Particle Post September 2011

"The greatest discovery of my generation is that a human being can alter his life by altering his attitudes of mind."

~William James

Previous issues October 2004 GO

Note from the Chair

The C-AD facilities survived Hurricane Irene without any damage and I hope this was also the case for everybody's homes. We should remain prepared since the hurricane season is far from over.

By the end of the month the next NSRL run will start and will also inaugurate our new Main Control Room on the second floor of 911. We are also on track to start the 4 Kelvin cool-down for the next RHIC run on January third. The budget discussions in Washington for the next year have restarted after the summer break and there is a possibility that a FY12 federal budget is approved before the beginning of the new fiscal year, something that hasn't happened for many years.

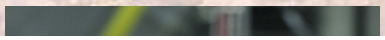
Administration

The Administrative group is in the process of preparing for fiscal year end closing on Wednesday, September 28th. At that point in time, our year-to-date expense on each program should reflect the value of all effort performed during the year, as well as the value of all goods and services received.

Throughout the year, expense in the last week of each month is processed in the following month. Thus, ending the year with a complete and accurate accounting of year-to-date expense requires additional effort. In order to capture direct labor effort through September 30th, the September time card extends beyond the customary cut-off on the 20th of the month and includes effort through the final day of the month. Likewise, Facilities and Operations will bill for services through the end of the month. Power costs, normally billed in the month following actual consumption are estimated for September and charged to the program as an accrual. In order to capture cost that reflects the level of effort expended on all construction, service and maintenance contracts, vendors are requested to provide an estimate of the value of their effort through September 30th. The estimated amount is then billed to the contract via the accrual process.

Please be attentive to requests for information and/or action throughout September. Additionally, in order to best position the Department for the possibility of a Continuing Resolution and/or budget cuts you are again urged to *make every purchase count. Buy only what you need to support critical work scope for which purchasing now is necessary to maintain schedule and achieve programmatic milestones.* Additionally, Thomas has strongly encouraged C-AD personnel to reduce vacation carry forward to a maximum of 20 days by September 30, 2011 which will reduce the labor cost charged to the Department.

Accelerator Division



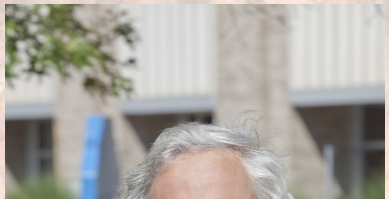
As preparations for the next run were under way, we had a small earthquake and Irene. Both events left little or no damage. For Run-12 we expect to start cool-down of the superconducting magnets to 4K at the beginning of January 2012. We will start with polarized protons at 100 GeV, followed by polarized protons at 250 GeV, and an ion run, either copper-gold or uranium-uranium or both.

Good progress has been made in the EBIS commissioning with gold beams. The design electron current of 10A was exceeded by 20%, and extraction from the trap is as expected. Now activities will shift to the transmission through the RFQ, Linac, and the Booster injection septum. We plan to take heavy ions from EBIS during the next RHIC run.

Many efforts are under way to ready the new Main Control Room for use in the NSRL run beginning mid-September. Computers and screens have being installed, the access control system, and the cryo control system is being implemented in the utility island. A few more things need to be done during and after the NSRL run so that the new MCR has the full capability for the next RHIC Run.

In addition to the spin-polarized protons we collide in RHIC, the experiments are also interested in spin-polarized neutrons. Since neutrons have no charge, they cannot be accelerated in the same way as protons.
They can be provided, however, inside polarized He-3 ions. A small workshop at BNL, 28-30 September 2011, will concentrate on finding practical ways to make this happen. A source is being developed with MIT, and EBIS can be used as an ionizer to form doubly charged polarized He-3 ions. The beams then need to be accelerated in the Booster, AGS, and RHIC. While not showstoppers are known, many details need to be worked out. Particularly challenging is the absolute polarization measurement at high energies.

