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January 2014

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Quote of the Month: "Science has not been successful by making up explanations of things that fit with the current social fabric." - Kary Mullis

## **A WORD FROM THE:**

Administration

Accelerator Div.

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Operations

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 Safety Stats

## **NOTE FROM OUR CHAIR: Thomas Roser**



I  
Congress finally passed a budget for this fiscal year and the president signed it into law. The news are very good for RHIC: we will be able to run for 22 weeks, which means we will have to run until the first week of July. In addition, there is now the strong intention by DOE to continue RHIC operation for several more years with a possible transition to the construction of eRHIC by the end of the decade.

Last Wednesday we presented our plans for the operation of RHIC over the next six years to the Office for Nuclear Physics at DOE and these plans were very well received. Until 2016 we will have three RHIC runs to fully exploit the recent accelerator and detector upgrades that have increased the luminosity of RHIC by an order of magnitude. At the same time we will construct electron cooling for low energy beams in RHIC and install it during 2017, when no RHIC run is scheduled. During the two RHIC runs in 2018 and 2019 we will then repeat the study of gold-gold collisions at low collision energies but at much higher collision rates.

In the meantime, preparations for the run have continued despite a number of storms that blanketed the Island with snow and ice. Despite these hazardous conditions we didn't have any injuries from slips or falls. Thank you for being very careful and please keep up the good work.

**VIEW [CONFERENCE PROJECTIONS FOR 2014](#): DUE ASAP**

## **DID YOU KNOW??**

**Check out who received an employee Service Award this year!** 2014 Collider-Accelerator Dept. employees who received a [Service Awards](#). Last year Service Awards are listed [here](#). 2012 Service Awards are listed [here](#).

## **EVENTS/SEMINARS...**



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

Check out Steve Bellavias' current Photos! [Supernova in nearby galaxy](#)

Joseph Tuozzolo's daughter Melissa got married in Thailand in early January.. Congratulations Joe! See pictures of the ceremony and of Thailand [here](#).



Feb. 11 - (Berkner Hall B | 12:00) African-American History Month Event

Feb. 13 - (Berkner Hall B | 6:30pm) Community Advisory Council Meeting

Feb. 14 - (Bldg 400 | 1:00) United Way Fundraiser - Bake Sale

Feb. 19 - (Berkner Hall | 4:00) Brookhaven Lecture, "'492nd Brookhaven Lecture" - Mike Jensen (Environmental Sciences Department)

Feb. 20 - (Berkner Hall | 9:00am) All-Employee Event, "Get to Know the Lab"

Feb. 25 - (Bldg 317 | 12:00) United Way Fundraiser - Italian Feast

Feb. 26 - (Bldg 911 | 12:00) United Way Fundraiser - Pizza and Star Trek

Feb. 28 - (Bldg 510 | 12:00) United Way Fundraiser - Pizza Palooza

March 7 - (Berkner Hall | 5:00) United Way Fundraiser - Tommy Sullivan Concert

March 13 - (Berkner Hall B | 6:30pm) Community Advisory Council Meeting

March 14 - (Berkner Hall | 12:30) United Way Fundraiser - Treasure Chest Event Drawing and Star Trek

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### IN OTHER NEWS...

~ According to a newly released study by the US National Science Foundation, only the US and the EU produce more scientific papers per year than China does. [Read more..](#)

***The National Science Foundation has just announced the winners of its 2013 International Science & Engineering Visualization Challenge - Discover the artistry behind the 2013 International Science & Engineering Visualization Challenge winners as they explain the processes, techniques and thoughts behind their entries..... [See the winners here](#)***

***Viewpoint: Encouraging Signs on the Path to Fusion~ [Read about it.](#)*** Last August, the National Ignition Facility at Lawrence Livermore National Lab reported a major milestone on the path toward laser-powered inertial fusion. Now, a paper describing the experiments has been published. Steven Rose of Imperial College explain's the paper's significance.

## WHAT'S GOING ON IN OUR NEIGHBORHOOD?

*Interested in Cycling?* No Cycling Events at this time

*Interested in Running or Walking?* Check out the [lirunning August Calendar](#) for the following events: No Events at this time

*For the Kids:* Harlem Globetrotters (February 15); Ringling Bros & Barnum & Bailey: Legends (March 5-10) @ [The Nassau Coliseum](#).

