pictured with several of the vehicles which are now available for rent at the new on-site Enterprise Rent-a-Car Office are: (from left) Enterprise Representative Tammy Southard, BNL Travel and Transportation Supervisor Sylvia Mouzakes, and Enterprise Representative Michael Reynolds.

Through a pilot program between Enterprise Rent-a-Car and BNL, an Enterprise office opened on site on April 3. BNLers may rent a wide variety of vehicles, ranging from compact cars such as the Chevy Cavalier and Toyota Corolla, to small or large 4x4s, luxury cars, minivans, and cargo vans.

"This pilot program with Enterprise was arranged to enhance the quality of life for all on-site residents, guests, and employees of the Laboratory who do not have any means of transportation," said Sylvia Mouzakes, Travel & Transportation Supervisor in the Staff Services Division.

Many residents arrive at the Lab by limo or taxi, Mouzakes explained. "So, having vehicles available for full-day and partial-day rentals allows residents to expand their travel beyond the BNL site boundaries."

Located in Bldg. 355, next to Bldg. 179 on Brookhaven Avenue, the Enterprise office gives BNLers discounted rates on car rentals whether the car is being rented for a business trip or for a weekend getaway. (See rental rates in box at right.) BNLers are encouraged to make reservations well in advance to ensure that a vehicle will be available.

"We are very pleased that this new service is now available," said Mouzakes. "Opening an on-site car-rental facility has been a Transportation Office objective since fiscal year 2000. With the support of the Quality of Life Steering Committee, the Procurement & Property Management Division, and the DOE Area Office, the Transportation Office was able to move this project to completion."

For more information, or to make reservations, contact Enterprise at Ext. 4888 or Ext. 4889. BNLers can also go to the Enterprise Website, www.Enterprise.com, and use the BNL corporate ID number, FX0019 when making reservations, to receive discounts on rental cars all over the United States.

Enterprise Car Rental Rates

Vehicle	Daily ^{1,2}	Weekly ¹	Monthly ¹
Subcompact	35.65	215.53	649.99
Compact	37.65	225.54	699.99
Intermediate	39.65	235.48	749.99
Full-Size	44.65	275.52	799.99

Partial-Day Rates¹

Hours are from 11 a.m. to 4 p.m. or from 4 p.m. to 9 a.m.
Compact - \$25 • Intermediate - \$30 • Full Size - \$35

¹ All rates are in U.S. dollars. Rates include unlimited free mileage for official BNL business. For unofficial rentals, unlimited free miles are restricted to New York, New Jersey, Connecticut, Delaware, Maryland, District of Columbia, and Massachusetts. All other destinations are restricted to 200 free miles per day with a 20 cents per mile charge thereafter.

² Full-Day Vehicle Rates (24 hour day)

U.S. Open Tennis, 9/3

Some seats remain for a bus trip to the U.S. Open Tennis Championships at the National Tennis Center in Flushing, Queens, on Tuesday, September 3, 8:30 a.m.- 7:30 p.m. The cost of \$61 per person includes bus transportation and a ticket for the day session. Pay for reservations at the BERA Sales Office, Berkner Hall, 9 a.m.- 3 p.m.

Join BERA Golf

The BERA Golf Association is accepting applications for the 2002 league. For more information, call Jeff Williams, Ext. 5587, or visit www.bnl.gov/bera/activities/golf.

BERA Trips, Parties Spring Fling 5/10

More party-goers are invited to attend BERA's Spring Fling, Friday, May 10, at the Rock Hill Country Club, 6 p.m.-midnight. The cost is \$15 per person, which includes a hot and cold buffet and music by DJ Johnny; a cash bar is available. No tickets will be sold at the door, and a minimum number of tickets must be sold to have the party, so fling into ticket-buying now. Contact Andrea Dehler, BERA Sales, Ext. 3347; Laurie Pearl, Ext. 5520; Louie Nieves, Ext. 4897; or John McCaffrey, Ext. 2075.

Atlantic City, 5/11

To avoid cancellation, more participants are needed by April 30 for the Saturday, May 11 BERA bus trip to the Showboat Hotel and Casino on the Atlantic City boardwalk. The cost is \$24 per person, with a \$10 coin return, for people of 18 years or older only. The coach bus will depart BNL at 8 a.m. and return at approximately 11 p.m. On the bus will be movies, games, and free rolls or donuts, but bring your own beverages.

Bronx Zoo Trip

Join BERA's Bronx Zoo bus trip on Saturday, August 24. The cost of \$32 for adults and \$28 for children covers coach transportation and Zooventure tickets, which include: general admission, round-trip zoo shuttle, Bengali Express, Skyfari Cable car (one way) and the Children's Zoo. The bus will leave the Brookhaven Center at 8:30 a.m. and leave the Zoo at 4:30 p.m., returning to the Lab by about 6:30 p.m. Pay at the BERA Sales Office, Berkner Hall, weekdays, 9 a.m.-3 p.m.

Ride Needed

A BNL employee with a disability needs a ride from the Lab to Middle Island on Mondays at 12:30 p.m. If you are able to help, contact Lorraine Merdon, Diversity Manager, Ext. 3318.

BERA Off-Road Club

The Brookhaven Employees Recreation Association (BERA) has formed an Off-Road Club and is currently looking for BNLers who enjoy taking their four-wheel-drive vehicles off the road to beaches and parks for recreational activities such as barbecues, volleyball games, and other get-togethers. For more information, send an e-mail to borc@bnl.gov.