

Studies of neutron-rich isotopes at the CARIBU facility

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A new facility for the production of short-lived neutron-rich isotopes, CARIBU, is now operational at Argonne National Laboratory. CARIBU, the Californium Rare Ion Breeder Upgrade (CARIBU) of the ATLAS superconducting linac facility, provides low energy and reaccelerated neutron-rich radioactive beams to address key nuclear physics and astrophysics questions. These beams are obtained from fission fragments of a ²⁵²Cf source, thermalized and collected into a low-energy particle beam by a large helium gas catcher, mass analyzed by an isobar separator, and charge bred to higher charge states for acceleration in ATLAS. The approach employed at CARIBU is fast and universal and short-lived isotopes are extracted with a yield essentially following the Californium fission distribution. The facility has ramped up with operation first with a 2.5 mCi source, followed by an 80 mCi source and now a 300 mCi source which has yielded extracted low-energy mass separated radioactive beams at intensities in excess of 2×10^5 ions per second. An upgrade to a full 1Ci source is expected later this year. Radioactive beams have been charge bred with an efficiency of about 12% and reaccelerated for experiments at or above the Coulomb barrier. Over 70 neutron-rich species have been extracted and used for experiments so far. The facility will be described and first results from measurements at low energy and with reaccelerated beams will be given. The ongoing PAC approved program will also be presented.

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