NSCL

THE GREENSHEET

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CCF USER PROGRAM WRAPS UP

The last experiment for the NSCL Coupled Cyclotron Facility will end on Sunday. The CCF program has been remarkably successful with over 2,500 publications and and educating more than 10% of the U.S. PhDs awarded in nuclear science over a 20-year period. More than 1,000 different rare isotopes were used in experiments conducted by thousands of scientific users. The results revolutionized our understanding of atomic nuclei and their role in the cosmos.

The CCF began operation almost exactly 20 years ago with beam extracted from the K1200 in October 2000. Coupling two superconducting cyclotrons was the original dream of Henry Blosser and his team, but for many years the K500 and K1200 cyclotrons were used individually. In the early 1990s Felix Marti suggested going back to the coupling concept in order to get higher beam power to make more rare isotopes. The CCF was realized by Richard York, who led the project, and the team working with him.

We are planning a lab-wide Zoom meeting celebration for the 20 years of successful operation of the CCF on December 4th at 10 am. We will hear comments from some of the people who made it work. Watch your email for an announcement.

REA3 STATUS AND UPDATE

ReA3 is shut down for maintenance and upgrades, and will return to operations, providing beam to experiments in March 2021. The upgrades, improvements, and maintenance activities include:

- Improvement of cryogenics distribution to increase reliability
- Replacement of faulty room-temperature quadrupoles in the high-energy beam line
- Elimination of remaining small air leaks in the RFQ
- Conditioning of the RFQ in order to achieve maximum inter-rod voltage, needed to accelerate q/A = 0.2

Other activities, linked specifically to ReA6, will also be completed at the same time, for example:

- Installation of new room-temperature rebuncher
- Installation of all diagnostics boxes in the ReA6 accelerator and experimental areas
- Completion of all utilities for ReA6
- Completion of power supply, RF and controls installation
- And, finally, run the whole system. ReA, which is the combination of ReA3 with ReA6, will be cooled down again in March, with commissioning starting in April.

View of the ReA6 cryomodule and new high energy beam line in the ReA6 accelerator vault.

2020 FALL MEETING OF THE DIVISION OF NUCLEAR PHYSICS

Contributed by Dean Lee

The 2020 Fall Meeting of the Division of Nuclear Physics (DNP) was held from October 29 to November 1, 2020, as a virtual meeting hosted by FRIB. There were approximately 1,400 registered participants, 900 oral presentations, and 100 poster presentations. These numbers are approximately double the usual participation at in-person DNP meetings. It was by far the largest DNP meeting ever held and probably the largest nuclear physics meeting ever held anywhere. There were many new developments announced in areas of nuclear structure, nuclear reactions, new detector technologies, isotope harvesting, electroweak processes, neutrinos, fundamental symmetries, neutron star properties, binary mergers, nuclear astrophysics, medium-energy and relativistic heavy-ion collisions, heavy flavor production, quark and gluon distribution functions, machine learning, quantum computing, diversity in nuclear physics, and numerous other topics. There were also sessions for the

50th anniversary of Physical Review C, Women in Science Social, DNP Business/Town Meeting, virtual tour of NSCL/FRIB led by Zach Constan, and three pre-meeting workshops on FRIB Day 1 Science, Frontiers in Neutron Physics, and Computational Advances in Nuclear Science.

It was the first virtual meeting of the DNP ever held, and by all accounts, the meeting was highly successful. The DNP leadership has said that it was impressed by the professional quality of the meeting organization and execution, and the feedback from participants has been overwhelmingly positive. The success of the virtual poster session with YouTube videos, extended discussions, and the participation of more undergraduates who might otherwise not attend, has led the DNP to consider adding a virtual poster session to the next in-person meeting.

The FRIB team was led by the tireless efforts of Elizabeth Deliyski, Katherine Rifiotis, and Robert Patterer, and the faculty organizer was Dean Lee. The planning included weekly meetings with Ken Hicks and Sherry Yennello from the DNP on organizational planning, as well as Shelly Lesher for the Conference Experience for Undergraduates poster session, Ramona Vogt for the session chairs, and Roxanne Springer for the DNP Allies Program. The meeting was very successful due to the efforts of many people at the laboratory who made available their time to assist with the event and serve as Zoom hosts.

MSU SCIENCE FESTIVAL NOW ACCEPTING PROPOSALS

Contributed by Zach Constan

MSU Science Festival (April 2020) is accepting proposals until December 1! They invite lots of different ways to (virtually) share your research with the public via live webinar or otherwise:

Citizen Science Project

Do you have a project that involves collecting information by the public and or school students which is then shared with researchers? Could you engage the audience in activities they can do outside or in the comfort of their home?

Experiment Along Virtual Demonstration

Hands-on activities families can do at home as they follow along with your instructions and demonstrations during a live streamed online event.

Online Virtual Talk, Demo, Tour, or Performance

Informal talks, performances, or demonstrations across the STEAM disciplines presented as a live streamed online event, pre-recorded presentation or film screening.

Self-Guided Experience

Provide information to walk visitors through self-guided experiences in your museum, garden, or even their own backyards through thoughtfully designed scavenger hunts, geocaching adventures, or other similar projects.

School events will also pair up classrooms with scientists for a short conversation. The entire presentation should last 30-45 minutes in total including time for questions. Use the links above to submit proposals and/or contact Zach Constan (constan@nscl.msu.edu) with questions!

CCF UPDATE

The cyclotrons are in their second week of running calcium-40, the final CCF beam, and we are making every hour count. Last week, calcium-37 fragments were provided to an S800 experiment that ended at 10:00 Saturday. Secondary beams of scandium-40 and -41 were developed next and sent to the N4 linear gas cell for stopping. At 22:00, these activities were interrupted for a detector test with calcium-40 in the S2 vault that lasted until 07:00 Sunday, at which time scandium-40 beam was reestablished and a BECOLA experiment began.

SEMINARS

- MONDAY, NOV 16 AT 9:00 AM
  Online via Zoom, Passcode: 774461
  Christopher Richard, NSCL
  'Analysis Techniques and Diagnostics of Low B Hadron Beams'
- TUESDAY, NOV 17 AT 11:30 AM
  Online via Zoom, Passcode: FRIBTA2020
  Ed Brown, NSCL/MSU
  FRIB Theory Alliance - Dialogues on Nuclear Physics:
  'The Nuclear Physics and Astrophysics of Accreting Neutron Stars'
- THURSDAY, NOV 19 AT 11:00 AM
  Online via Zoom, Passcode: 865595
  Ruben de Groote and Jacek Dobaczewski,
  University of Jyvaskyla; University of Warsaw
  'The Magnetic Octupole Moment of scandium-45'

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