Experimental Support & Facilities Division



I'd like to begin by thanking our Scheduling Physicist for FY 2011, Alexei Fedotov, for a job well done. Run 11 was a busy run with four different RHIC running modes plus an engineering run for a new experiment (A_NDY) along with three NSRL runs and a long BLIP run. Again,

thank you Alexei!

I am pleased to announce that Francois Meot has kindly agreed to serve as our Scheduling Physicist for FY 2012. The first run activity for the FY 2012 year will begin in a couple of weeks with the start of the NASA run (NSRL 11C). This run is particularly noteworthy since this will be the commissioning run for our new MCR.

We are still on course for a 1 Jan start for RHIC Run 12 with hopes that the budget will support a long run. Next week we will begin the STAR detector move from the collision hall to the assembly area. Although we anticipate no problems the move is a delicate operation as the 1200 ton detector system has to be moved a fair distance! This move is necessary in order to gain access to the inside of the STAR solenoid to install part of the Forward Gem Tracker for Run 12. The PHENIX experiment will have a new detector system for the next Run, a forward vertex detector system and the last complement of the resistive plate chambers. In addition, we have formulated a plan to add more shielding inside the RHIC tunnel to hopefully alleviate some issues with background in the PHENIX muon detector arms. Further work in support of the new A_NDY experiment awaits the resolution of funding issues . We continue to support several other projects for the department including the new MCR (still awaiting an official authorization to occupy!) , stochastic cooling, spin flipper, eLens, 56 MHz cavity, ERL etc.

Accelerator R&D Division

Gary McIntyre for Ilan Ben-Zvi: As noted in the last edition of the Particle Post the eRHIC team is turning its attention toward estimating the cost of eRHIC – Phase 1: 5GeV. Towards this end, Vadim Ptitsyn and Joseph Tuozzolo gave presentations defining the boundaries of the estimate during a meeting on September 5th. Generating this estimate is a major effort for CAD, in general, and for group leaders, specifically, and critical step towards the funding of this new collider. Due dates were given at the meeting including: the freezing of the physics criteria driving the design by September 27, 2011 and the submission of completed Work Breakdown Structure sheets by each group to the Administration group by November 15, 2011. Completion of this estimate represents a great deal of work, but it is extremely very important to the Department and the Laboratory.

With conditioning of the Fundamental Power Couplers (FPC) complete the CAD Vacuum is installing

them into the Energy Recovery Linac's gun cavity. Due to the negative impact of particulate matter on cavity performance this work must be done in a Class 100 cleanroom. Once the couplers are installed and the cavity is "baked" in place, the construction of the e -Gun cryomodule can proceed in Building 905 and then Building 912.

In addition to this assembly, other work has been continuing in the ERL blockhouse. The installation of the beamline for the G-5 testing is well underway. Many of the required magnets, stands and vacuum chambers are in place. As with the cavity/FPC installation all ERL chambers must be low particulate processed and installed while in a Class 100 cleanroom environment, a time consuming process. In the very near future FPCs from the Office of Naval Research (ONR) will arrive in the ERL for conditioning and testing. At ONR's request these FPCs will be conditioned and then powered to failure. Since one of the goals of FPC conditioning is traditionally to NOT damage the couplers, this is a unique opportunity to push a pair of FPC to their upper limits.

Operations

Operations are presently gearing up for the fall NSRL run (11c) which officially begins September 26th. Startup and checkout began the week of the 12th with beam anticipated in the Booster and to the experimental hall the week of the 19th. In addition to the usual tasks associated with startup from a long shutdown, the present effort includes commissioning and checkout of the new MCR. All operations will be executed from the new MCR starting with NSRL run 11c.

Elsewhere in the CAD complex, major work continues to progress. In the Booster, refurbishment/modification of RF system and EBIS to Booster transfer line modifications are nearly finished and all other planned work fully completed. In the AGS, replacement of Sextupole magnets, survey and other planned work is progressing on schedule.

