

AUGUST '15
ISSUE

PARTICLE POST

COLLIDER-ACCELERATOR DEPARTMENT

Contact: [A. Lamberti](#)

A WORD FROM
THE:

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Accelerator Div.

Quote of the Month: "Every great advance in science has issued from a new audacity of imagination." -John Dewey

ES&F Div.

Acc. R&D Div.

Operations

NOTE FROM OUR CHAIR: Thomas Roser



At the end of July, Linac operation for isotope production ended as the last part of this year's run. It was again a record year for BLIP with the highest proton current delivered to the target and with the largest amount of medical isotopes produced. Congratulations to the whole team!

If you go to the farthest corner of building 912 you can, however, still find a dedicated team commissioning the test ERL with electron beam throughout the summer. First beam from the SRF electron gun was achieved last year and now beam has been transported from the gun to the beam dump. The next step is to add acceleration in the 5-cell SRF accelerating cavity and then transport the beam around the recirculation loop back to the cavity for energy recovery.

In the meantime shutdown work is in full swing everywhere at RHIC. Preparation for the first part of the installation of the Low Energy RHIC electron Cooling (LEReC) has started with the removal of the instrumentation systems in the one o'clock warm section and reinstallation in other locations in RHIC. LEReC is the highest priority construction project at the Department and consists of a complete high intensity, high brightness electron accelerator to be installed in the two o'clock IR. The electron beam will overlap with and cool the RHIC low energy gold beams in the one o'clock warm section. The system has to be ready for operation in 2019.

VIEW [CONFERENCE PROJECTIONS FOR 2015: DUE ASAP](#) -

CONFERENCES SHOULD BE PROJECTED THROUGH DECEMBER 2015

DID YOU KNOW??

Check out who received an employee Service Award this year! Collider-Accelerator Dept. employees who received a [Service Award](#).

Check out who received an employee [Spotlight Award](#) this year!

EVENTS/SEMINARS...



Check out the [BNL Calendar](#) for upcoming Events & Seminars or the [Upcoming Conferences & Workshops](#) page for those happening at BNL.

August 13 - (Berkner - Rm. B | 12 pm) Social Security

▶ Arrivals/Departures

Safety Stats

Mike Mapes was recognized for his engineering and leadership skills at the Employee Awards Ceremony last month where he was a recipient of the [2015 Engineering Award](#)! Congratulations, Mike!



Two critical items were received for completing the CeC proof-of-principle system: the 20 MeV 704 MHz SRF Linac module assembled by Niowave and three helical wigglers for the CeC FEL amplifier made at Budker Institute of Nuclear Physics (BINP, Novosibirsk, Russia). All of the wigglers were assembled and one was tuned during the visit by BINP team with help from SMD and CeC teams.

CeC Project Engineer, Jean Clifford Brutus, celebrates arrival of the 704 MHz SRF Linac cryo-module to BNL.



Maximization Planning: "Foundation for Personal Financial Education"

August 14 - (Bldg. 555 - Hamilton Seminar Rm. | 11 am) Chemistry Dept. Colloquium: "Hydrogen Storage in Formic Acid/Formate Solutions - Kinetics and Mechanism"

August 24 - (Bldg. 510 - Small Seminar Rm. | 2 pm) Special Nuclear Theory/RIKEN Seminar: "Thermodynamics and Topology from Lattice QCD"

August 25 - (Bldg. 510 - Small Seminar Rm. | 11 am) Nuclear Physics Seminar: "Orbital Angular Momentum and Generalized Transverse Momentum Distribution"

September 8 - (Bldg. 510 - Small Seminar Rm. | 11 am) Nuclear Physics & Particular Physics Seminar: "Understanding the Nature of Neutrinos via Neutrinoless Double-beta Decay"

September 9 - (Brookhaven Center) Blood Drive

September 10 - (Berkner - Rm. B | 6:30 pm) Community Advisory Council Meeting

Do you have to give a talk?

