

New Machine Record for Heavy Ion Luminosity at RHIC

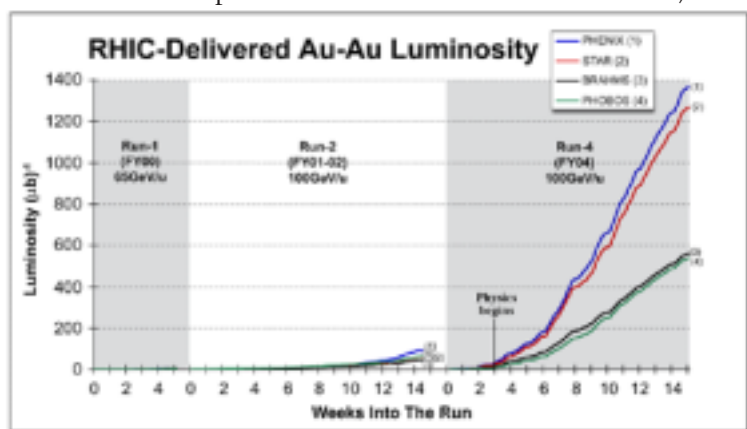
BNL's Relativistic Heavy Ion Collider (RHIC) has established a new machine record for heavy ion luminosity, well above its previous performance. Luminosity is an extremely important measure of a colliding-beam accelerator's performance.

Exceeding all expectations of the 1,000-plus international physicists working at RHIC, the record-breaking luminosity, or rate of particle interactions, was set during the most recent experimental run using gold ions, which lasted four months, from

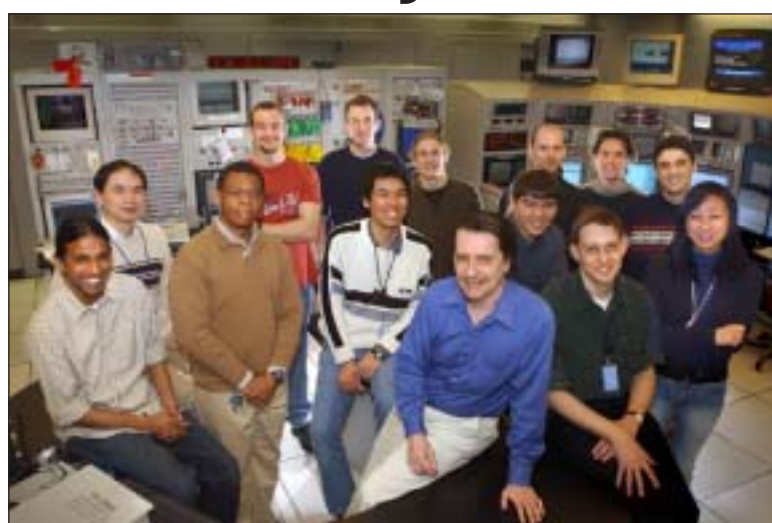
December 2003 until April 2004.

"The record luminosity performance is a direct reflection of the expertise of the designers, builders and operators of RHIC. This tremendous achievement supports the fact that the Collider-Accelerator Department ranks with the best accelerator organizations in the world," said Derek Lowenstein, Chair of the Collider-Accelerator Department (C-A), which operates a suite of facilities for accelerator-based experiments hosted by the Lab.

Funded by DOE's Office of Science and commissioned in 2000 as the world's highest energy heavy-ion collider, RHIC has so far run four times, with each period of operation lasting several months. During three of the four runs, including the one just completed, two beams of gold ions traveling in opposite directions at near the speed of light have been smashed into each other. The goal is to recre-



This graph shows the very sharp rise in the luminosity of the gold-ion beam collisions delivered to the four experiments, PHENIX, STAR, BRAHMS, and PHOBOS, at the Relativistic Heavy Ion Collider, during the run of fiscal year (FY) 2004, and in contrast to the runs of FY 2001-02 and FY 2000. In FY 2000 beams collided at 65 GeV/u (100 billion electron-volt per nucleon), in the later two runs at 100 GeV/u.