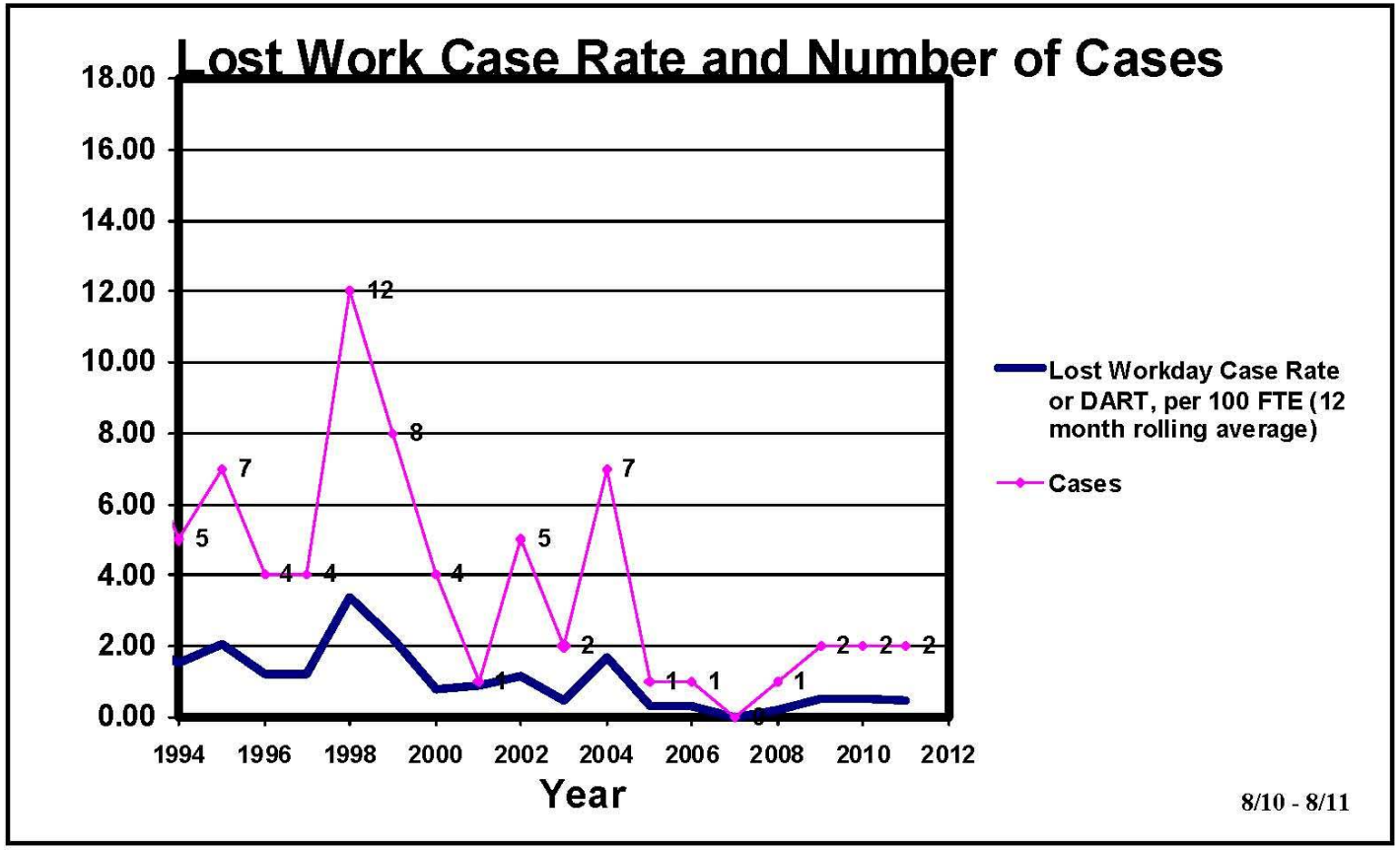
Major projects in and for RHIC continue to progress including 9 and 28MHZ RF Band III, stochastic cooling systems, e-lens infrastructure, instrumentation, cryogenics, vacuum and others. is progressing well.

