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Radioactive ion beams developments from the TRIUMF resonant ionization laser ion source

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Developments towards intensity and purity increases of the radioactive ion beams delivered from TRIUMF's ISAC facility by means of target ion sources coupled to the laser resonance ionization ion source (TRILIS) will be detailed.

There are a number of long standing experiments in nuclear structure and nuclear astrophysics that have not been able to be conducted at present isotope separator and accelerator facilities due to one or two general shortcomings. These are:

(a) the production and/or beam intensity delivered is too small, and/or (b) the purity of the delivered beam is insufficient to conduct a successful measurement.

There is incremental progress at all RIB facilities towards obtaining higher beam intensities and increased beam purity. At TRIUMF our most notable improvements in the past years has been the successful prototyping and application of an ion guide as part of the resonant ionization laser ion source to increase the beam purity by introducing a suppression of isobaric beam contamination (from surface ionization) by up to 6 orders of magnitude. In addition improved laser ionization schemes for a number of elements have been developed and applied to boost overall yields of radioactive isotopes. In order to motivate the rationale and constraints of the approaches taken to obtain improved RIB delivery to experiments a general introduction to RIB production at TRIUMF's ISAC facility will be included.

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