Roger Stoutenburgh D1430404

In the photo are some of the RHIC accelerator physicists and operators in the Main Control Room. They are: (from left) Rama Calaga, Haixin Huang, Lee Hammons, Travis Shrey, Andrew Meyer, Kin Yip, Brian Van Kuik, Thomas Roser, Todd Satogata, Christoph Montag, Wolfram Fischer, Rogelio Tomas, Ubaldo Irioso, and Mei Bai.

ate "quark-gluon plasma," an extremely dense state of matter thought to have last existed micro-seconds after the Big Bang.

Analyses of data from the earlier runs indicate that RHIC is, indeed, producing an extremely dense form of matter that has never been seen before. Whether or not it is the long-sought plasma of quarks and gluons freed from their confinement within the atomic nucleus remains to be determined. To make such a determination, experimenters need as much data on the events coming out of RHIC's gold-beam collisions as possible. So, the higher the rate of RHIC's particle interactions, the more data coming out of those collisions to support the quark-gluon plasma search.

Given the record-setting luminosity and its contribution to the run's success,

Extended Run

Roser explains that one of the goals of RHIC is to uncover the energy at which quark-gluon plasma first begins to emerge. To find this energy, RHIC was operated at two energies during the recent gold-on-gold run.

The first collisions of the run were with beams of 100-billion electron volts (GeV) per nucleon, or 200 GeV at the collision center. Energy that high is thought to be more than sufficient to generate quark-gluon plasma. Following the phenomenal luminosity achievements, the RHIC experimentalists requested that the run be extended by one week for lower energy collisions for comparison. DOE's Office of Science provided additional funding, so that data from the collision of gold ions with energy of only 31.2 GeV per nucleon, or 62.4 GeV at the collision center, could be obtained.

"The RHIC accelerator physicists agreed to tune the machine to a new beam energy with only a two day setup time," says Mark Baker, Deputy Spokesperson for the PHOBOS experiment, speaking for all RHIC experiments (BRAHMS, PHENIX, PHOBOS, and STAR). "They pulled it off brilliantly. This combination of high luminosity and flexibility to scientific needs is essential in order to really characterize the high density matter that has been created at RHIC."

— Marsha Belford

Attention to Detail Pays Off



Roger Stoutenburgh D1430404

Wolfram Fischer, seen in the Relativistic Heavy Ion Collider (RHIC) ring at one of the injection kickers that "kick" the beam coming from the Alternating Gradient Synchrotron accelerator onto the RHIC ring orbit.

- replacing the foil that divided incoming from circulating beam in the Booster, thereby increasing the intensity of the beam within the chain of accelerators feeding beam to RHIC
- minimizing the "electron cloud" that affected RHIC's vacuum, thereby increasing the lifetime of the beam within RHIC
- eliminating power-supply and other equipment problems that limited reliability

- improving computer-control systems to make operating various systems and the entire accelerator more efficient and effective.

Also, expecting that a greater number of particle collisions per second in a given beam area would be delivered over a longer time, the experiments had to make certain upgrades so that they could handle all the collisions.

Confident that their fixes would work, Roser and Fischer projected that RHIC's luminosity would reach 200-500 inverse micro-barns over the course of the run, while the experimenters expected 300 inverse micro-barns. Inverse micro-barns is a measurement of luminosity. The higher the number, the more data for

(continued on page 3)

"It was a successful team effort to bring about an assortment of small improvements — 5 percent here, 10 percent there — that all added up very nicely."
— Wolfram Fischer

sponsible for RHIC operations within C-A. "I believe that either quark-gluon plasma will be found to be there within the expected energy range, or that something even more interesting and unexpected will appear."