EBIS commissioning will continue throughout the shutdown and upcoming NSRL run.

Daily startup schedules can be viewed on the CATV system.

For updates on shutdown progress see: Shutdown Progress

Safety Stats



C-AD Occupational Injury Statistics

	For Year* 2010	For Year* 2011
First Aid Cases	5	5

First Aid Cases	3	3
Recordable Cases	2	2
Lost Work Cases	1	2

* Calendar Year through 8/11

REMINDER: TLD exchange is done the *FIRST* FRIDAY of the Month.

EXCHANGE DATE: FRIDAY, October 7, 2011

Pete Cirniglario

Arrivals

Prachi CHITNIS joined the department on August 29. He is working with Kevin Brown in the Controls Group.

Andrey ELIZAROV joined the department on August 15. He is working with Vladimir Litvinenko in the Accelerator R&D Division.

Louis Evers rejoined the department on September 6. He is working with Leonard Mausner in the Medical Isotope Research & Production (MIRP) Program (BLIP/RRPL) Group.

Yichao JING joined the department on August 17. He is working with Vladimir Litvinenko in the Accelerator R&D Division.

Keren LI joined the department on September 6. She is working with Ilan Ben-Zvi in the Accelerator R&D Division.

Igor PINAYEV joined the department on August 15. He is working with Vladimir Litvinenko in the Accelerator R&D Division.

Vahid RANJBAR joined the department on August 22. He is working with Mike Blaskiewicz in the Accelerator Physics Group.

Steven TRABOCCHI joined the department on August 15. He is working with George Mahler in the Mechanical Support Group.

Takayuki YAMAMOTO joined the department on August 15. He is working with Masahiro Okamura in the Preinjector Systems Group.

Also,

Jean Clifford Brutus, Co-Op Engineer working with Joe Tuozzolo in the Accelerator Division appointment has been extended to December 9.

Alissa Lamberti, Student Assistant working with Tony Arno in the Design & Documentation Group appointment has been extended to November 30.

WELCOME!

Departures

John Barry, Vacuum Systems Group will be retiring on September 30.

Xiangyun Chang, Accelerator R&D Division will be leaving on September 30.

M. Paul Menga, Machine Operations Group has terminated effective August 18.

GOOD LUCK!

RHIC Newsletter. Please click on link to the left to view the latest web publication of RHIC News.

*We wish all of you born in **September***
a happy and healthy year ahead.
Birthday people ONLY click on cake

C-AD Service Awards August

30 years	Walter Shaffer
25 years	John Carlson
20 years	Dave Passarello

Congratulations!

DID YOU KNOW

By Emily Ruppel | August 24, 2011

Promoting Diversity — on the Atomic Level

They come from the midst of exploding stars beyond our solar system — and possibly, from the nuclei of far distant galaxies. Their name, "galactic cosmic rays," sounds like something from a science fiction movie. They're not really rays.

