

Construction of The SCRIT Electron Scattering Facility

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SCRIT Collaboration

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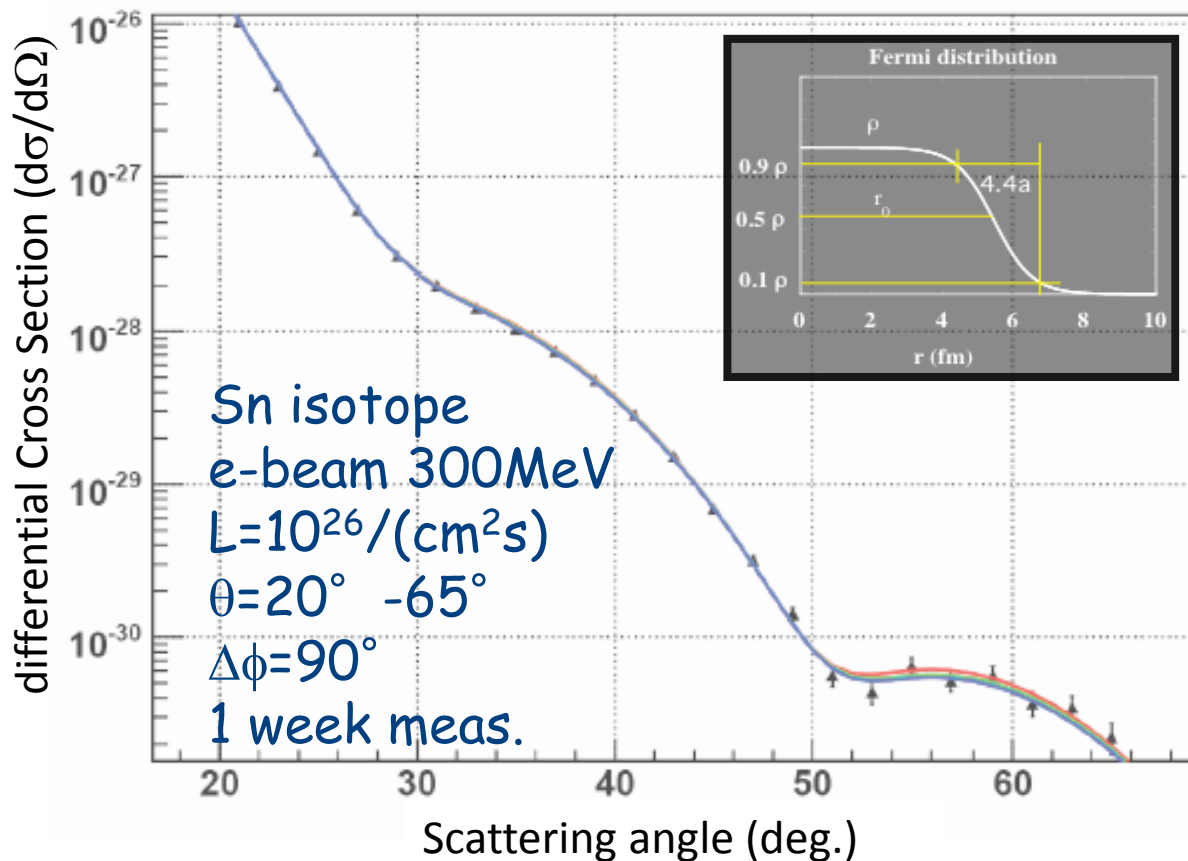
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Electron Scattering off Unstable Nuclei