Public Speaking Techniques: Verbal & Non-verbal

Presented by: Theodore Sampieri

12:00 – 1:00 Fridays

CAD Bldg. 911

Large Conference Room: 2nd Floor

IN OTHER NEWS...

The last place left in America that's piecing together the origins of the universe- In the instant after the Big Bang, the only thing in the universe that existed was a hot plasma soup full of subatomic particles. But to study that plasma, you don't have to travel back in time billions of years to the Big Bang itself - just go to Long Island, NY. [Read about it.](#)

Liquid-like magnetic state leads to superconductivity- Despite a quarter-century of research since the discovery of the first high-temperature superconductors, scientists still don't have a clear picture of how these materials are able to conduct electricity with no energy loss. [Read about it.](#)

Magnet hyperthermia, an auxiliary tool in cancer treatments- Hyperthermia has been used for centuries to combat tumors and reduce their effects.

BNP and BNL team assembled first of three helical wigglers.



New research aims to use a different system (magnetic nanoparticles) to increase body temperature. [Read about it.](#)

Big PanDA and Titan merge to tackle torrent of LHC's full-energy collision data - With the successful restart of the Large Hadron Collider, now operating at nearly twice its former collision energy, comes an enormous increase in the volume of data physicists must sift through to search for new discoveries. Fortunately, a remarkable data-management tool developed by physicists is evolving to meet the big-data challenge. [Read about it.](#)

3 Keys to USA's incredible 5-2 World Cup victory over

Japan - For the first time since 1999, the U.S. doesn't have to hear about comparisons to it's elders, pressure to win or how it came close four years ago. [Read about it.](#)

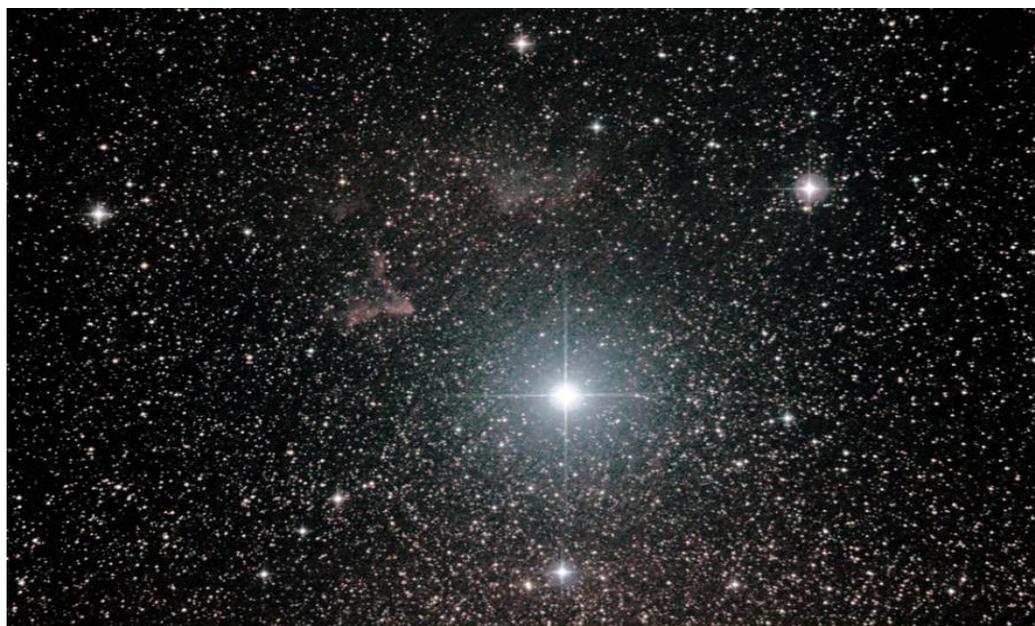
Steve Bellavia captured some amazing photos while at Cherry Springs State Park, PA!



SH2-54 is an extended bright nebula in the constellation of Serpens within the open cluster **NGC 6604**, approximately 6,000 light years from Earth. In its core there are many protostars and many infrared sources. Some of these sources are most probably very high-mass stars. The older star population in this region has an average age of 4-5 million years, and its components are grouped in the open cluster NGC 6604.



