

Contact: [C. Scholl](#)

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July 2014

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Quote of the Month: "Science grows like a weed every year." - Kary Mullis

## **A WORD FROM THE:**

Administration

Accelerator Div.

ES&F Div.

Acc. R&D Div.

Operations



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

This year's running period has finally come to an end with the completion of Linac operation for BLIP at the end of July. This was one of the most successful running periods with record gold-gold luminosities at RHIC, a record LINAC beam delivery and Sr-82 isotope production at BLIP and the first and the highly successful first use of the new Laser Ion Source for NSRL and RHIC. Congratulations to everybody and thank you for your outstanding dedication to the work at C-AD.

The summer is also very busy and we are preparing for another running period with very ambitious goals. It will see the first proton-gold collisions in RHIC, preceded by a high luminosity polarized proton run at 100 GeV and the isotope program will again be called upon to deliver record amounts of Sr-82 medical isotopes as the national demand continues to increase.

▶ Arrivals/Departures

Safety Stats

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 Award](#). Last year Service Awards are listed [here](#). 2012 Service Awards are listed [here](#).

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

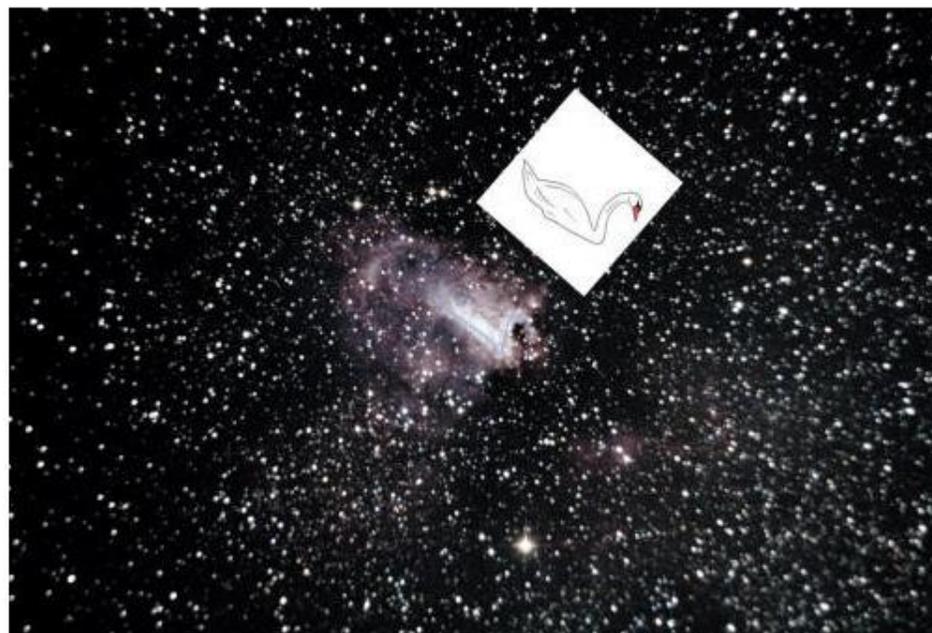
## **EVENTS/SEMINARS...**



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

Aug 11- (Bldg 510- SCR | 3pm) Particle Physics Seminar, "The Challenges in Operating a Large high energy physics experiment"

*Steve Bellavia captured a picture of - "The Swan Nebula", one of the largest star forming regions in our galaxy. It is approximately 5,500 light-years from Earth in the constellation Sagittarius and can be seen with binoculars or a small telescope. Much larger telescopes, or a time exposure photograph, is needed to begin seeing any color.*



~~Challenges in Operating Large High Energy Physics Experiments~~  
Presented by Beniamino DiGirolamo, CERN

Aug 12 - (Bldg 520 - SCR | 11am) Nuclear Physics Seminar "The Chiral Phase Transition of QCD from the Functional Renormalization Group" Presented by Fabian Rennecke, U. of Heidelberg

Aug 13 - (Bldg 463 - John Dunn SR | 9am ) All-Employee Event "Coffe & Conversation" Presented by Doon Gibbs, BNL

Aug 13- (BERKNER HALL Rm D | 12pm) "BWIS"

Aug 21 - (Berkner Hall Rm B | 4pm) Asset Protection & Preservation: Is Your Portfolio Protected?