CFN Users' Meeting May 19-20

At the annual Center for Functional Nanomaterials (CFN) Users' Meeting, users will be able to make contacts, share results, and help to shape the operation and capabilities of the CFN. Talks by world-class nanoscientists, information on the CFN and how to apply for user time, and meetings with vendors will be included on the agenda. Wednesday, 5/19 - registration at Berkner Hall, 4 p.m.; vendor/poster session, 5-9 p.m. Thursday, 5/20 - registration from 7 a.m.; main meeting, 8:30 a.m.; talks, afternoon breakout sessions, open forum, 6 p.m.; vendor/poster session, followed by a banquet.

www.cfn.bnl.gov/user/meeting/

2004 NSLS Users' Meeting May 17-20

The National Synchrotron Light Source (NSLS) Annual Users' Meeting is a forum for reporting new research results and advances in experimental capabilities that utilize synchrotron radiation. The meeting includes workshops, invited talks, a poster session, and vendor exhibits.

- Monday, 5/17 - Berkner Hall - workshops, poster session, vendor and equipment exhibit, evening reception
- Tuesday, 5/18 - Berkner Hall - main meeting: talks, poster session, vendor and equipment exhibit, poster awards, banquet
- Wednesday, 5/19 - workshops
- Thursday, 5/20 - workshop.

The meeting and workshops are sponsored by the NSLS Users' Executive Committee (UEC), the NSLS, BNL, and vendor exhibitors and sponsors.

For details on registration, including check-in and voting for 2004/5 UEC members on Sunday, May 16, 4-7 p.m., list of workshops, talks, speakers, and full agenda, visit www.nsls.bnl.gov/users/meeting/.

2004 RHIC & AGS Annual Users' Meeting May 10-14

The Relativistic Heavy Ion Collider (RHIC) & Alternating Gradient Synchrotron (AGS) Annual Users' Meeting will include four days of topical workshops around a one-day plenary session, which is on Wednesday, 5/12. The plenary program will include: latest results from RHIC, AGS, and NASA Space Radiation Laboratory; reports from Washington, elections, awards, open forum meeting; thesis awards; poster session with prize for best student post-doc poster; and banquet. Workshops will be held on Monday and Tuesday, 5/10 & 11, and Thursday and Friday, 5/13 & 14.

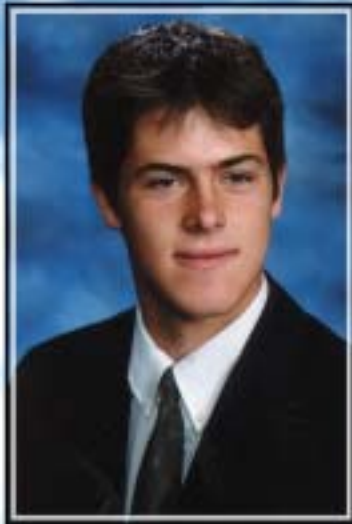
https://www.bnl.gov/rhic_ags/users_meeting/

2004 BSA Scholars

BSA has announced the 15 winners of the annual BSA Directors' Scholarships, which go to children of BNL employees in continuation of a tradition instituted at BNL 36 years ago. Each BSA Scholar is a high-school senior who will receive \$2,500 per year for up to four years of study at the college or university of his or her choice.



Deborah Alessi, the daughter of James Alessi of the Collider-Accelerator Department, attends Longwood High School. She will major in math or science at the State University of New York at Buffalo or Geneseo.

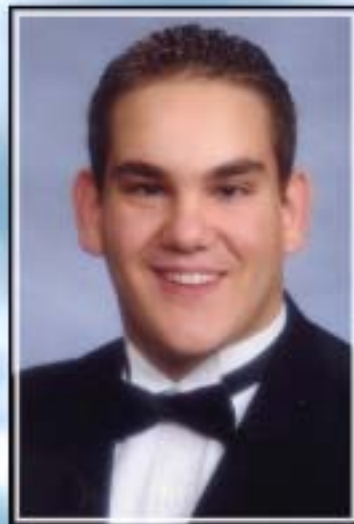


John Boucher, the son of Thomas Boucher of the Plant Engineering Division, attends Mattituck High School. He plans to attend Middlebury College or Colgate University to study biology.