IC1284 is an emission nebula located in Sagittarius. Light from bright stars within the dust produces the two prominent blue reflection nebulae (NGC 6589 & 6590) just to the right of the bright red nebulae, IC1284. They are members of a loose open star cluster, NGC 6595, which is located at a distance of about 5,900 light years.



IC59 and **IC63** are reflection/emission nebulae that lie near Gamma Cassiopeia, a bright, 2.15 magnitude star, forming the center vertex of the "W". They are approximately 600 light years from Earth. IC63 is the slightly brighter one, closer to the star.



The **Blue Moon** that appeared on July 31st.

WHAT'S GOING ON IN OUR NEIGHBORHOOD?

Interested in Cycling? <http://www.bicyclelongisland.org/majoride.htm> & <http://www.cyclotour.com/events.htm>

Interested in Running or Walking? Check out the [lirunning Calendar](#) for the following events: 8/22 Volunteer Ambulance Corps 5K (Commack); 8/23 Jamesport FD Sound to Bay 5K Run/Walk (Jamesport)... **and more in September!**

For the Kids:

3rd Annual LEGO Building Contest & Exhibit - Sep 19-Oct 18 (10a-5p) at Stony Brook Village

Stony Brook Events:

The Love Affair With Motorcycles Continues! - July 11 - Sept 7 (10a - 5p) Over 30 Motorcycles on Display.

35th Annual Sunday Summer Concerts On The Village Green - July 12 - Aug 30 EVERY SUNDAY (7-9pm) [SEE LINE UP HERE.](#)

22nd Annual Walk for Beauty! - Oct 25 (8:30a - 4p)

DAY AT THE VINEYARDS...

Duckwalk North - [SOUTHOLD] Music on Saturdays (4-6pm)

Duckwalk South - [WATER MILL] **None at this time**

Castello di Borghese Vineyard & Winery - [CUTCHOGUE] ** Vineyard Tours & Wine Tastings Every Thursday & Sunday @1pm & FREE Jazz Every Saturday (2-4) with Marguerite Volonts**

Jamesport Vineyards - *Live Music from 1-4pm every Fri, Sat & Sun*

Martha Clara Vineyards - [RIVERHEAD] - **Live Music every weekend**

Palmer Vineyards - [RIVERHEAD] - Live Music every Sat (12-4).

Pindar Vineyards - [PECONIC] - Live Music Every Saturday (1-5pm)

Baiting Hollow Farm Vineyard - [BAITING HOLLOW]

Check out Erik Forsyth's Travel's :



[HTTP://WWW.YACHTFIONA.COM](http://www.yachtfiona.com)

Music every Sat & Sun from (2-6)

—
Paumanok Vineyards - [RIVERHEAD] - Fresh, Local
Oysters (2-5pm) Every Sat & Sun starting Memorial
Day through September

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NOTE FROM OUR ADMINISTRATION: S. LaMontagne

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I hope it comes as no surprise that efforts to minimize current year cost are essential. This is true not only in C-AD but throughout the Directorate. DOE funding has been relatively flat for a number of years and this year we will consume the last of the carry forward balances built up in the wake of ARRA funding.

During the most recent NPP All Hands Meeting on July 9th, our ALD, Berndt Mueller, urged employees to reduce vacation balances over the next six month period in order to reduce labor cost to programs. Skeptical about this advice? The savings are real because your vacation is costed to the program when it is earned. The process works in much the same way as a Christmas Club account or in this case, a Vacation Club. Each month, BSA sets aside the funds needed to pay you for the vacation you earned in that month. When you take your vacation, the "Club" provides the funds to pay you for the time you were on leave; programmatic funding is only needed to fund the time worked. SO **USE YOUR VACATION.**

As in earlier years, I strongly encourage you to complete your monthly time card as early in each month as possible. That is, enter your planned vacation and the hours you anticipate you will work during the upcoming period as soon as your new time card can be accessed for entry. This will enable my group to more accurately project labor cost by program and thus, ensure that critical procurements are not deferred unnecessarily. Remember, you can modify your input at any point prior to submitting your card for approval.