Sept. 1 - LAB HOLIDAY

*Do you have to give a talk?*

**Public Speaking Techniques:**

**Verbal & Non-verbal**

*Presented by:*

*Theodore Sampieri Ext: 4894*

*12:00 – 1:00 Fridays*

CAD Building 911

*Large Conference Room: 2<sup>nd</sup> Floor*

Comet C/2014 E2 (Jaques) 8/7/2014:



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## IN OTHER NEWS...

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***Ebola Break out-*** Liberia shuts hospital where Spanish priest infected, Ebola toll hits 932- [Read about it](#)

***Airstrikes undertaken as US re-engages in Iraq-*** [...read about it.](#)

***Tropical Storm Iselle Makes Landfall in Hawaii*** ~ Honolulu ~ The first storm in a one-two punch heading for Hawaii clamored ashore overnight Friday as a weakened tropical storm, while a second system close behind it strengthened... [read more](#)

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## WHAT'S GOING ON IN OUR NEIGHBORHOOD?

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***Interested in Cycling?*** <http://www.bicyclelongisland.org/majoride.htm>

***Interested in Running or Walking?*** Check out the [lirunning March Calendar](#) for the following events: LIRRC Wed Night Summer Series (Eisenhower Park/Jul 16); Purple Ribbon 5k (Wantagh/ July 26) R.O.C. Race (Brooklyn/Sept. 13); Survival Race (Sept. 28) and more..

***For the Kids.*** Marvel Universe LIVE! (August) @ [The Nassau Coliseum](#).

### ***Stony Brook Events:***

***Horse-Drawn Carriage Rides*** ~ July 3 ~ Aug. 28 (6:00pm-) Take a ride through Stony Brook Village, past the harbor and back Thursday evenings throughout July and August. Rides begin adjacent to Robinson's Tea Room in the Inner Court at 6 pm and run through dusk and cost \$3 per person.

[Sunday Summer Concerts on the Green](#) ~ Free!

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## DAY AT THE VINEYARDS...

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***Macari Vineyard*** ~ [MATTITUCK] June 13 ~ In Store tasting at the Wine Guy; June 18 ~ Wine Dinner at One Main Restaurant

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

***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 Sat & Sun\*

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

***Palmer Vineyards*** - [RIVERHEAD]

## NOTE FROM OUR ADMINISTRATION: S. LaMontagne



This month, Property Management and DOE personnel are conducting a walkthrough of C-AD facilities. Although the last two walkthrough inspections noted improvements in housekeeping, it is imperative that both general housekeeping and the safeguarding and security of property are evident to the observers in this walkthrough.

The identification of personal property has been consistently noted as lacking in previous walkthroughs. Please ensure that personal property is clearly identified as such. If you are hosting guests or summer students, their personal property must also be clearly identified. Personal property labels are available from Ann Lamberti.

Throughout the year, all active Laboratory employees share responsibility for the success of the Laboratory's Property Management Program. In preparation for the annual walkthrough, you were asked to:

Ensure that work areas are clear of idle equipment. Equipment not in use should be either securely stored for future use, reassigned or excessed through the Department's Property Management Representative, Ann Lamberti.

Ensure that work areas are clean and materials are stored in an orderly manner. Valuable materials, including but limited to copper, should be securely stored.

Ensure that sensitive equipment not in use is securely stored.

Ensure that equipment is appropriately tagged. Government owned equipment should have either a barcode or a red tag (U.S. Government tag). Identifying labels should also be affixed to any personally owned equipment such as laptops, microwaves, toaster ovens, refrigerators, etc.

Your compliance with the requirements of the Laboratory's Property Management System is important. Remediation of deficiencies identified in the annual property walkthrough can be very time-consuming and divert manpower from critical efforts.

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## NOTE FROM OUR ACCELERATOR DIVISION: Wolfram Fischer



LINAC operation for BLIP ended in July, and the LINAC delivered another record number of protons to BLIP this. After last year's record of 0.455 Ah, this year came in at 0.513 Ah, +13% higher. The average current per day also set a new record with 106 micro-A, a 16% increase over last year's value of 95 micro-A. Congratulation to Deepak Raparia and the whole LINAC team. The LINAC will also undergo a number of upgrades this summer. We are installing new 5 kW solid state amplifiers that replace a tube model, and prepare for a current increase to 140 micro-A. In addition, the first elements of the BLIP Raster upgrade project will be installed in the BLIP beam line.