Tamara Campbell, daughter of Mary Campbell, Collider-Accelerator Department, attends William Floyd High School. She plans a double major in art restoration and teaching at the State University of New York at New Paltz or Potsdam.



William Carroll, son of Stuart Carroll of the Plant Engineering Division, attends Longwood High School. He will major in mathematics at Boston University or New York University.



Andrew Davenport, the son of James Davenport, Center for Data Intensive Computing, attends Ward Melville High School. He will study history or biology at Amherst University, Brown University, or Duke University.



James Davis, son of Roger Davis of the Collider-Accelerator Department, attends Center Moriches High School. He plans to major in music and science at Bard College or the State University of New York at Stony Brook.



Michelle Louie, daughter of Wing Louie, Collider-Accelerator Department, attends Kings Park High School. She has decided to study medicine at George Washington University.



Maria Michta, the daughter of Richard Michta, National Synchrotron Light Source Department, attends Sachem North High School. She will major in molecular biology and genetics at Long Island University.



Antonia Fthenakis, the daughter of Vasilis Fthenakis of the Environmental Sciences Department, attends Half Hollow Hills High School East. She will study chemistry and medicine at George Washington University.



Ludmila Rehak, the daughter of Margareta Rehak, Collider-Accelerator Department, and Pavel Rehak, Instrumentation Division, attends Ward Melville High School. She will study biological sciences at Cornell University.



Michael Somma, the son of Leo Somma, Plant Engineering Division, is at Chaminade High School, Mineola. He will attend Brown University as a premedical student majoring in biology.



Lena Trbojevic, the daughter of Dejan Trbojevic, Collider-Accelerator Department, attends Knox School, St. James. Undecided as yet on her major, she will study at Sarah Lawrence College, Emerson College, or the University of New Hampshire.



Colin Wilke, son of Richard Wilke of the Environmental Sciences Department, attends St. Anthony's High School, Bayport. He will major in engineering at the Cornell School of Engineering.



Anya Swiss, daughter of Marcia Swiss, Information Technology Division, attends William Floyd High School. She will participate in the Physicians Assistant Program at the State University of New York at Stony Brook.



Brandon Wright, the son of James Wright of the Plant Engineering Division, attends Patchogue Medford High School. He plans to attend Niagara University to major in education.

Congratulations, 2003 Spotlight Winners

For extending extraordinary efforts in response to the needs of their departments or divisions, the following BNL employees were honored during fiscal year 2003 by Spotlight Awards. These winners are listed in addition to those in the Bulletin of April 9, 2004. Each winner is awarded a certificate and a check ranging from \$100 to \$900 before taxes. Winners have been listed under the names of departments or divisions in which they served at the time of their award.

Collider Accelerator Department: Ila Campbell, Terence Higgins, Ann Lamberti, Patricia O’Grady, and Patrick Talty; Energy Sciences & Technology Department: Nereida Santiago; Environmental Services Division: Melvin Van Essendelft; High Energy & Nuclear Physics Directorate: Susan White De Pace; Human Resources & Occupational Medicine Division: Lorraine Barry; Internal Audit Office: Elinor Adams; Physics Department: Pierrot Bichoneau and Cynthia McQuilken; and Superconducting Magnet Division: Edwin Casanas.

Science Fair at the Child Development Center



Roger Stoutenburgh D0530404

Practicing to be Sherlock Holmes? No: These children (above) at the Lab’s Child Development Center (CDC) are learning about magnification during this year’s annual science fair.

Says CDC Director Deborah O’Neill, “At the CDC, we include science as part of our daily curriculum. Young children are always eager to explore, discover and learn.”

Adds O’Neill, “We wish to thank Cindy Biancarosa of the BNL Science Museum in the Office of Educational Programs for providing us with materials that helped us put together the events of our annual CDC science fair.”