Charge density distribution from elastic scattering



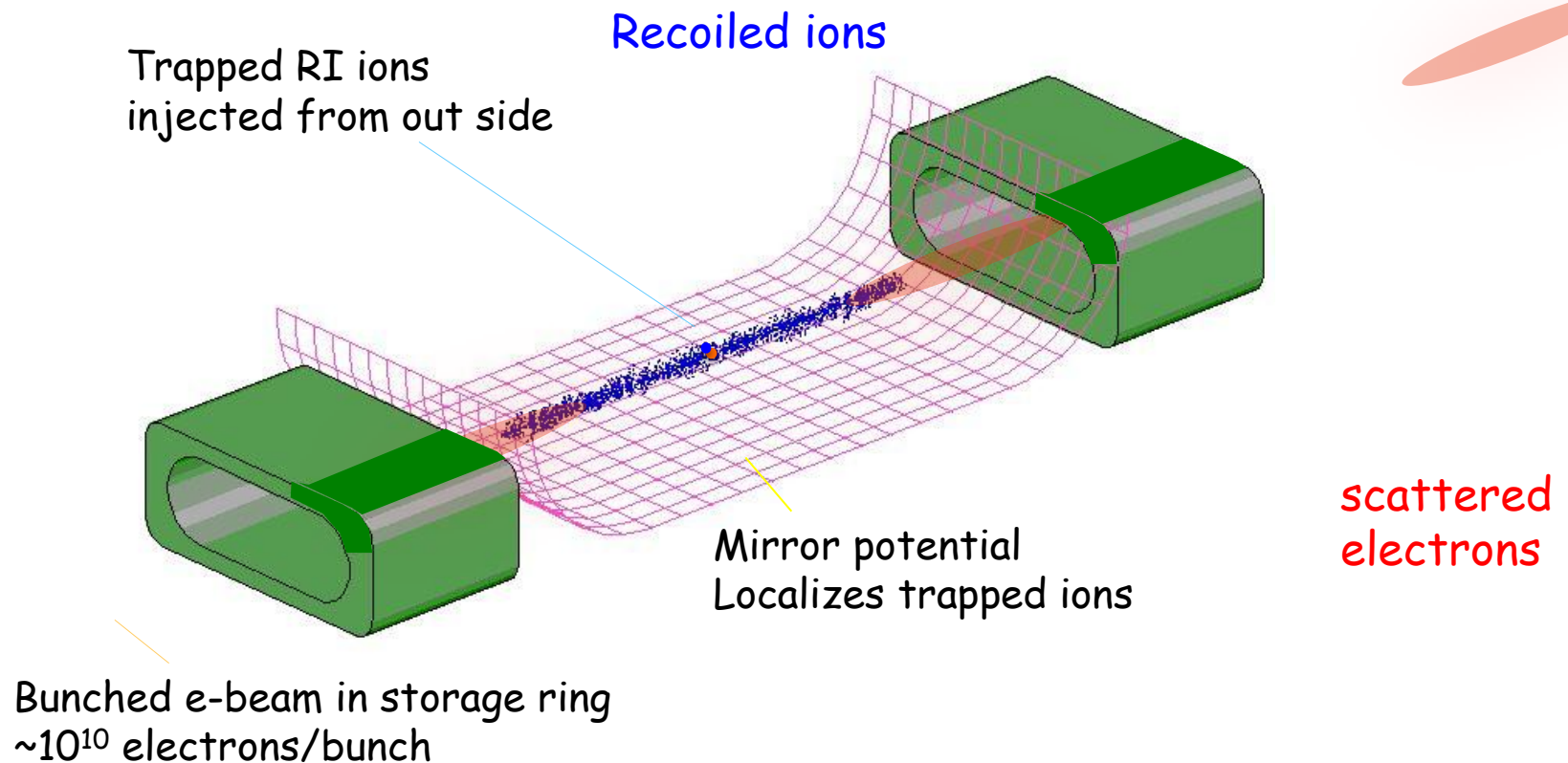
Luminosity
 $> 10^{26}/(\text{cm}^2\text{s})$

Cross section until
the second maximum

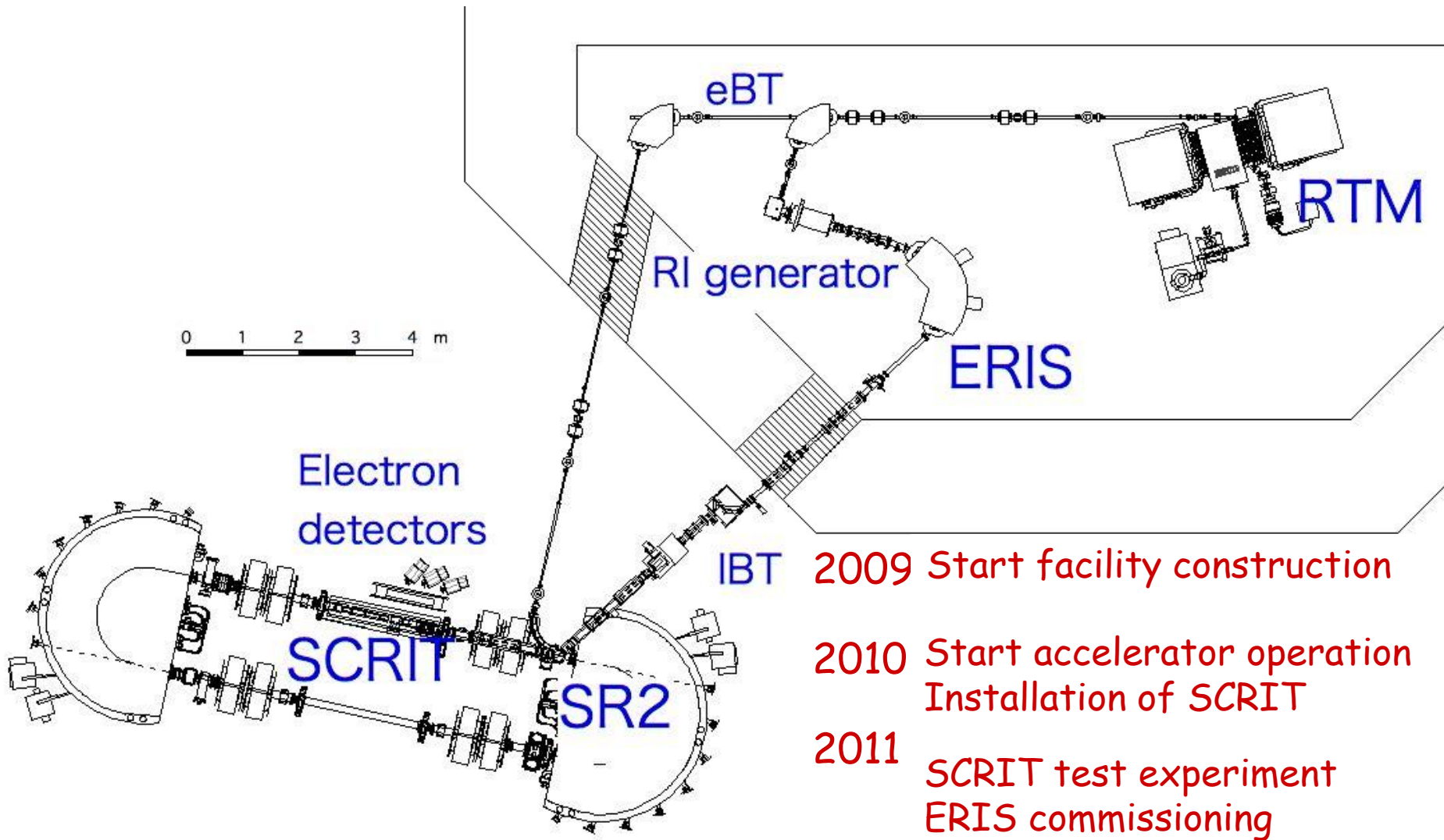
Determination of
radii and diffuseness
with a few % accuracy

