

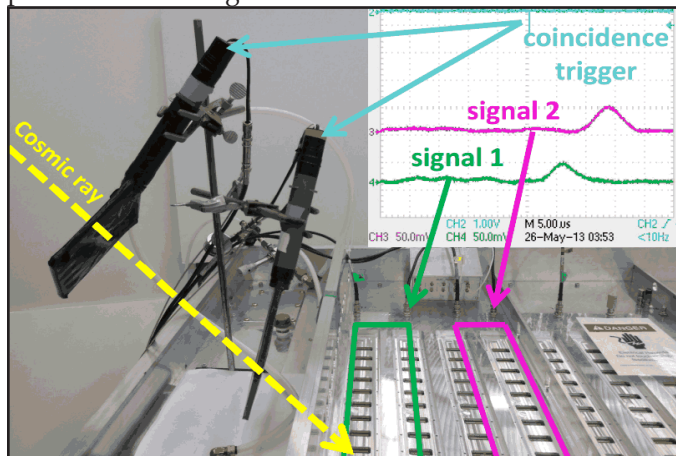
Experiment of the week

The VANDLE collaboration has returned to complete experiment 11027 in partnership with the MoNA-LISA collaboration. In February we used a ^{40}Ca beam to test the viability of the MoNA-LISA-VANDLE (d,n) experimental setup. Currently we are trying to measure the $^{56}\text{Ni}(d,n)$ cross section which provides important information for a proton-capture reaction in the rp-process of stellar nucleosynthesis. We have about 30 visitors scheduled to arrive during the experiment from Rutgers, ORNL, Tennessee, Augustana, Hope, Concordia, Westmont, UMich, Wisconsin LaCrosse, Wabash, Indiana and Gettysburg.

Samurai TPC

The SAMURAI time-projection chamber saw its first traces of cosmic rays this past week. The main component of the TPC consists of a field cage which forms the walls of the detector and provides a uniform electric field. Cosmic rays passing through the detector ionize the argon/methane gas inside. Under the influence of the electric field, the ionized electrons drift toward a set of wire planes near the top. These planes form a high-electric-field multiplication region which causes an electron avalanche, amplifying the signal on the anode wires.

To identify a cosmic ray we use two plastic-scintillator paddles. When the cosmic ray passes through the TPC, we observe coincident signals on two sections of the wire plane (see figure below). The timing of the two peaks, relative to the paddles' coincidence trigger, is related to the drift time of the electrons. It gives us information about the vertical position of the particle. This is the "time-projection" information of the detector, which provides a 3D image.



SAMURAI TPC's first traces of cosmic rays.

Imaging the EBIT's electron beam

The NSCL's electron-beam ion trap (EBIT) charge breeder is part of the ReA post-accelerator. The EBIT increases the charge state of ions, which are injected from the gas stopping (N4) vault, and ejects highly charged ions to the ReA linear accelerator for reacceleration to high energies. Highly charged ions are created and trapped in the EBIT by means of a high-current electron beam which is compressed by a strong magnetic field of a few Teslas. The efficiency of ion injection and the speed of the charge breeding process strongly depend on the density of the electron beam.

Last winter, a new cathode insert for the EBIT electron gun was designed and built in order to improve electron transmission through the trap system. The new insert recently produced an electron-beam current of 800 mA, which is the highest current sent through the EBIT superconducting magnet so far. To confirm that the beam was well compressed by the 4-Tesla field currently used, pictures of the electron beam have been taken with a pinhole X-ray CCD camera. The camera allows one to observe X-rays emitted from highly charged ions that have been excited by the electron beam.

The radius of the electron beam was measured to be in the range of $100\mu\text{m}$ (roughly the size of a human hair), in agreement with expectations. In the next months, systematic studies will be conducted to study how the electron-beam radius can be reduced further by changing operating parameters of the electron gun and increasing the EBIT magnetic field up to 6 Tesla.



Typical image of the EBIT electron beam taken with an X-ray pinhole camera. Each white dot is the result of an X-ray hitting a pixel of the CCD.