The preparations for Run-15 are now in full swing. We will start with 9 weeks of polarized protons at 100 GeV, followed by 5 weeks of proton-gold and possibly 2 weeks of proton-aluminum collisions. Vincent Schoefer has agreed to be the pp Run Coordinator so that Joerg Kewisch can concentrate on beam simulations for the low-energy cooling project LEReC. These simulations are critical for the progress of the project, and we are thankful to both Joerg and Vincent.

### *Upcoming events:*

13-14 August 2014      RHIC Retreat, BNL

22-26 September 2014      International Workshop on FFAG Accelerators, BNL

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



RHIC Run 14 ended the physics phase on 6 July. Overall Run 14 was a very successful run with a total of 22.4 weeks of cryo operation. With this we were able to get in 3.4 and 13.3 weeks of physics production with gold-gold beams at 14.6 and 200 GeV/n center of mass energies and 2.3 weeks of physics using a new beam combination – helium 3 on gold at 200 GeV/n center of mass energy. All physics goals were met or exceeded. Our post-run RHIC Retreat is planned later in this month where we will look into the run details and look for ways to make the runs even more productive. The plan for Run 15 is coming together with another new beam combination on the agenda – protons on gold together with another 100 x 100 GeV polarized proton run. The plan is to run for 22 cryo week, budget permitting, so with this we will likely be able to add a third collision pair (protons on silicon or aluminum are under discussion). The experiments are into their summer shutdown activities with STAR restoring the Forward Mass Spectrometer detector.

The annual Summer Sunday event featuring the RHIC machine and the PHENIX and STAR experiments was held this past Sunday. The has it a little over 1300 people from the local community took the busses to visit the RHIC complex. A larger number came to Berkner Hall to participate in the activities there, the RHIC presentation, Stump the physicist, special demonstrations along with 3-D displays of the accelerator (new this year), and the Phenomenal Physics show. In addition, the **Associate Director of Science for Nuclear Physics, Tim Hallman, was there manning a DOE booth promoting support for science research.** Tim is always welcomed here as we all fondly remember his days here doing AGS fixed target experiments in the 90's and of course as spokesperson for the STAR experiment for many

years. 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. [See pictures here.](#) BLIP completed operations on 31 July, ending another long 32 week run. Efforts were focused primarily on two fronts, the production of strontium-82 for medical use and research and development of a new medical isotope, actinium-225. Both efforts were successful. This year was a record year for strontium-82 production thanks to outstanding performance from the Linac and to excellent control of chemical processing by the Target Processing Laboratory processing team. BNL, LANL and Oak Ridge are collaborating on the actinium project. This year we irradiated thorium at BLIP at 140, 160, 180 and 200 MeV. The 200 and 140 MeV irradiations were completed in July. The targets were then shipped to Oak Ridge for chemical processing to separate out the actinium and assess yields and purity. The plan is to be able to process the irradiated thorium targets in the TPL by 2016. The goal of this project is to determine if actinium-225 can be produced in sufficient quantities to be useful for radioimmunotherapy of blood born tumors such as leukemia. Phase I of the new beam raster project has begun with procurement of beam line components and installation of some components before the 2015 BLIP run begins. Final installation will be during the 2015 shutdown period.

C-AD and Magnet Division personnel (mechanical, electrical, and cryogenic engineering) are completing preparations for shipping the sPHENIX BaBar magnet from SLAC to BNL. This involved visiting SLAC to assess the items to be shipped, producing detailed engineering drawings to design and machine the support systems for the magnet heat shield and the cryo valve box. In addition, preparations are underway to receive the magnet in building 912 for low power testing. The target date for shipping is the first two weeks this September. Additional work is expended in detailing the process of decommissioning the PHENIX experiment planned for the 2016 shutdown.