SCRIT (Self-Confining RI Ion Target)

SCRIT is internal-target-forming technique in an electron storage ring. This makes good use of "Ion Trapping"
Target ions are confined within beam size by periodic focusing force.



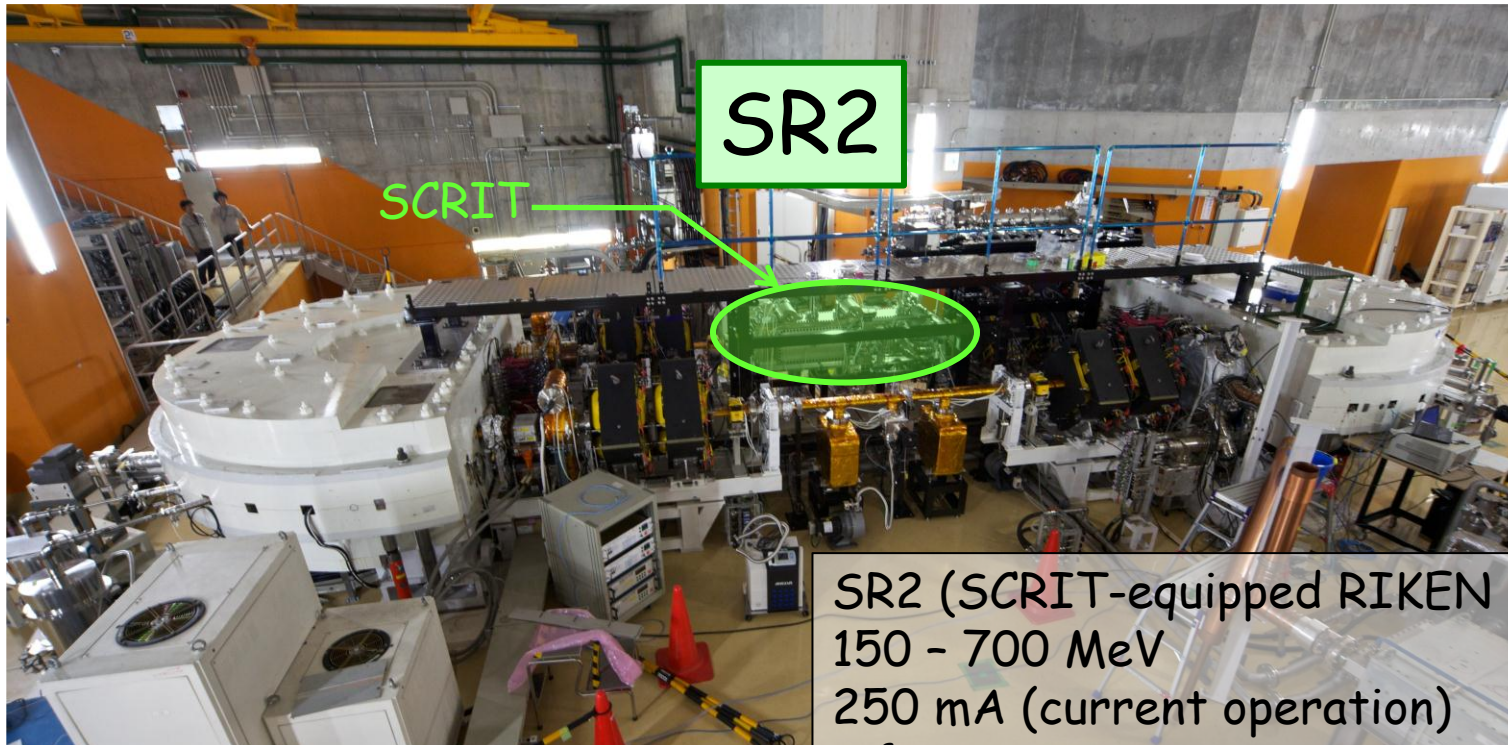
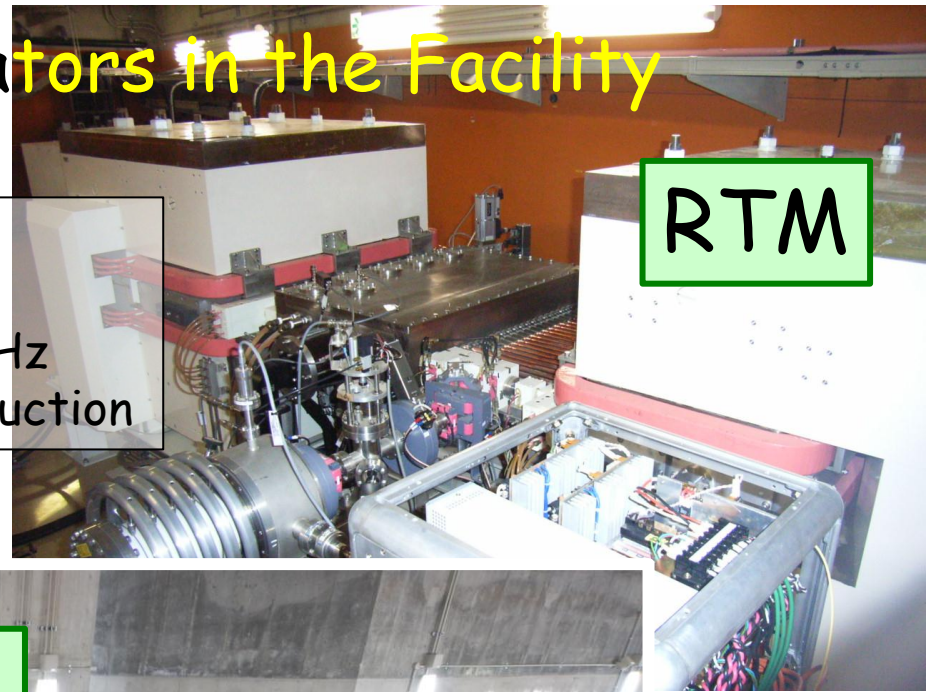
The SCRIT Electron Scattering Facility