### *Stony Brook Events:*

*Hot Cocoa And Marshmallows:* Jan. 22-March 5 (10:30~) Ages 3-5 listen to a story while enjoying a cup of hot cocoa. 3\$ per Person

*Dinosaur Daze!* ~ Feb. 18-20 (10~11:30am) Walk with dinosaurs at Stony Brook Village Center! Designed for children ages 3-5, Dinosaur Daze features three fun-filled days of science, crafts & imagination. Registration is limited, so reserve early to avoid disappointment. \$50 per child

*Dinosaur Detectives!* ~ Feb. 18-20 (1:00~3:00pm) Walk with dinosaurs at Stony Brook Village Center! Designed for children ages 6-9, Dinosaur Detectives features three fun-filled days of science, crafts and imagination! Registration is limited, so reserve early to avoid disappointment. \$65 per child

*Genetic Medicine.. Where Are We Now?* Mar. 6, 2014 (6:30pm~) Moderator Lina M. Obeid, MD, the Vice Dean for Research from the Office of Scientific Affairs at Stony Brook University, will lead a panel discussion exploring the promise of early disease detection and targeted drug therapies. Panelists include Alexander Krasnitz, Ph.D of the Cold Spring Harbor Lab and Janice Lu, MD Ph.D., Associate Professor of Medicine, Stony Brook Medicine. **\$25 per person; includes buffet dinner**

### *Nassau Coliseum ~*

*Upcoming shows:* Brad Paisley, Kayne West, Demi Lovato, Miley Cysrus & More

Long Island Boast Show ~ February 7-9

Spring Craft Beer Festival ~ March 22

## DAY AT THE VINEYARDS...

*Macari Vineyard* ~ [MATTITUCK] No upcoming events at vineyard.

*Duckwalk North* ~ [SOUTHOLD] No Events Posted

*Duckwalk South* ~ [WATER MILL] No Events Posted

*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* ~ Feb 8th-Mar 16th: [Live on the Vine](#) (Acts and times TBA)

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

*Palmer Vineyards* - [RIVERHEAD] No Events Posted

*Pindar Vineyards* - [PECONIC] ~ No Events Posted

*Baiting Hollow Farm Vineyard* ~ [CALVERTON] \*Music every Sat & Sun from (2-6)\*

*Paumanok Vineyards* ~ [AQUEBOGUE] No Events Posted  
August 5-15, 2014 ~ Paumanok Mediterranean Wine Cruise

## NOTE FROM OUR ADMINISTRATION: Stephanie LaMontagne-McKeon



Just one year ago, our Director, Doon Gibbs had the following comment on the Tribble Panel Recommendations on Nuclear Physics Funding:

“Although the Tribble report paints a sobering perspective for nuclear physics, it is important to keep in mind that the final decisions have not been made nor are the outcomes prescribed. It does mean that we will have to continue to live with uncertainty about a significant portion of the Laboratory’s science program in the near term. I recognize and regret the anxiety this causes. It is a part of the constrained budget world we live in today, and reflects the larger challenges science faces across the board in our country.”

What a difference a year can make! This past Wednesday, Thomas, Wolfram, Phil and I, along with Berndt Mueller, David Lissauer and several employees in the Physics Department, made our annual visit to the Nuclear Physics Program Office on Wednesday to present our plans for the future of the RHIC Facility. It was not “business as usual”. The Program Office was very receptive to our ideas and the mood in the room was refreshingly upbeat.

Late in January, we learned that the FY 2014 budget for RHIC Operations is the budget that reflects our most optimistic planning. A 22-week operating program commenced this week and plans for yet another ambitious shutdown schedule are already in process.

In conclusion, I am more than happy to be able to offer a respite from constant reminders to keep spending to a minimum. Keep up the good work, be safe and spend wisely.