NOTE FROM OUR ACCELERATOR DIVISION: Wolfram Fischer



BLIP operation ended on 31 July 2015 with a Linac high current test in which a new record for the average current was reached with 147 micro-A. This exceeds the goal of 140 micro-A for the present Linac intensity upgrade. Congratulations to Deepak and the Linac team.

At this year's RHIC Retreat we looked back at Run-15 with record luminosities in polarized proton collision, coordinated by Vincent Schoefer, and two new operating modes -p+Au and p+Al - in which we met or exceeded luminosity goals, coordinated by Chuyu Liu. Thanks to the efforts of all groups over the last years, in Run-15 we also had the highest availability in the history of RHIC, 87.5%.

For the next run we are preparing for Au+Au at 100 GeV, and possibly for Au+p or d+Au. Asymmetric operation will require a better protection of the detectors against the effects of particle loss after an abort kicker pre-fire.

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NOTE FROM OUR EXPERIMENTAL SUPPORT & FACILITIES DIVISION: Phil Pile

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The annual Summer Sunday event featuring the RHIC machine and the PHENIX and STAR experiments was held this past Sunday. Thanks go to Yousef for once again coordinating the event from our end and to all that gave up their Sunday to help promote RHIC science. A summary of our Summer Sunday activities provided by Yousef follows:

"RHIC Summer Sunday a Resounding Success

August 2nd was RHIC Summer Sunday day where we opened the RHIC tunnel at 1005 and the STAR and PHENIX experiments to the public. The public came first to Berkner Hall where they were given an overall introductory presentation in Berkner Room B, hands on experiences as well as a 3-D simulation of RHIC and eRHIC all in the lobby. In Room A we had a popular Stump the Physicist arena where a pair of physicists (theorist and experimentalist) fielded questions about heavy ions and spin physics and a free for all into different physics subjects. Buses then took people to the RHIC complex. At Building 1005 they visited the RHIC tunnel and learned about superconducting magnets, cryogenic systems, the helium refrigerator and compressors. At STAR and PHENIX they were shown the experiments, discussed details of the physics program, shown computer displays of actual data taken and results achieved so far, as well as future plans for the Beam Energy Scans. They also had hands on exhibits of detector systems including prototype calorimeter detectors for the sPHENIX proposal.



The early count has yet a new record of 1330 visitors boarding the buses to RHIC. Of course, this could not have happened without the wonderful help from our volunteers who donned the Sunbeam Yellow Tea-shirts and worked the long hours from 10 am 'til 4 pm. C-AD had 44 volunteers, STAR-9, and PHENIX-21 this in addition to the Community Relations Summer Sunday crew. Many thanks to all for helping to reach out to the community and inform them of the excitement of our research."

We are well into our summer shutdown for RHIC. The STAR experiment did not roll out of the IR this year as only routine maintenance is required. As discussed in the previous Particle Post, the PHENIX experiment experienced a beam induced failure of the MPC North and South detector systems. These detectors had to be removed for repair of the front end electronics systems. The repair will add some degree of protection (new diode plus resistor) against beam induced overcurrent caused by abort kicker pre-fires. The plan for Run 16 calls for a long full energy gold-gold run followed by a series of asymmetric (pAu, Au+Au, or dAu) runs at a few different energies. The choice of beams will be decided later this month based on the degree of confidence (or lack thereof) in our ability to deliver collisions to the experiments with an acceptable risk of detector damage due to abort kicker pre-fires. The diode protection added by PHENIX to the MPC may do the trick as protection from the machine side at this point looks to be costly and difficult (impossible?) to implement before the end of the year. Then, if time allows, there are a couple of short 31 GeV runs planned using gold-gold and p-p. The sPHENIX project is progressing with an EMCAL workshop at UCLA later this month followed by a Tracker workshop in Santa Fe in October and an internal Cost and Schedule review at BNL in November. The BaBar magnet has been rotated to install the valve box in preparation for a leak check as well as cooling down for a 100 amp low power test. We expect DOE presence at the November internal Cost and Schedule review with a "CDO - Mission Need" declaration by DOE as a possible outcome.

