

## Acceleration of Radioactive Ions with REX-ISOLDE

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The ISOLDE facility placed at CERN, Geneva has been successfully used for the production of radioactive ions since more than 30 years. Until now the beam energy available is at 60 keV. The aim of REX - ISOLDE (Radioactive beam EXperiment at ISOLDE) is to overcome this and to post - accelerate light ( $A \leq 50$ ) radioactive ions up to an energy of 0.8 - 2.2 MeV/u. At this energy coulomb excitation and particle transfer reactions can be used to study nuclear structure far of stability. For many cases this will be done via  $\gamma$  -spectroscopy with the MINIBALL, a  $4\pi$  Ge detector array. First experiments plan to investigate neutron rich isotopes near to the magic neutron numbers 20 and 28. Beside this, measurements in astrophysics, atomic physics and solid state physics are planed. They will make use either of the availability of having highly charged radioactive ions or the high and variable energy of them.

The setup is shown in figure 1. A unique system for beam preparation is used. It consists of a Penning trap for beam accumulation and bunching and an electron beam ion source (EBIS) for charge breeding, which can deliver a very clean beam of bunches of highly charged radioactive ions. An additional advantage is the fast breeding time to reach an  $A/q$  value of about 4.5, which is necessary for the accelerating structures. For isotopes below  $A=50$  the required charge state can be reached within less than 20 ms. This enables it to handle also short-lived isotopes. After a mass separator to choose the right  $A/q$  value a linear accelerator formed by an RFQ, an IH structure and three 7-gap resonators is used to accelerate the ions. Finally there are two target and detector stations, one for the installation of the MINIBALL and one for other experiments.

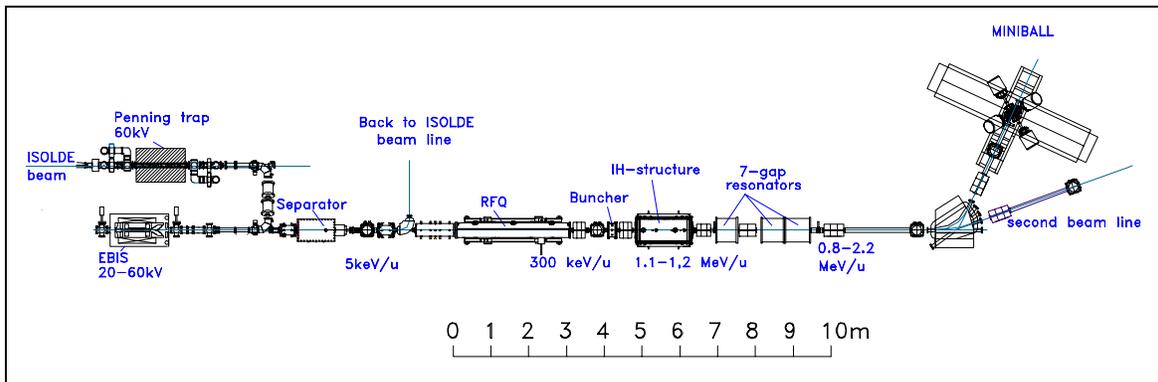


FIG. 1. Top view of the REX-ISOLDE post accelerator.

All components of the set-up are finished, tested and most of them are already installed at the ISOLDE facility. The accumulation, cooling and bunching of ions delivered by ISOLDE, has been demonstrated with the Penning trap. Acceleration up to 300 keV/u of ion bunches delivered by the EBIS with the RFQ has been successfully carried out. The status of the commissioning of the whole installation, especially the interplay of the different components will be presented.