## NOTE FROM OUR ACCELERATOR DIVISION: Wolfram Fischer



The RHIC cool-down to 4K started on 3 February 2014 as planned and both rings are now cold. Through the extraordinary effort of so many people, we also have installed the new 56 MHz cavity, the first superconducting cavity in RHIC. As we finish up the cavity installation the power supplies are turned on, and we expect first beam on Sunday, 9 February 2014. The Run will last for 22 cryo-weeks, extending into the first week of July.

The catalog of all Technical Notes is <http://www.rhichome.bnl.gov/AGS/InternalReports.html>, and it is linked from both the Department and Accelerator Division home pages.

## NOTE FROM OUR EXPERIMENTAL SUPPORT & FACILITIES DIVISION: Phil Pile



The budget for this year allows for 22 weeks of cryo operation. RHIC cool-down started on 3 February, as scheduled, and both the Blue and Yellow rings are now at 4.5 deg K. Twenty two weeks of cryo operation will take us to 7 July with beam off on 4 July so cryo warm-up can begin. Installation of the 56 MHz cavity is almost finished and must be completed before beam injection into RHIC can begin. At this point we expect to be able to begin setting up RHIC with beams by Sunday night. The three week low energy (7.3 x 7.3 GeV/n) gold-gold run should see first collisions around mid-February. The full energy AuAu run is presently scheduled for 15 weeks of physics. There may be sufficient time left after completion of the full energy run to allow for another short run with beams to be determined. Both STAR and PHENIX are eagerly awaiting first collisions.

BLIP is into its fourth week of operation. Two RbCl target stacks have been irradiated and a third is in beam. The first RbCl target array has been processed in the TPL and Sr-82 shipped to customers. Processing of the second BLIP target array will be complete later today and be ready for shipment to customers by tomorrow morning. In addition, a thorium foil was irradiated at 200 MeV overnight on 13 January and sent to ORNL for processing. Thorium irradiations are in support of a collaborative R&D effort between BNL, ORNL and LANL to determine if Ac-225 (an alpha emitter) can be produced in sufficient quantities to be useful for radioimmunotherapy of blood borne tumors such as leukemia. The new LINAC beam raster project for BLIP has begun with procurements in the pipeline. The goal for this project, a challenging goal, is to be operational for the 2016 BLIP run. BLIP will run through July with target processing continuing into August.

NASA sponsored NSRL experiments for the fall began on 7 October and ran through 15 November followed by a one week run in support of the National Reconnaissance Office (NRO). We expect to begin NSRL experiments on 31 March and run through June.

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



eRHIC design:

Intensive accelerator design work has been underway in recent months on the eRHIC version based on FFAG lattice. In this scheme the multiple recirculations of the electron beam can be done in a wide range of electron energies (from 1.3 GeV to 21.2 GeV) by using only two beam transport lines, which can be realized on the basis of permanent magnets. In such form, considerable construction and operation cost savings are expected, which is an important factor for the success of the eRHIC endeavor.

To this moment many of the important features and parameters of the FFAG eRHIC design have been worked out, including the FFAG lattice, the permanent magnet design, the beam measurement and correction principles, and the evaluation of different beam dynamics effects. Presently, work is underway to provide a description the FFAG eRHIC machine design for the eRHIC Design Study paper. This paper will present a detailed report of the eRHIC physics and the accelerator and detector designs.

LARP Group:

The Double Quarter Wave Resonator Crab Cavity (DQWCC) work was highly recognized by different groups working for the LHC HiLumi Upgrade at the Crab Cavity Workshop in December. By now we finished the Proof of Principle cavity profile measurement, and we will use the results as guidance for the fabrication of the prototype cavity. The collaboration between CERN and us for the tuner and cryomodule design is ongoing with onsite visits, frequent videoconferences, and material exchange on CERN EDMS system. It seems likely that all three cavity candidates will use our high pass filter design (initially developed for the 56 MHz cavity) for their Higher Order Mode coupler, which is a good opportunity to extend our idea to further applications. We are now working on constructing a Proof of Principle high pass filter using 3D printing followed by electroless metal plating and plan to measure its microwave performance.

#### Photocathode Group:

The Gatling gun project achieves a milestone in the month of January with the assembly and testing of the high voltage safety enclosure for the Gatling Gun Project. Figure:1 shows a Cad model shows how enclosure will contain the Gating Gun and Depressed collector along with the high voltage supplies and be installed in the 905 clean tent later this year. Figure 2 shows the completed structure and Figure 3 shows the high voltage system inside the enclosure.