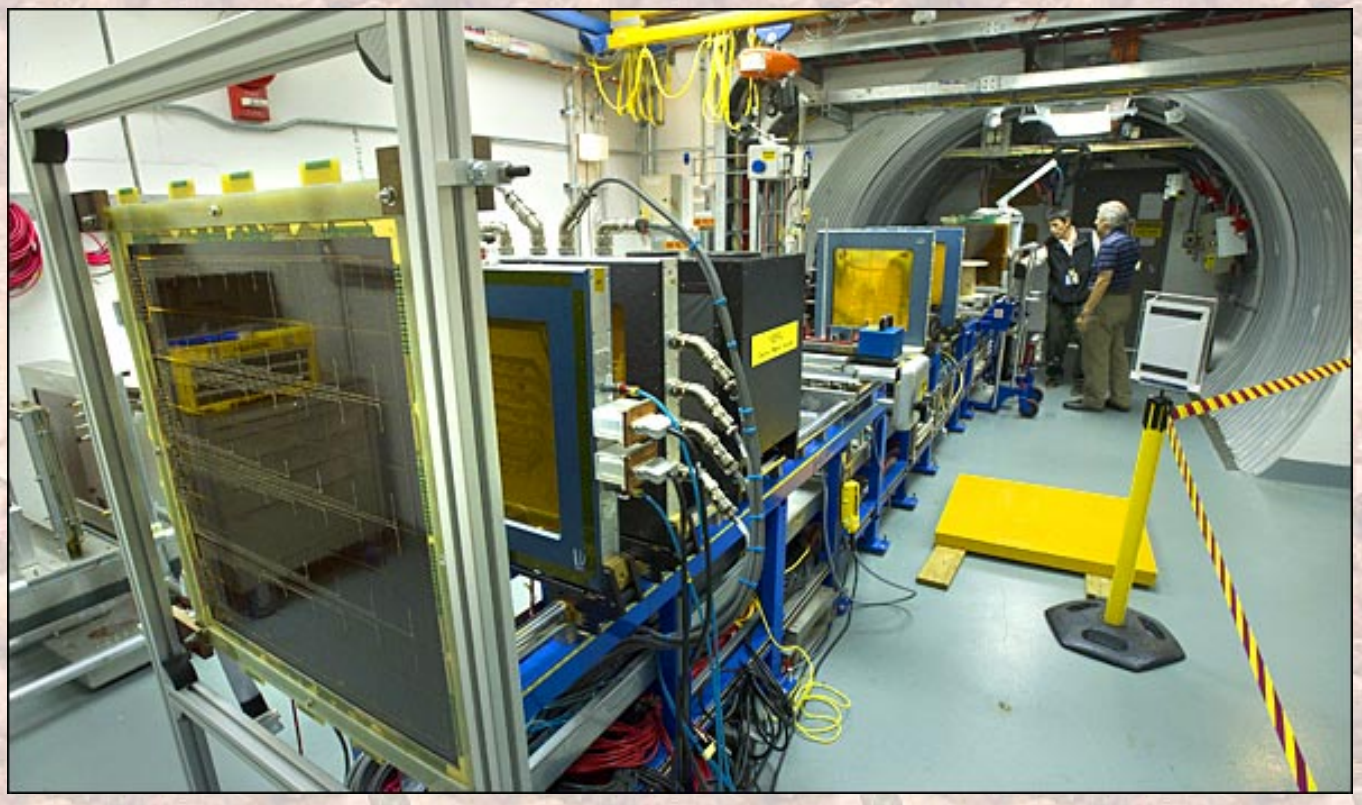
The Electron Beam Ion Source, a modern, compact ion injector will feed new kinds of particles to RHIC and NSRL.

Galactic cosmic rays (GCR) is the term used to describe a wide variety of charged particles traveling through space at high energies and almost the speed of light, from subatomic particles like electrons and positrons to the nuclei of every element on the periodic table. Since they're created at energies sufficient to propel them on long journeys through space, GCRs are a form of ionizing radiation, or streaming particles and light waves with enough oomph to knock electrons out of their orbits, creating newly charged, unstable atoms in most of the matter they traverse.

Unfortunately for astronauts going on missions outside the protective arms of Earth's atmosphere and magnetic fields, both of which shield us from high-energy space radiation, GCRs may live up to their ominous alias when they collide with the atoms inside living cells, possibly damaging cells' ability to repair and

reproduce properly. These interactions can lead to the types of mutations that cause cancer, tumors, genetic defects in offspring, blindness, and even death.