Linac operation in support of BLIP continued through the end of July in support of strontium-82 production and R&D. The last beam irradiation was a 3 hour full current beam test of the present Sr-82 production target stack. This year we set an administrative limit of 115 microamps to minimize the possibility of target failure due to beam heating. This limit was lifted for this test aimed at showing the present beam/target configuration is robust enough to not fail. The targets survived the test with the Linac delivering a record 147 microamps to the target array. This does not guarantee that the array would survive a typical 2-3 week exposure but with implementation of the new beam raster system next we should be able to take the full intensity from the Linac with no administrative limit promising about a 20% or more increase in Sr-82 production from customers. The Target Processing Laboratory will continue processing through mid-August. Plans for next year call for installation and commissioning of the new beam raster system in late December followed by strontium production using the raster system beginning in early January.

The NSRL facility is in a shutdown mode at this time. A project to raise the maximum beam energy to 1.5 GeV/n is under construction with installation of a third dipole in the R-line beam complete and installation of an upgraded D6 Booster extraction dipole about to begin. This project will allow for higher energy heavy ion beams to better simulate the galactic cosmic ray spectra that will be encountered by future deep space explorers. The next operation of the Booster in support of NSRL will begin around the middle of October with the exact schedule to be determined.

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Link to: [ATF Newsletter](#)

Operations

NOTE FROM ACCELERATOR R&D DIVISION: Ilan Ben-Zvi

▶ Arrivals/Departures

○ Safety Stats



The R&D ERL continues commissioning. The performance of the SRF gun continues to improve, notably the dark current (beam without photoemission) is already a record small number. The beam is being tested all the way to the beam dump, with a good transmission efficiency, undergoing fault studies as part of the commissioning plan to increase the beam current.

The Summer 2015 ATF Newsletter is available at:
<http://www0.bnl.gov/atf/docs/ATFNewsletter.pdf>

The design of eRHIC, which has been going on for the past 15 years, considered both ring-ring and linac-ring options. The design effort has been successful and is now entering its final stretch. The current eRHIC design based on an electron ERL colliding with RHIC covers the entire center-of-mass energy range of the Electron Ion Collider (EIC) with a high luminosity. Work on the ring-ring design is also being pursued.

The Nuclear Science Advisory Committee (NSAC) has an Electron Ion Collider (EIC) under consideration. Our goal is that eRHIC will be selected to be the Electron Ion Collider. Recently an EIC costing committee chaired by Ed Temple reviewed the eRHIC (BNL) and MEIC (JLab) designs. The committee determined that "Of the uncertainties that remain, the subcommittee considers the dominant ones to be technical."

To address the recommendations of the Temple committee and address the technical risks we held the eRHIC R&D Retreat on May 18-19. In the meeting we identified and prioritized the technical risks in the eRHIC project, assessed their impact and identified R&D to mitigate these risks.

Following the retreat, we established a number of working groups to plan the accelerator R&D towards eRHIC. A review of the R&D plan will be carried out by a newly established eRHIC R&D Advisory Committee. The first meeting of the committee will take place on August 10-11.