- 2009 Start facility construction
- 2010 Start accelerator operation
Installation of SCRIT
- 2011 SCRIT test experiment
ERIS commissioning
- 2012 Test for RI production

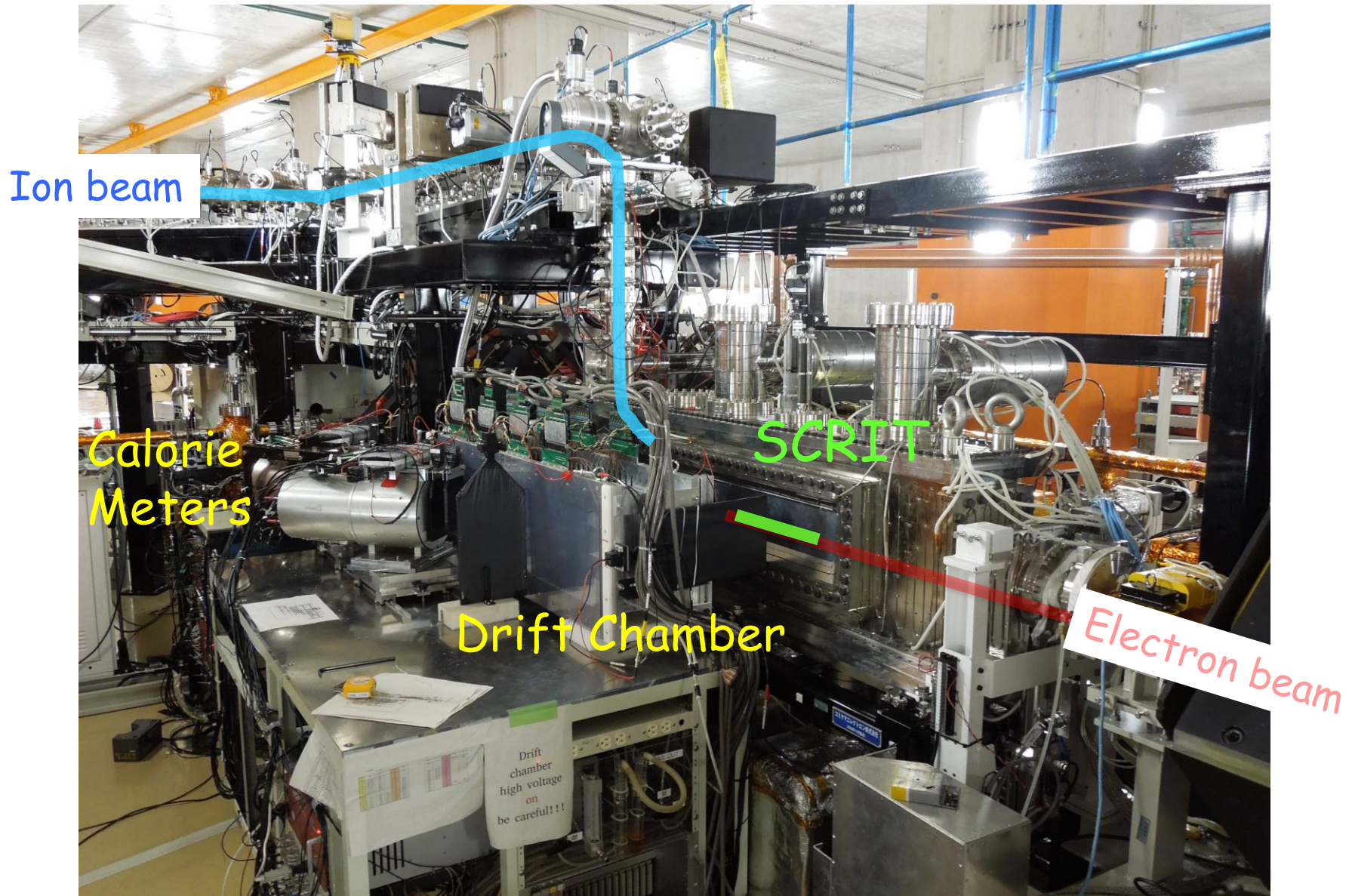
Electron Accelerators in the Facility

RTM (Race-Track Microtron)
S-band RF acceleration