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## NOTE FROM OPERATIONS: Paul Sampson



Shutdown for FY14 is progressing well. Tests and last minute cold work was completed early last month. Major construction, upgrade, and maintenance projects have begun. In RHIC these include: CeC installation, e-lens upgrade and repair, PP-PP installation, bunch-by-bunch damper installation, Beam Dump and Dump Kicker repair and upgrades and many other items. The AGS, Booster and LINAC are opened and on Restricted Access. Work in those areas is progressing well. Work in the BLIP area will commence later in the run after an extended cool-down period. RF tests in those areas. Upgrade to the access controls system is a major effort in the Booster while other projects are ongoing in the rest of the injectors. Be aware of scheduled power outages this shutdown. Use the "RHIC Broadcast" link below to view all scheduled outages and testing. Shutdown project progress can also be viewed via the links below.

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



### **Polarized electron gun:**

The Funneling Polarized Electron Gun (AKA Gatling Gun) marked twin very significant milestones this month. The gun has been assembled at a Palo Alto, California site of the company Stangenes. The huge gun vessel attained a vacuum level of  $10^{-12}$  Torr, then conditioned with a high-voltage power supply. Gallium arsenide cathodes prepared with a cesium monolayer specially treated with oxygen were transferred into the gun. One should note that this extremely delicate cathode was measured to have a quantum efficiency of 0.12% in the preparation chamber, and following the load-lock transfer operation (lasting 30 minutes) still had a quantum efficiency of 0.1% in the gun following this very successful transfer operation. Then a small laser was used to illuminate, initially a single cathode. The gun produced a clear beam, which was measured on a beam profile monitor screen and current was measured from the power supply and on the Faraday cup. Following that, two cathodes were used to produce two beams from diametrically opposed ends of the gun (two barrels of the 20 barrels Gatling Gun...). These beams were alternately pulsed at a frequency of 2 Hz, and these two bunch streams were merged into a single beam at the output of the gun, using the special beam rotator magnet (see attached pictures). Thus the two milestones, the “first beam” and the “funneling” were demonstrated, at a low current dictated by the level of radiation shielding in the Transfer Engineering site.

Thanks are due to a large number of people in the department who contributed to the design, fabrication, laser, beam instrumentation, specialty magnets, power supplies, vacuum, photocathodes, controls and much more. This project is one of a small number of accelerator R&D experiments with critical importance to the eRHIC project.

