HRIBF, Upgrade for the FRIB Era Workshop Report

http://www.phy.ornl.gov/workshops/users09/

On Nov. 13-14, 2009, the HRIBF Users Group held an HRIBF users workshop at Pollard Conference Center on the campus of Oak Ridge Associated Universities in Oak Ridge. The purpose of the workshop was twofold: (i) to solicit user input and support for the proposed new production driver based on a 70-MeV fixed-energy light-ion cyclotron; (ii) to solicit user input to update the HRIBF strategic plan.

The workshop was a resounding success, both in terms of attendance (153 participants representing 44 institutions from 10 countries) and outstanding user input (suggestions, proposals, and advice).

Agenda

Presentations and discussions were organized into sessions encompassing:

- Upgraded HRIBF
  - Technical aspects of a commercial "turn-key" 70-MeV cyclotron
  - HRIBF and its relation to other ISOL facilities in the world
  - Isotope research opportunities with the cyclotron
- Research areas
  - Nuclear structure by in-beam spectroscopy
  - Nuclear structure by decay spectroscopy
  - Nuclear astrophysics
  - Nuclear reactions
  - Applications with radioactive ion beams
  - ISOL technologies
- Associated areas
  - Instrumentation
  - Coupling between nuclear theory and experiment
  - World-wide context
  - Coupling between FRIB and HRIBF
  - Education and outreach

The program for individual areas was organized by session conveners consisting of non-HRIBF scientists and local personnel. Most sessions consisted of a series of presentations illustrating the type of research the users would like to do with the new beams and higher intensities that would result with the new cyclotron driver. The required equipment was discussed. Theoretical perspective on the type of data needed to make impact on model developments was offered.

The majority of the proposed research centered on neutron-rich beams from proton-induced fission. In addition, proton-rich beams important for astrophysics and unique ^{56}Ni beams with low ^{56}Co contamination were highlighted. Major research thrusts discussed included studies of:

- single-particle strengths using light-ion transfer
- collectivity and g factors of excited states using Coulomb excitation

- heavy-ion fusion-fission cross-sections
- radioactivity, encompassing level structure, beta-delayed neutrons, and beta strengths,
- (n,γ) surrogate reactions
- low-energy resonance and proton capture reactions of importance for understanding astrophysical processes

Separate sessions were devoted to laser and electromagnetic techniques for producing and enhancing radioactive beams and to various applications of radioactive beams at HRIBF, especially in the context of the facility upgrade (unique opportunity for isotope R&D with 70-MeV cyclotron, fission-fragment data of interest to nuclear reactor operations, stockpile stewardship, medical wear studies, and accelerator mass spectroscopy).

White paper

The conveners of the working groups will produce written reports from their sessions. This will provide a core of the White Paper that will be put together by the User Executive Committee and facility management. This White Paper will contain the case for the 70-MeV cyclotron proposal submitted to DOE and will be used to update the Strategic Plan for the facility.

The schedule to produce the HRIBF User white paper in support of the upgraded HRIBF is:

December 18 - Conveners submit their contribution
January 7 - Distribution of the draft to the users
January 14 - Receipt of user input
January 21 - Submission to the Office of Science