Figure 1

Figure 2

Figure 3

#### The ATF Group:

Researchers from Euclid Techlabs studied wakefield electron acceleration, by sending the ATF linac beam through dielectric wakefield accelerating structures. A ramped "drive" beam efficiently produces a strong electromagnetic wake, which is probed with a compact witness beam with a variable delay. More about the ATF's experimental program and recent results, including ion generation, plasma wakefield and beam instrumentation experiments, may be found in the latest issue of the ATF newsletter at [http://www.bnl.gov/atf/docs/ATFNewsletter\\_Jan2014.pdf](http://www.bnl.gov/atf/docs/ATFNewsletter_Jan2014.pdf)

#### The Muon Accelerator Group:

Past month progress for MAP activity has been highlighted by the submission of a complete 6D cooling scenario in which several (up to 7) separate lattices have been designed and simulated by Diktys Stratakis and Bob Palmer. This scenario is being considered for inclusion into the initial baseline for a MAP Muon Collider and is a major system component for an eventual machine.

#### Low Energy RHIC electron Cooling:

To meet the timeline and cost goal for the LEReC project it was decided that the baseline approach for LEReC will be 704 MHz SRF gun and 704 MHz SRF cavity from the R&D ERL. Thus the needed hardware for the injector is already available and is under commissioning. Presently, installation of LEReC components in RHIC tunnel is planned for run FY17 with RHIC available for installation of hardware starting summer of 2016. Accelerator physics design for LEReC based on the ERL gun is presently in progress. An urgent task is to develop accelerator physics design and establish engineering baseline with the new LEReC layout in the RHIC tunnel as soon as possible, followed by the WBS estimates and other project documentation, in preparation for the upcoming DOE review.

#### Energy Recovery Linac:

Following the decision mentioned above, the ERL effort is focused on an early demonstration of high current from SRF gun and long cathode lifetime.

We started preparation for ARR of the SRF Gun at full current operation, as a first stage of full ERL commissioning.

We are exploring the beam physics of reusing ERL components for LEReC operation.

Multipacting effects in the ERL gun have been further studied. Simulation results support the experimental data, so we believe the results.

While multipacting will not stop us to do the first beam test from the gun in pulsed mode, the multipacting issue has to be resolved for CW mode operation. The plan is to copper plate the stainless steel parts of the second (existing) cathode stalk to reduce the secondary electron emission yield. Meanwhile we will design and build a new cathode stalk with improvements based on our new understanding.

#### Coherent electron Cooling:

112 MHz gun was surveyed and installed in place. Supports for the magnetic elements, diagnostics and fundamental power coupler were installed. Two clean rooms were delivered and installed in the IP2 tunnel. Trailer for the drive laser was delivered and installed near IP2 entrance.

Budker INP is on track with manufacturing of the helical undulators. The cartridges for the first undulator were machined. Permanent magnets were delivered by vendor and are being characterized.

#### The SRF Group:

ERL: Preparations for the low power beam test are under way.

56 MHz SRF cavity for RHIC: The cavity is in the tunnel for the upcoming RHIC run. There is still a lot to be done, but it is there and will see the first beam in February.

Congratulations to everybody involved! Your hard work is appreciated.

SRF for CeC PoP: The 112 MHz SRF gun is installed in the tunnel and surveyed into its final position. The two cleanrooms are in place on both sides of the cryomodule. Preparations for installation of the cathode cart at one end of the cavity and the FPC assembly at the other end are in progress. Fabrication of a cryomodule for the 5-cell BNL3 cavity is in progress at Niowave. Most of the parts for the helium vessel are on hand and Niowave is proceeding with brazing of a superfluid heat exchanger, which is an integral part of the vessel.

SRF VTF: The NSLS-II cavity vertical test was successfully completed at the Large VTF in building 912. The results exceeded the cavity specs and were slightly better than for the first NSLS-II cavity, which was tested at Cornell. Congratulations to everybody involved with the first successful test at LVTF!

We are happy that Photon Sciences appreciated our support on this test.