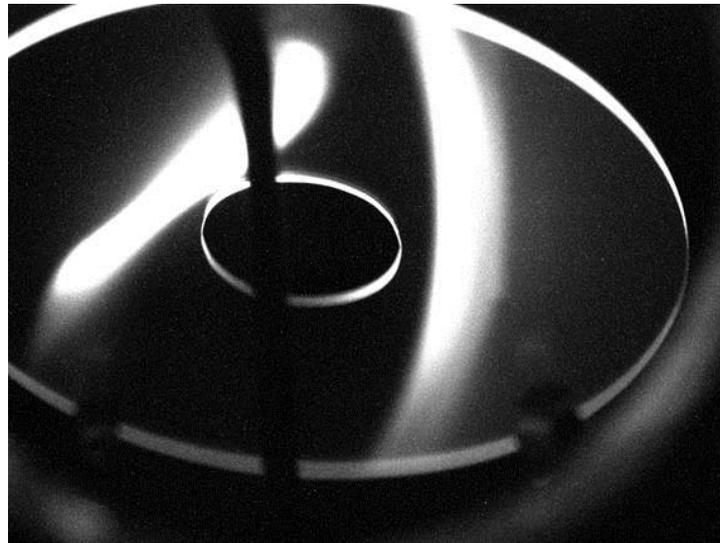


Figure 1. Two beams seen on the beam profile monitor

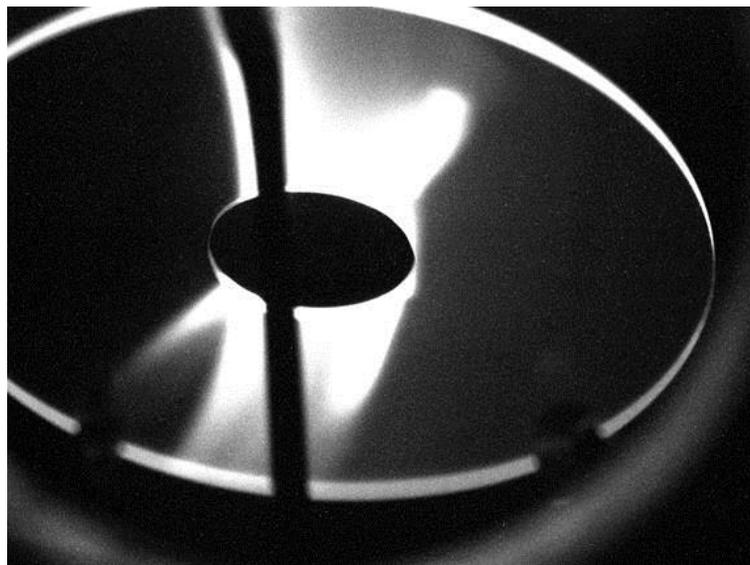


Figure 2. The two beam have been combined on axis of the gun output.

## **LEReC**

LEReC had the DOE Technical Cost Schedule and Management review on July 09-11.

The overall review went very well. DOE especially commended the choice of re-using ERL's equipment which significantly reduced the cost of the project. However DOE identified several items which require immediate attention. These include a fully completed bottom-up contingency estimate, the resource-loaded schedule and strengthening of the project management team through increase in level of effort.

To follow up on the committee's recommendations, LEReC will proceed with a baseline design based on the SRF gun, which is presently under commissioning. At the same time, a design based on the backup approach with DC gun will be fully developed.

### **The LHC Accelerator R&D Program Group:**

As the main body design is completed, the Double Quarter Wave Crab Cavity (DQWCC) work is focused on the design of its RF components. The collaboration work between Lancaster University and BNL pushes the Higher Order Mode coupler and filter development forward in a very efficient way. The Proof of Principle (PoP) cavity has arrived at CERN for another round of cold test scheduled in September. The cavity will be prepared in the new SRF cleaning facility.

### **The Coherent electron Cooling experiment:**

We have continued installation of the experimental equipment for CeC PoP. The machine protection system was mounted in the rack and connected to the equipment. PASS system was certified and presently we have ability to test RF components when closing the entire RHIC tunnel. All items from the 704 MHz cavity critical design review are closed and Niowave placed an order for the pressure vessel, which is to be delivered by the end of October. Budker INP has assembled and preliminary tuned the first helical undulator. Currently it does the fine-tuning of the undulator with 3D Hall probe. The precise machining of the cartridges for the second undulator is completed.

### **The Accelerator Test Facility <http://www.bnl.gov/atf>:**

First experimental demonstration of a single-shot, angle-resolved, Compton x-ray spectrum marked a new level of achievement in the ATF's user experiment conducted by UCLA with participation from Tokyo

Metropolitan Univ. The researchers used a Bragg bent-crystal spectrometer developed earlier in collaboration with Peter Siddons (NSLS).

The "Compton beamline" (ATF BL#1) is being reconfigured now for a different experiment, from RadiaBeam Inc., aimed at demonstrating x100 enhancement in the Compton source repetition rate by recirculating a laser pulse in an active cavity. Simultaneously, a new Inverse Free Electron Laser user experiment is under installation in ATF BL#2.

In preparation to the upcoming 17th ATF User Meeting <http://www.bnl.gov/atfusersmeeting/>, a call for new user proposals is sent out. This meeting will be followed by the ATF II Upgrade Workshop <http://www.bnl.gov/atfupgrade/>.

For more information about the ATF please check out the latest issue of the ATF Newsletter <http://www.bnl.gov/atf/docs/ATFNewsletter.pdf>."

### **Energy Recovery Linac:**

July was very busy month for the ERL team. We were heavily involved in participation for LEReC review.

Meanwhile we continue installation of components and preparing documents in order to make sure that ERL team is ready for commissioning high power gun to dump test. Beam dump has installation has been completed, shielding installed, water connected. Extraction line vacuum components and magnets have been installed. The copper plated cathode stalk has been cleaned and getting ready to be installed in the gun next month. Many diagnostics components have been installed. The new system to monitor average beam power has been designed and will be ready for operation soon.

Thanks to ERL Operations Coordinator (Lee Hammons) the package of ERL OPMs have been updated with new procedures and all necessary training were completed and classes have been taken by ERL operators in time.

