APR08-2008-000310

Abstract for an Invited Paper
for the APR08 Meeting of
the American Physical Society

Accelerator Physics Related to Rare Isotope Beams[1]

PETER OSTROUMOV, Argonne National Laboratory

Extensive analysis of the existing data and theoretical models has suggested that the highest yield for a wide range of rare isotopes available for experiments can be obtained by using two accelerators: a heavy-ion driver and a post-accelerator for re-acceleration of radioisotopes. The superconducting driver linac provides the primary, 400 kW, stable-ion beams in the energy range from 580 MeV for protons to 200 MeV/u for uranium required to produce the radioisotopes. To overcome intensity limitations from the most advanced ECR ion sources, the driver linac is designed for the simultaneous acceleration of two charge-states of uranium ions in the front-end and 5 charge states of uranium ions after the liquid lithium stripper. The most efficient production mechanisms for slow radioactive ions produce these ions in 1^+ or 2^+ charge states. The post-accelerator must, therefore, be able to accept such low charge-to-mass ratio ions. However, this option results in an expensive post-accelerator. One approach is to increase the charge state of the ions before acceleration via a charge booster stage. The intensity of rare isotope beams can be enhanced by the acceleration of multiple charge state beams.

[1]This work was supported by the U.S. Department of Energy, Office of Nuclear Physics, under Contract No. DE-AC-02-06CH11357.