Researchers at the NASA Space Radiation Laboratory (NSRL) at Brookhaven Lab have been working to determine the type and extent of the biological risks astronauts on long-term missions in space face from exposure to GCRs and other types of space radiation (like proton-dense solar flares). At NSRL, researchers simulate space-based environments by using beams of charged particles extracted from Brookhaven's Booster particle accelerator to irradiate living cells, tissues, DNA (suspended in solution), and biological specimens.



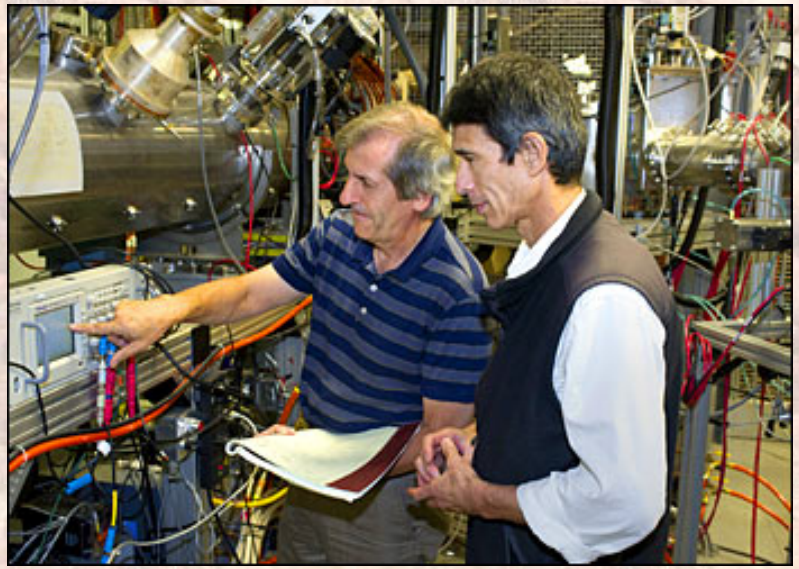
The NASA Space Radiation Laboratory

But because of their heterogeneous nature, creating the laboratory counterpart of a GCR has been a real challenge. Until recently, NSRL researchers could only use a single species of particle beam on any day, and their choice of elements was limited by the fact that Brookhaven's long-time heavy ion preinjector, the Tandem Van de Graaff, is only designed to work with certain types of atoms.

"What the Tandem does, it's been doing very well for many years," says Collider-Accelerator Department (C-AD) physicist Jim Alessi, "and that's to supply beams of heavy ions to the Relativistic Heavy Ion Collider and NSRL. But since the atoms provided by the Tandem have to be negatively charged before they can be accelerated, they must be capable of taking on an extra electron, which not all elements can do."

Noble gases, for instance, resist the addition of electrons to their atomic structure and can't be accelerated by the Tandem, so these common components of GCRs have been unavailable for study at NSRL until this spring, when the new Electron Beam Ion Source (EBIS), first came online.

Jointly funded by NASA and the U.S. Department of Energy's Office of Nuclear Physics, the new $20-million preinjector for RHIC and NSRL is capable of making and accelerating ions of almost every element in the periodic table.



Jim Alessi (left) and Adam Rusek at the Electron Beam Ion Source

"It's a big improvement," says C-AD physicist Adam Rusek. "We're trying to look at how living cells and DNA react to the kinds of exposure to radiation we don't get on Earth — and energetic ions of everything are out there in space. Of course, nobody is going to run an experiment using all the elements on the periodic table, but now we can provide many more particles than we could with the Tandem accelerators, which is more representative of galactic cosmic rays."

EBIS is also capable of switching very quickly between different species of ions, so soon NSRL researchers will

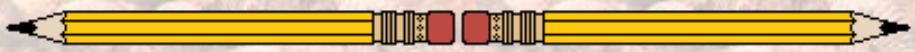
be able to integrate multiple ions into a single simulation, rather than waiting for another element to become available.