The ERL gun to dump Accelerator Readiness Review (ARR) took place on July 29-31. The ARR team was charged by C-AD Management to perform an independent Accelerator Readiness Review of ERL gun and beam transport to the dump for high-current commissioning. The team was asked to identify actions that are needed for a successful Phase II Accelerator Readiness Review of the complete ERL later in the year.

The final report should be available in couple weeks. In general ERL team received very positive review with some comments and suggestion for improvements. The ARR team indicated several minor action items to complete before high power commissioning of ERL will start. Meanwhile the ERL should continue commissioning under the low power exemption.

I would like to say thank you all groups who continue enthusiastically supporting the ERL project. Next month we will continue studies of SRF gun behavior with cathode stalk. Then starting from September we will be back for commissioning with the beam.

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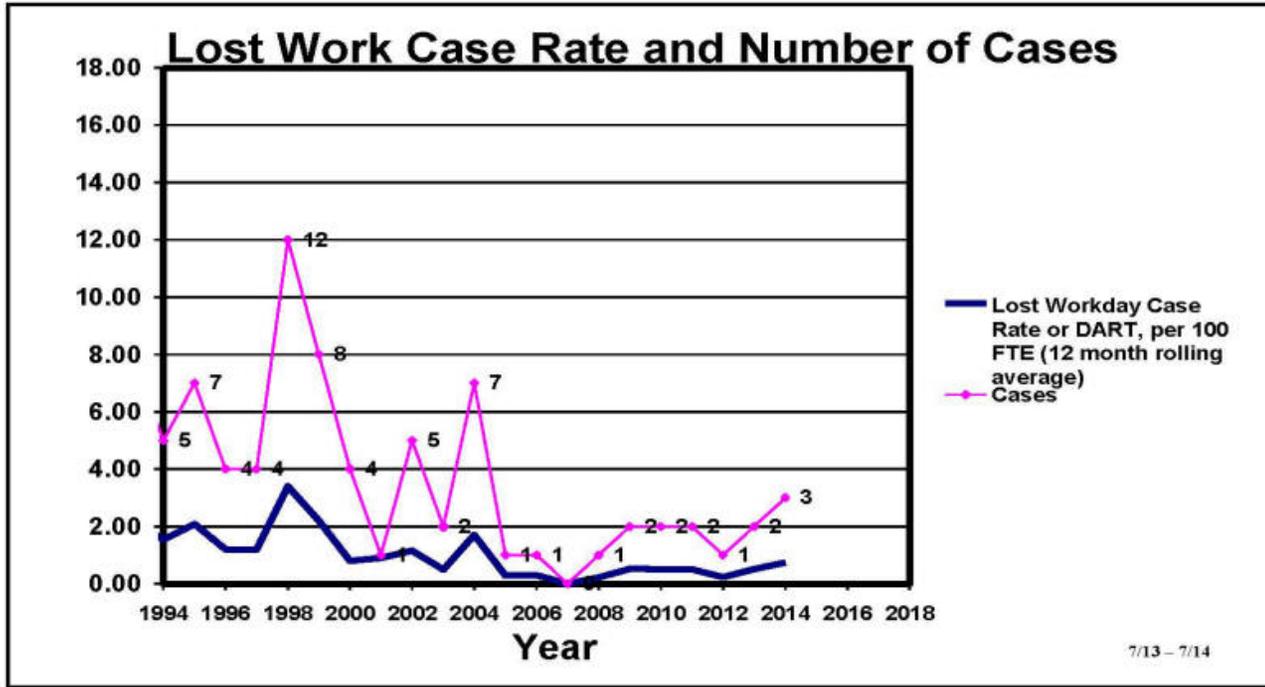
### **ARRIVALS: Welcome!**

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

Carlos Marques - (SRF) - Last Day is August 31, 2014

### **Guest Notices:**

Zhe Duan (Acc. Physics), C-AD Guest end date was July 31, 2014.



### C-AD Occupational Injury Statistics

**For Year 2013      For Year\* 2014**

<b>First Aid Cases</b>	<b>5</b>	<b>5</b>
<b>Recordable Cases</b>	<b>3</b>	<b>2</b>
<b>Lost Work Cases</b>	<b>2</b>	<b>1</b>

\* Calendar Year through 7/14