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Modelling of "Self-Confining Radioactive Ion Targets"

We present here the modelling of the concept of Self Confining Radioactive Ion Target (SCRIT) [1] using an approach similar to what is traditionally applied for the evolution of charge state population in Electron Beam Ion Sources [2]. Critical parameters in this modelling have been found to be:
- the charge breeding cross sections, not well known at the high electron beam energies used for SCRIT (500 MeV),
- the ion heating term [3], which has been generalized in our model to relativistic electrons,
- the compensation of the electron beam space charge, which induces a cloud radius expansion and eventually triggers ion losses

The SCRIT concept has shown to be a promising technique to explore nuclear densities of radioactive isotopes via electron scattering [4]. Results of the model will be compared to measurements as well as original simulations done at and for the pioneering SCRIT facility at RIKEN. Prospects for future machines using innovative techniques for optimizing the achievable luminosities will be finally discussed.

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