150MeV / 3 mA peak / 1 μ s pulse / 10 Hz
Injector for SR2 & Driver for RI production



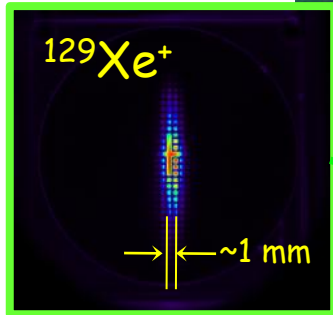
SR2 (SCRIT-equipped RIKEN Storage Ring)
150 - 700 MeV
250 mA (current operation)
Lifetime ~ 1 AH

SCRIT installed in SR2

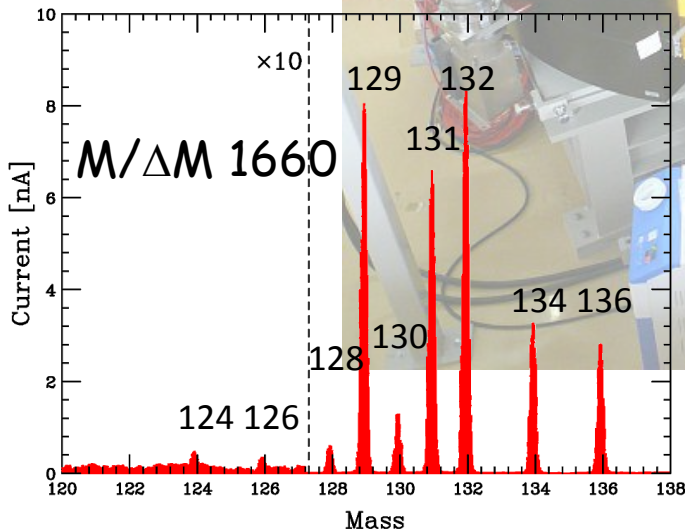
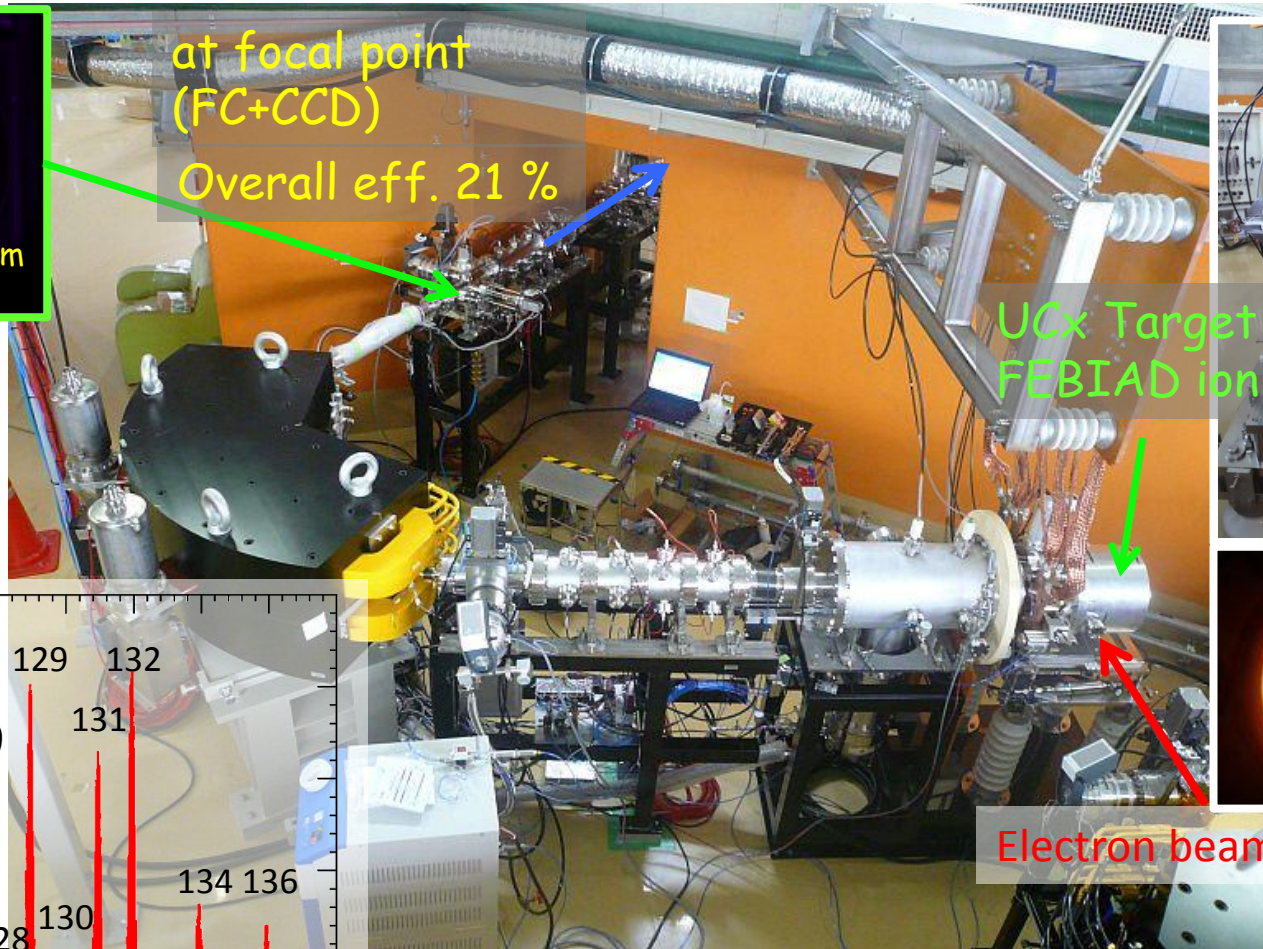