Other activities of the day included teaching the children about “sink and float” and planets.

Located in Bldg. 373 in the apartment area, the CDC opened its doors in September 1991. Today, CDC and Little Red School House staff care for 81 children between the ages of 6 weeks and 5 years. For information about the CDC, or to register your child or grandchild, call O’Neill at Ext. 7416.

— Jane Koropsak



Roger Stoutenburgh D0707404

Inviting Visitors to BNL

When visitors come to the Lab, whether one or many, the person sponsoring them must complete a Visitor Notification Form and send it to the Safeguards & Security Division at least 24 hours ahead of time, if possible. In the case of a foreign national, notification should be started 30 days before the visit.

Access to BNL is controlled by permitting entrance only to those persons who have official business at the Lab and only to those visitors who are properly sponsored by a BNL employee or guest. So, anyone who is organizing a meeting, conference, or public event such as a concert, or who is expecting guests on site, must fill out the form.

The easiest way is to go to the BNL Home Page. In the left-hand side column, click on “Visitor/Event Notification.” Requests for individual visits and requests for properly approved events with multiple visitors are handled on separate forms — but read the explanations on the webpage. If you need help in accessing or submitting these forms, call Safeguards & Security at Ext. 4271.

Arrivals & Departures

Arrivals

Bernd Foerster Medical
Levente Hajdu Physics
Michael Jensen Env. Sciences
Gina Pavaglio NSLS

Departures

Keith Boone ITD
Katarina Leckova Medical
Daqi Li ES/WM
Salvatore Scarpitta Rad. Ctrl.

Retirement Counseling: TIAA-CREF, 5/14, 5/24

A TIAA-CREF representative will visit BNL on Friday, May 14, and Monday, May 24, to answer employees’ questions regarding the TIAA-CREF retirement plan, such as TIAA and CREF differences, allocating funds between TIAA and CREF, options, flexibilities with TIAA-CREF, and retirement options. For a 45-minute appointment, call Valerie James, (800) 842-2733, Ext. 7980.

Attention to Detail Pays Off

the experiments to analyze.) By reaching 1,370 inverse microbarns, “We surprised ourselves,” admits Roser. “We thought that we could attain this rate of luminosity improvement within a couple of years, but we didn’t know that we would get there so quickly.”

Tandem to Booster Fix

The most important improvement that resulted in more and denser beam, interestingly enough, came about as a result of another ongoing program within the RHIC complex: the NASA Space Radiation Laboratory (NSRL) run.

Since 1995, NASA radiobiologists have been employing low-energy beams of iron and silicon at BNL to simulate the cosmic rays encountered in space, with the goal of understanding and mitigating their risk to space travelers. That program now uses the Booster, which is the accelerator that accepts heavy ions from the Tandem Van de Graaff, in which they originate and are initially accelerated. After speeding them up further, the Booster injects the beam into the Alternating Gradient Synchrotron, which accelerates them even more before

sending them to RHIC.

During the preparation for this year’s NSRL runs, it was discovered that, where the beam comes from the Tandem into the Booster, there was a badly bent foil, which separates incoming beam from circulating beam. Replacing this septum foil resulted in a 25 percent improvement in the intensity of beam delivered to RHIC.

Vacuum Improvements

With more intense beam available, the second most important improvement was an upgrade in RHIC’s vacuum, which allowed the intense beams to be stored and collided. In theory, a vacuum is space in which there is no matter. In practice within RHIC, each of the two beams circulates within its own vacuum pipe, in which the pressure is far below atmospheric pressure so that the residual gas within the pipe interferes as little as possible with the beams.

The problem was that the intense beams could accelerate electrons, which are always present in the beam pipe. The accelerated electrons hit the beam pipe again and release more electrons, ultimately



Can You Spare a Can?

Remember — please bring in a can or two of food to put in the BNL Food Drive bin in your building. Your donations are needed so much.

(cont’d.)