FRIB Lehman review

FRIB finished preparations for a Lehman review next week. 19 reviewers and observers will hear 36 presentations in 1.5 days. This review is about half the size of last year's review. The goal of the review is to validate two proposed baselines that allow for the start of civil construction this fall. The review in the Henry Center takes place next Tuesday and Wednesday morning. President Simon will give the opening address and also in attendance will be Executive Vice President Udpa and Vice President for Research Hsu.

ReA3 progress

The installation of the ReA3 beam-lines is rapidly progressing. Several activities such as cable tray installation, magnet assembly, beam diagnostics assembly and alignment, and beam line leak checking and cleaning are currently underway. The first beam-line being built goes to the ANASEN detector currently installed on the ReA3 hall area. The beam line consists of 19 quadrupoles, 4 dipoles, 6 corrector magnets and several diagnostic stations.



Sam Nash works on the assembly and installation of an aperture to be used in one of the ReA diagnostic stations. Once the box is fully assembled, it will be installed on the ReA beam line.



Danby quads and a corrector magnet have been installed on the East High Bay.

Tier II Inspection June 12

The Laboratory monitors the effectiveness of its Environment Safety and Health Management System (ESHMS) program through ongoing assessments and through review of Laboratory operational performance, ESHMS objectives and performance measures. This process includes evaluation of reportable occurrences and non-conformances, through Tier I and Tier II inspection findings, pre-job site inspections and briefings, Trouble Reports and incident/injury investigations.

The next Tier II inspection is scheduled for June 12. Members of MSU EHS will be inspecting Laboratory work areas for compliance with EHS regulatory requirements. Historically, the most frequent observations during Tier II inspections involve housekeeping, chemical container labeling and misuse of extension cords and power strips.

Please take some time in the next week to examine your work area and address those issues that could use some improvement.

Lab reception and tours for UITI2013

On Tuesday June 4 from 4-7pm the lab will host a poster session and reception for participants in the University and Industry Technical Interchange (UITI) Review Meeting, UITI2013. The UITI2013 meeting will be held at the Lansing Center from June 4-6 and is the 2013 version of the bi-yearly gathering of researchers supported by the Department of Energy's Office of Defense Nuclear Nonproliferation Research and Development. We expect around 250 participants and the reception will be a great chance to show-off the laboratory. Representatives from 11 of the US national labs will be in attendance. There are 101 posters that will be presented (with 25 from NSCL). The event will occupy Room 1221, the Seminar Room, and the Atrium with people moving between. Graduate student tour guides will show small groups around the lab as part of the event.

Seminars

- **Wednesday, June 5 at 11 AM**

Nuclear Seminar in the Seminar Room

Alexander Volya (Florida State University): "Continuum Shell Model and the Nuclear Many-Body Problem at the Limits of Stability"

- **Thursday, June 6 at 11 AM**

Research Discussion in the Lecture Hall

D. Ackermann (GSI Helmholtzzentrum für Schwerionenforschung GmbH): "²⁷⁰Ds and Its Products K-isomers, sf-alpha Competition and Masses for Superheavy Nuclei"

People at NSCL

Next week NSCL has 9 visitors: Dan Bardayan (Oak Ridge National Lab), Jerry Hinnefeld (Indiana Univ.), Raymond Kozub and Zachary Bergstrom (Tennessee TU) are coming for Bill Peters's experiment 11027B; Chris Campbell (LBNL), Umesh Garg (University of Notre Dame), Masaki Sasano (RIKEN) and Sydney Gales (GANIL) will participate in Remco Zegers's 11021 experiment and Torben Lauritsen (ANL) will come to participate in GRETINA discussions.

NSCL welcomes 3 new people. Alan Lear joined Sean Liddick's group on May 28, Liliana Caballero will join Hendrik Schatz's group on June 1 and Ella Higgins will join the Facilities Department on June 3

Congratulations to Andrew Klose, who successfully defended his Ph.D. dissertation on Wednesday. Paul Mantica is his advisor.

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