The Accelerator R&D Division has been reorganized in order to reflect the new priorities and execute the R&D under a well-defined plan, focusing on the high priority items. The eRHIC groups are focused on the following items: The Coherent electron Cooling experiment, headed by Vladimir Litvinenko, concentrates on carrying out the proof-of-principle Coherent electron Cooling experiment and possibly associated tests in IP2. The Cornell-Brookhaven Electron Test Accelerator, headed by Dejan Trbojevic, is engaged in assembling and testing a multi-pass FFAG ERL at Cornell University. The eRHIC Physics group, headed by Vadim Ptitsyn, carries out the design and beam physics of eRHIC, aiming at reducing risk and cost, with a new luminosity staged approach. The Polarized Gun group, headed by John Skaritka, aims at concluding the funneling high current polarized gun tested initially at industry and now situated at Stony Brook University. The SRF group, headed by Sergey Belomestnykh, is carrying out the construction of a well-damped eRHIC cavity at 422 MHz as well as supporting multiple C-AD SRF and RF projects, including the 56 MHz RHIC cavity, SRF and RF elements of LEReC, the R&D ERL, the CeC experiment, and the LARP SRF crab cavity. The High-Energy Physics groups remain unchanged, the national ATF user facility, directed by Igor Pogorelsky, the Energy Frontier Accelerator group, headed by Bob Palmer and the LARP crab cavity group,

headed by Qiong Wu. Two division projects, which are not distinct groups, are the ATF-II, headed by Ilan Ben-Zvi and R&D ERL, headed by Wencan Xu.

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NOTE FROM OPERATIONS: Paul Sampson



Shutdown 2015 continues throughout the complex. With the completion of the BLIP run on July 31st, all of the accelerators are in shutdown mode.

The major work at RHIC continues to be in the 1 and 2 o'clock regions on the CeC PoP and LEReC projects. In the 4 o'clock RF sector, testing is ongoing and access is being locally controlled.

The LINAC tunnel was opened on the 3rd and shutdown and maintenance work continues. Final installation of the Raster and related components in the BLIP tunnel will take place later in the shutdown, following an extended cool down period.

Work in the Booster is progressing well. The 1.5 GeV upgrade for NSRL is underway and the installation of the new D6 septum and tunnel bending-magnet will be completed in August with testing to begin in September. The Booster will be restored to operation in late September just prior to the NSRL run in early October.

Work in the AGS is also progressing. Vacuum chamber and component replacement is ongoing and installation of new low field corrections will begin as materials arrive later in the shutdown.

The "[RHIC Broadcast](#)" link displays the latest schedules for testing, power disruptions, outages and daily schedules.

To view a list of approved work for the Shutdown or to review past results, go to the [Job Request System](#) and select the appropriate date. This link is behind the firewall and requires privileges to view.

For weekly schedule updates see: [This Week](#), which can be viewed by all.

▶ Arrivals/Departures

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ARRIVALS: Welcome!

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Matthew Lorio

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DEPARTURES: Farewell, you will surely be missed..

Roger Smith

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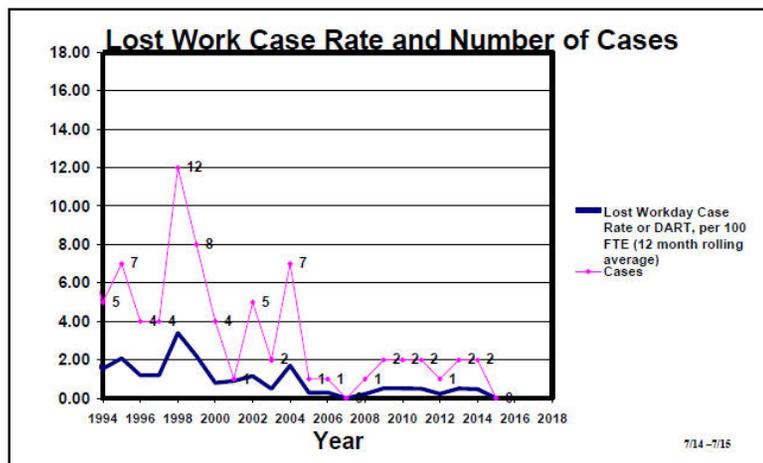
Acc. R&D Div.

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SAFETY STATS: Peter Cernigliaro

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 Safety Stats



C-AD Occupational Injury Statistics

	For Year 2014	For Year* 2015
First Aid Cases	8	4
Recordable Cases	3	1
Lost Work Cases	1	0

* Calendar Year through 7/31