Fidelity Investment Counseling, 5/11

A Fidelity Investment representative will be at the Lab on Tuesday, May 11, to hold sessions with individual employees interested in learning more about their retirement-savings and investment options.

Schedule one of the 45-minute appointments by calling (800) 642-7131.

Potluck Party

The Hospitality Committee welcomes Lab newcomers and BNLees at its potluck party on Friday, May 14, at 6 p.m. in the Recreation Hall in the apartment area.

Bring your family, friends, and your favorite dish to share for six people. Drinks and live piano music will be provided. For more information, contact Monique de la Beij, 399-7656.

Cafeteria Survey

In order to serve the Lab’s food service needs better, the Staff Services Division and FLIK International ask all BNLees to take the online survey located at www.bnl.gov/staffservices/foodservices/foodservices.asp.

Calendar

— TODAY, 5/7 —

Friday, 5/7

*BNL Career Network Group Meeting
Noon, Berkner Hall, Room A. All are welcome. Cathy Wehrmann, Ext. 7823.

— WEEK OF 5/10 —

Mon.-Fri. 5/10-14

*RHIC & AGS Annual Users’ Meeting
See notice on page 1 and www.bnl.gov/rhic_ag/users_meeting/.

Wednesday, 5/12

Rifle & Pistol Club Meeting
Noon, Conference Room, Bldg. 535. A guest speaker will talk about a wild boar hunt. Jim Durnan, Ext. 8236, durnan@bnl.gov; Rich Conte, Ext. 5741; or www.bnl.gov/bera/activities/tpc/.

Universal Voltronics, CMCAMC Demo
10 a.m.-3 p.m., Berkner Hall. Representatives from Universal Voltronics and CMCAMC will display new HV and CAMAC instrumentation and various new products. Bert Yost, (518) 569-3543.

— WEEK OF 5/17 —

Mon. 5/17 — Thurs. 5/20

*National Synchrotron Light Source Annual Users’ Meeting
See notice on page 1 or go to <http://www.nsls.bnl.gov/users/meeting/>.

Wednesday, 5/19

Brookhaven Lecture
4 p.m., Berkner Hall. Paul Moskowitz, Nonproliferation & National Security Department, on “Protecting Our National Security: BNL’s Contributions.” All are welcome.

Wed. 5/19 & Thurs. 5/20

*CFN Users’ Meeting
See notice on page 1 or go to <http://www.cfn.bnl.gov/user/meeting/>.

Thursday, 5/20

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

Saturday, 5/22

*Blues Legends’ Concert
8 p.m., Berkner Hall. Two blues legends, David “Honeyboy” Edwards and Hubert Sumlin, and more. Buy tickets in advance at the BERA Sales Office for \$20; \$25 at the door. For more information, see story on page 4.

— WEEK OF 5/24 —

Monday, 5/24

IBEW Meeting (note new location)
6 p.m. Centereach Knights of Columbus Hall, 41, Horseblock Road, Centereach. A meeting for shift workers will be held at 3 p.m. in the union office. The agenda includes regular business, committee reports, and the president’s report.

— WEEK OF 5/31 —

Monday, 5/31

Memorial Day Holiday
The Lab will be closed in honor of Memorial Day. No Bulletin will be published on Friday, June 4.

Wednesday, 6/2

National Bond and Trust Demo
9 a.m.-2 p.m., Berkner Hall. Representatives from National Bond and Trust, a licensed issuing agent of the U.S. Treasury, will present BNLees with information about payroll-deducted savings bonds and will enroll those who are interested. Jane O’Malley, (516) 979-6970.

— WEEK OF 6/7 —

Thursday, 6/10

Costco Wholesale Club Demo
9 a.m.-2 p.m., Berkner Hall. Representatives from Costco Wholesale Club (Price Club) will present BNLees with a special offers, including a \$45 annual membership that includes 2 membership cards and an additional \$10 cash card. There will also be a raffle for a free one-year membership. Kendra, 366-1506.

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. Enter 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.