"We've already shown through our research at NSRL that live cells elicit different gene expression patterns based on the kinds of radiation they're exposed to," says NASA biologist Michael Story. "The frequency of cell transformation is much higher with energetic heavy ions than it is with x-rays or gamma rays. These types of transformations are the first step in the carcinogenic process, which can lead to cancer. Our goal now is to perform further studies of space radiation so we can determine with better accuracy what the risks are for astronauts spending longer and longer amounts of time in space — and to test and develop better protective measures against those risks."

Brookhaven physicists provide the starting particles for EBIS by producing a singly charged beam of the desired ions in an external ion source, and shooting these charged atoms into a one-and-a-half-meter tube inside a high-powered magnetic field, called the "trap."

Here, the particles are held and stripped of even more electrons by a high current electron beam, raising their charge from +1 to about +32 (for gold ions). After reaching the desired charge (which only takes a fraction of a second), the particles are released from the trap and the resulting beam is passed to the first of two radio frequency accelerators, which use the electric field from radio waves to "push" particles to a high velocity before they're sent to the Booster, from which they're transported to RHIC or NSRL.

"EBIS is the result of a long and fruitful relationship between the Department of Energy and NASA," said Derek Lowenstein, previous chair of C-AD and NSRL principle investigator, who wrote the original proposal for EBIS more than 20 years ago, "This is a major achievement for DOE, NASA, BNL, and the experimental community. It's a win-win situation for everyone."



FUN TIME

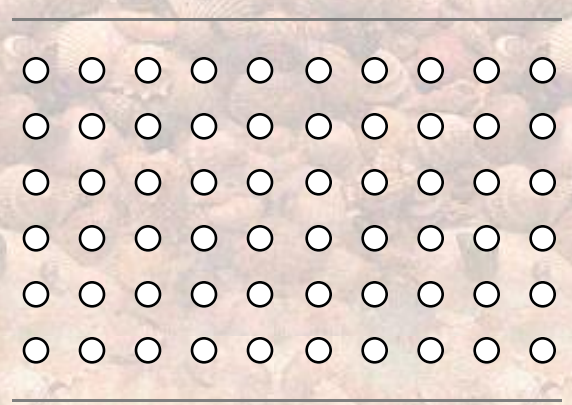
Hit-the-Dot

Test your skill. How many boxes can you check in 30 seconds?

Start Game | Stop Game Time:

Push Start to Play

Score:



Instructions:

1. **Click on the radio buttons as they are selected randomly by the computer.**
2. **1 point per hit, minus 1 point per miss.**

From: Carter, Christine B
Sent: Wednesday, September 07, 2011 11:44 AM
Subject: BERA Update 9-7-11 Please post & pass on!!

Good morning all & happy end of summer!

Let BERA assist you with the back to school, work, and the transition into Autumn with our awesome benefits!

FITNESS:
86 degree swimming pool for Aqua Aerobics, hot ZUMBA classes, Yoga, Pilates, Dance classes, and more!!!

Learn more about the programs and register today.

TRIPS & EVENTS: http://www.bnl.gov/bera/recreation/events.asp To purchase, visit the BERA Store in 488 M-F 9am-3pm

Cabela's, Bronx Zoo, Do as you Please NY City in the Chelsea/Eataly/High Line area, Show Boat in Atlantic City,

and a GHOSTLY walking tour of Greenwich Village in NY City!

**** NOTE: *Red Bull vs. LA Galaxy Soccer was rescheduled* due to the hurricane and BERA ended up with a few tickets to sell.**

The game is in NJ at the Red Bull Stadium on Tues 10/4, leave at 4pm for an 8pm game vs. Galaxy.

**** NOTE: *DUCKS Playoffs* = FIREWORKS!**
2 games for sure, and possibly more as they advance:

Divisional Playoffs (Best of 5) – Ducks host Games One and Two
Home Playoff Game A Wednesday, September 21 @ 6:35 p.m.
Home Playoff Game B Thursday, September 22 @ 6:35 p.m.