ERIS (Electron-beam-driven RI separator for SCRIT)

Commissioning with stable Xe isotopes

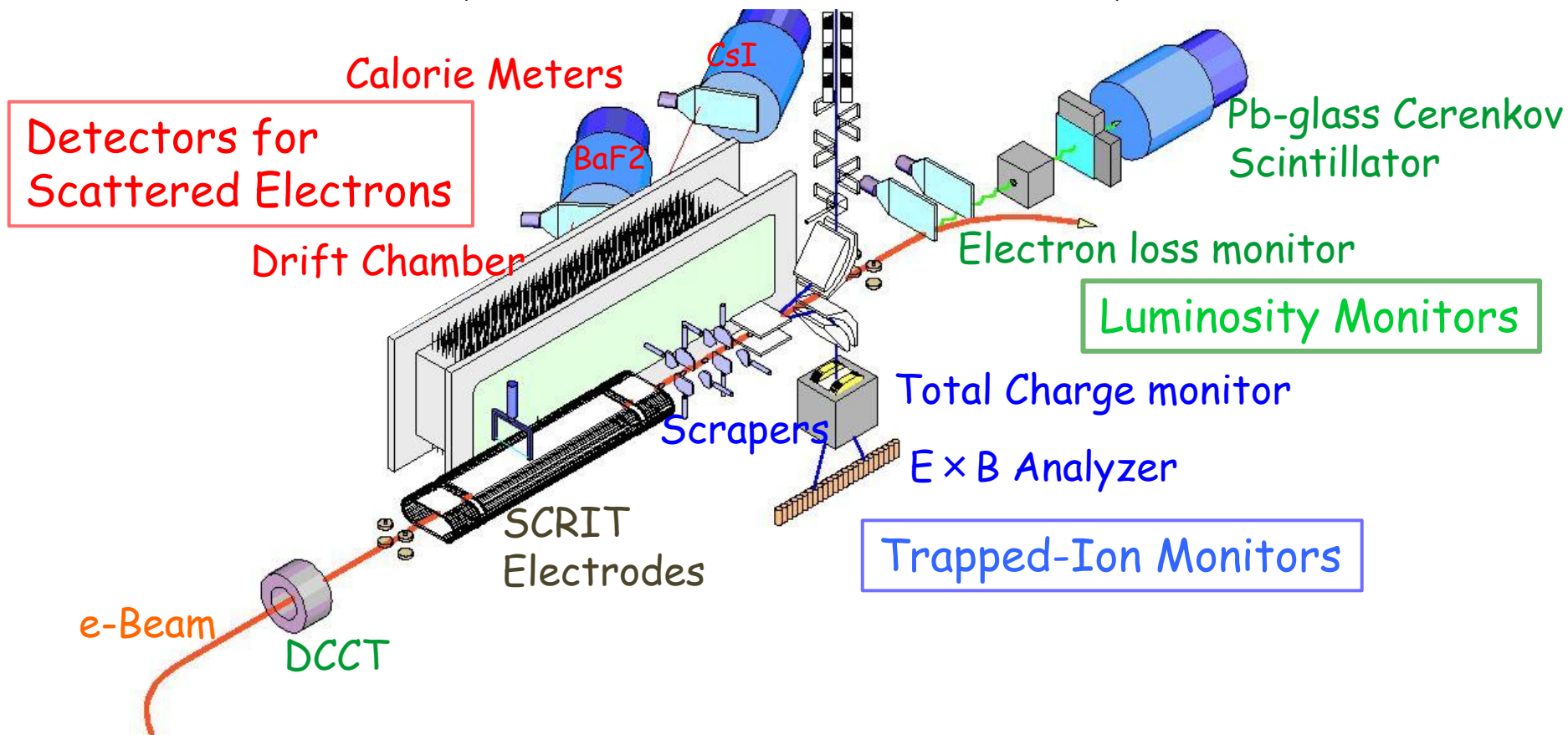
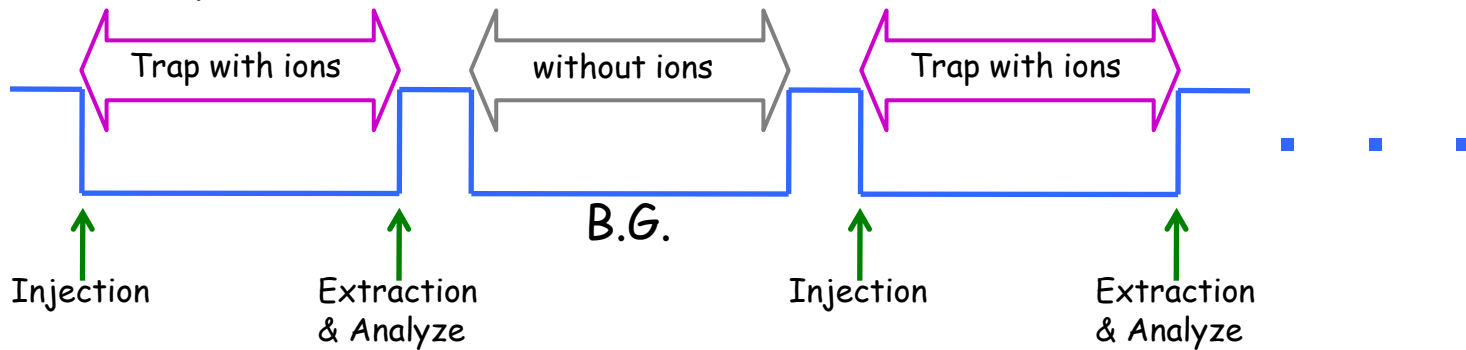


