

## Radioactive ion beam post-acceleration at ISAC

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ISAC at TRIUMF is a world-class facility for the production and post-acceleration of radioactive ion beams (RIB). Commissioned in 2002 the ISAC I linear accelerator serves three different beam lines. Two of them are permanent experiments (DRAGON and TUDA); the third one is a general purpose station (GPS). Moreover, starting this year, the ISAC I accelerators will also provide beams to ISAC II.

The ISAC I first stage of acceleration is accomplished with a room temperature cw RFQ. The RFQ is able to accelerate  $3 \leq A/Q \leq 30$  from 2 keV/u to 150 keV/u. The second stage of acceleration is completed with a variable energy room temperature IH structure DTL able to reach 1.8 MeV/u. Since the DTL accepts  $2 \leq A/Q \leq 6$  the medium energy beam transport (MEBT) line between the RFQ and the DTL contains a stripping section. The ISAC facility has an off line ion source (OLIS) that produces stable isotopes for beamline and accelerator tuning, stable beam experiments and for pilot beams in support of RIB delivery. OLIS is a multiple source station; at the moment a microwave and a surface source are installed providing predominantly a 1+ charge state. An upgrade with an ECR source will take place this year increasing the charge state and consequently the mass we can accelerate. The stable pilot beams are chosen to match the  $A/Q$  of the RIB required by the experiment. The accelerator and beamlines are tuned with the pilot beam that provides a beam of relatively high and stable intensity. The switching procedure from pilot to radioactive beam is straightforward and reproducible. The pilot beam concept allows us to accelerate RIB's of low intensity with a minimum number of low intensity diagnostics.

The medium beta section of the ISAC II superconducting LINAC, presently being commissioned, increases the ISAC I capability by 20 MV. The total voltage added by ISAC II will be increased to 40 MV with the addition of the high beta section by 2008. A first experiment with  $^{11}\text{Li}$  has already been planned and it will take place in the fall of this year. The superconducting cavities have been tested individually and all of them perform above the ISAC II specifications. Two single cryomodule tests have been performed as well. A first acceleration of alpha particles has been accomplished in the clean room. A second successful acceleration test took place in the accelerator vault with the cryomodule in the final configuration. Presently all five cryomodules are installed in the vault with commissioning planned for March/April 2006.

The paper will give an overview of both ISAC I and ISAC II accelerators. Operational experience with accelerating RIBs in ISAC I will be summarized. ISAC II commissioning results will be presented.