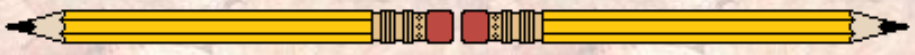
BERA Discount Week Monday 9/12 through Friday 9/16! BJ's, Costco, PERKS Card

VENDOR DAY, Atlantis Marine World, and more!

Come to 488 BERKNER HALL each day from 11am-2pm to check them all out, sign up, and save!

Hospitality, Play Group, and free Knitting Classes will all resume the week of September 12. Please join us at the REC HALL 317! Socialize & meet new BNL folks. http://www.bnl.gov/hospitality/ www.meetupl.com and join BNL Play Group

The September "Well Workplace Health Letter" can be accessed via the link (http://intranet.bnl.gov/).



The Food Pantry needs our help…

If everyone can bring in at least one non-perishable food item, this would help the local food pantries in our area. There are so many families who are in need of food and depend on their local food pantry to have at least one meal a day. With the food supply so low, the volunteer's who help out at our local food pantries can't help those in need. So please……bring whatever you can to replenish the food supply for those in need.

Your donation of any non-perishable food item can be

left in the box marked "Food Drive" located in the 911A Lobby. Your continued support is appreciated.

Thank you.

ALUMNI NEWS: AGS/RHIC/C-AD RETIRED CROWD - We'd enjoy hearing from you and what you have been up to. Please send your notes to pmanning@bnl.gov

You can catch up on all of Eric Forsyth's travels by clicking on his sailing yacht below.

September 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2 C-AD AP Seminr "Time resolved charge distribution and polarization Measurements on GaAs based strained superlattice photocathodes", Eric Riehn, C-AD, 4pm, Bldg. 911B LCR	3
4	5 Labor Day Lab Holiday	6	7	8 BSA Distinguished Lecture "Creating 'Personalized' Solar Energy for Six Billion People", Daniel Nocera, MIT, 4pm, Berkner	9	10

11 Grandparent's Day  Patriot Day	12	13	14	15 Blood Drive 9:30am to 3pm Brookhaven Center	16	17
18	19	20 Physics Colloquium "Towards a Muon Collider: The Physics Case", Estia Eichten, FNAL, 3:30pm, Bldg. 555 Hamilton	21 471st Brookhaven Lecture, Michiko Minty, C-AD, 4pm, Berkner	22	23 Autumn Begins APS Historic Site 2011 Walk, 11:30am Berkner APS Historic Site 2011 Award, 1:30pm Berkner	24
25	26	27 EAP Seminar "Preparing Your Marriage for Your Retirement", Nancy Losinno, 12noon, Berkner, Rm B	28 "The Opportunities for polarized He-3 beams for RHIC and EIC Workshop", 8am, Brookhaven Center	29 Rosh Hashanah "The Opportunities for polarized He-3 beams for RHIC and EIC Workshop", 8am, Brookhaven Center	30 "The Opportunities for polarized He-3 beams for RHIC and EIC Workshop", 8am, Brookhaven Center	

October 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1
2	3	4 Physics Colloquium "Workshop on QCD Phase Diagram", 3:30pm, Bldg. 555 Hamilton	5	6 EAP Seminar "Marital Checkup: Positive Stephs for a Healthy Marriage", Nancy Losinno, 12noon, Berkner, Rm B	7	8 Yom Kippur
9	10	11	12	13	14	15
16	17	18 Physics Colloquium "TBA", Michael Turner, 3:30pm, Bdg. 555 Hamilton	19 BSA Distinguished Lecture "Recent progress in particle physics and cosmology", Nima Arkani-Hamed, Princeton, 4pm, Berkner	20	21	22
23	24	25 Physics Colloquium "LHC Physics", Chris Tully, Princeton U., 3:30pm, Bldg. 555 Hamilton	26	27	28	29

30	31			
				

We Remember
Sept. 11, 2001

USS New York - A ship forged from the steel of the World Trade Center

Editor: ***Pamela Manning x4072***