Ferdinand Willeke wrote:

Thomas, Ilan,

I would like to thank for your support in getting the NSLS-II superconducting cavity cols tested at the C-AD facility.

The 2<sup>nd</sup> cavity completed its test quite successfully last week and your part in this is success highly appreciated

Ferdinand

Jim Rose wrote:

Dear all,

Two weeks ago we concluded the successful vertical test of the second NSLS-II CESR-B cavity at the CAD facility. I wish to thank Sergey and the SRF group for their hard work and expertise in accomplishing this task. I also wish to thank Roberto and the CAD cryogenic group for their support and insight to the cryogenic tests. Special thanks to the CAD vacuum group for responding quickly to install a turbo pump on the cavity vacuum to overcome a cold leak that developed mid-test and threatened the test and our cavity schedule.

Over three years ago Gary McIntyre, on behalf of Ilan, told me of the plans for building a vertical test facility at CAD, and asked what our plans were for NSLS-II RF cavities. At that time we had kept both CESR-B and KEK type cavities in mind and it was agreed that the dimensions of the vertical test dewar would accommodate the testing of the NSLS-II cavities. We appreciate the foresight of the CAD SRF group in accommodating the needs of the NSLS-II program and their recent help in making this successful test.

Jim

## NOTE FROM OPERATIONS: Paul Sampson



RHIC shutdown ended early this month following the 4k cool down, power supply and ramp setup in RHIC and final pre-beam work in the tunnel. Setup continued in the injectors for much of January. After successfully achieving set goals for the new Booster LLRF system, most notably the double bunch merge, beam was injected into, accelerated and extracted from the AGS. During setup in AGS, both the nominal and low energy modes of running were established.

In the RHIC tunnel, pre-beam installation of the 56 MHz SRF Cavity has been completed. Full installation of it and other systems such as the Stochastic Cooling kickers, the AC dipole and transverse damper components will be completed on Maintenance Days and other scheduled access. Scheduled shutdown work, maintenance, repair and upgrades to other major systems have been completed.

In the AGS, all work has been completed. The D5 eIPM has been removed and is presently being modified for installation on a Maintenance Day. D15 eIPM fabrication continues. It will also be installed following magnetic mapping and welding of the girder outriggers in the ring.

BLIP is running well following a source change late last month. Maintenance for BLIP and LINAC will continue to run on a separate schedule, synchronized to scheduled target changes.

Work on the EBIS source and the laser ion source continues while setup with Au beam continues.

The CAD CATV system display includes daily updates including Testing, power disruptions and outages as well as important dates. This information can also be seen on the web at [RHIC Broadcast](#).

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

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

## **ARRIVALS: Welcome!**

Ramesh Sharma ~ Joined the MIRP/BLIP Group on Feb. 4, 2014 as a Research Associate, working with Suzanne Smith.

Susan Thomas - Joined the Main Control Room on Jan. 27, 2014, working with Peter Ingrassia as an Operator.

Petra Adams ~ Joined the Main Control Room on Jan. 8, 2014, working with Peter Ingrassia as an Operator.

Charles Sottile - Joined the RF Group on Jan. 23, 2014, working with Nick Laloudakis.

Winston Pekrul ~ Joined the Controls Systems Group on Jan. 23, 2014, working with Jim Jamilkowski under Front End Systems.

## **DEPARTURES: Farewell, you will surely be missed..**

F. Randazzo- (CAD Job Shopper) - last day was Friday, January 24, 2014

Derek Lowenstein - Retired and has a guest appointment with CAD

Anju Vyas - (Power Distribution) - Last day was January 24, 2014

David Pate- (Acc. R&D) - Last day is February 24, 2014 - Retiring

John Nicoellis - (CES) - Last day is February 24, 2014 - Retiring

Hans Abendroth - (Preinjector Systems) - Last day is February 28, 2014 - Retiring

## **Guest Notices:**

Lin Wu - First day was Jan. 23, 2014, working with N. Tsoupas.

Ruizhe Li - First day was on Jan. 23, 2014. working with H. Hahn as a Guest Scientist.

Ahovi Kponou - Last day is Feb. 28, 2014 as Research Collaborator