at focal point
(FC+CCD)
Overall eff. 21 %



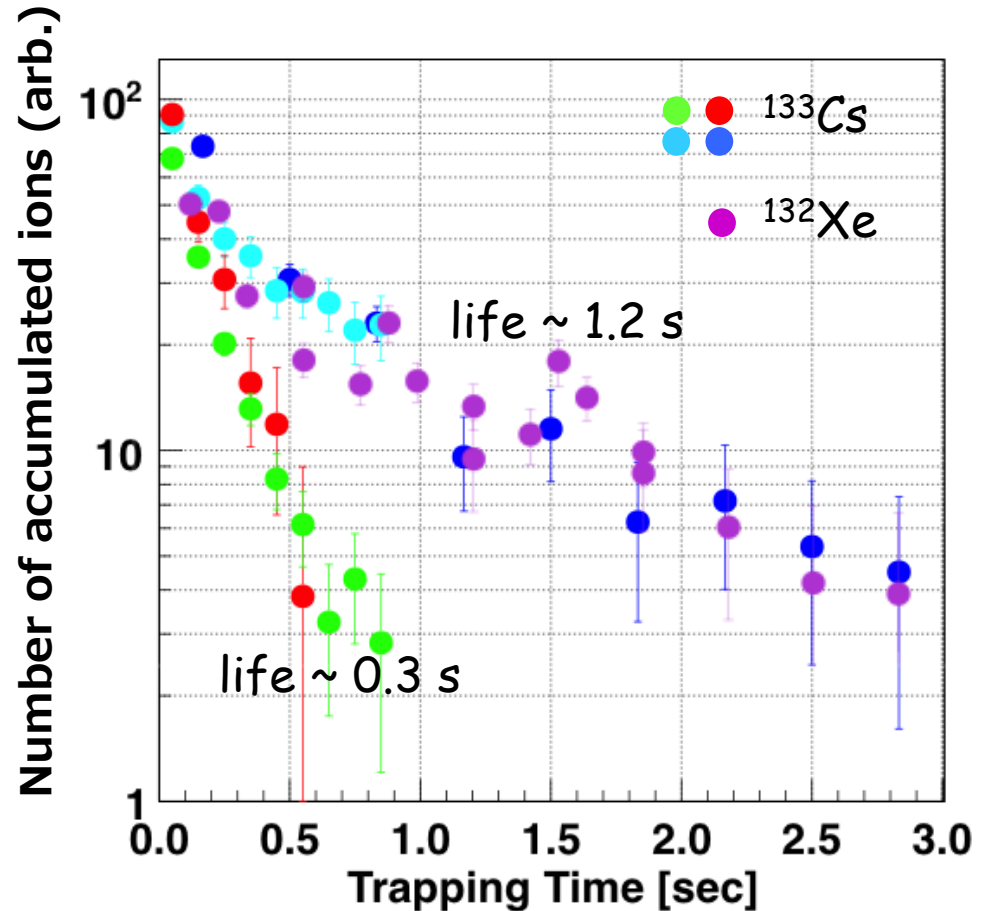
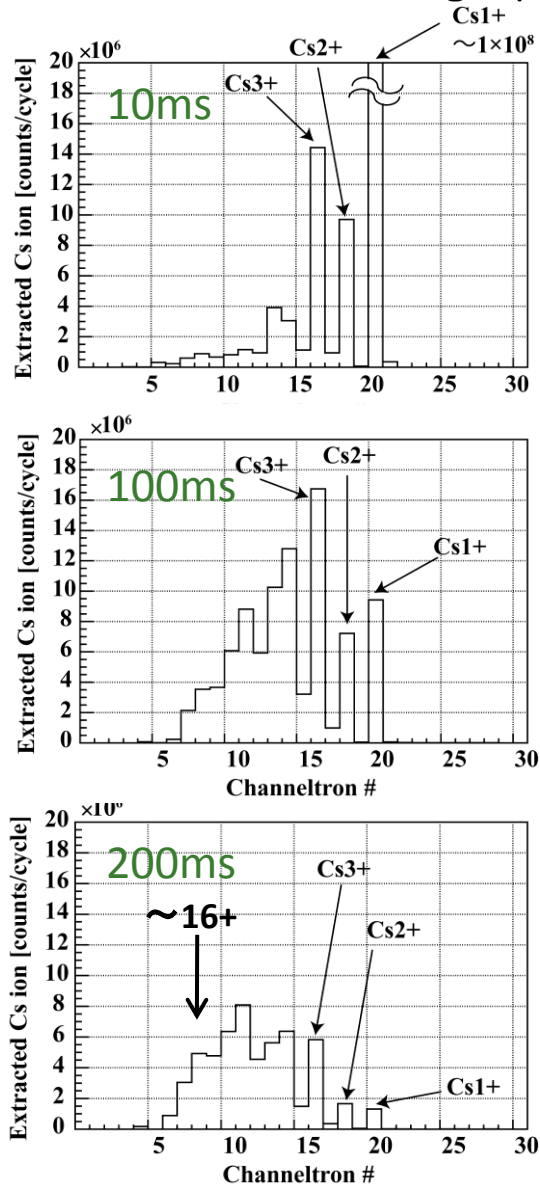
Poster 115 (T. Ohnishi et al.)

Time sequence for measurements



Ion Trapping in SCRIT Device

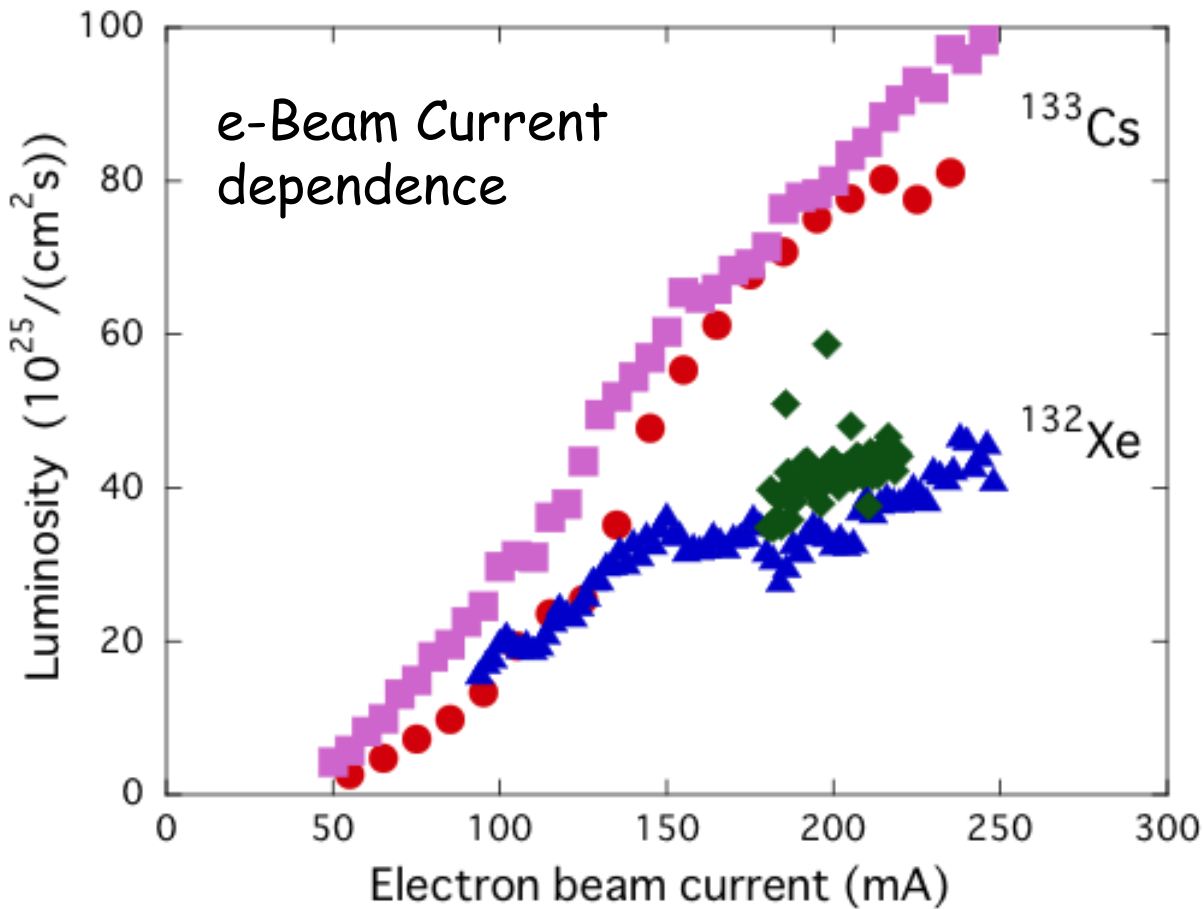
Quick shift to highly-charged state



Trapping properties are controllable by tuning electron-beam instability

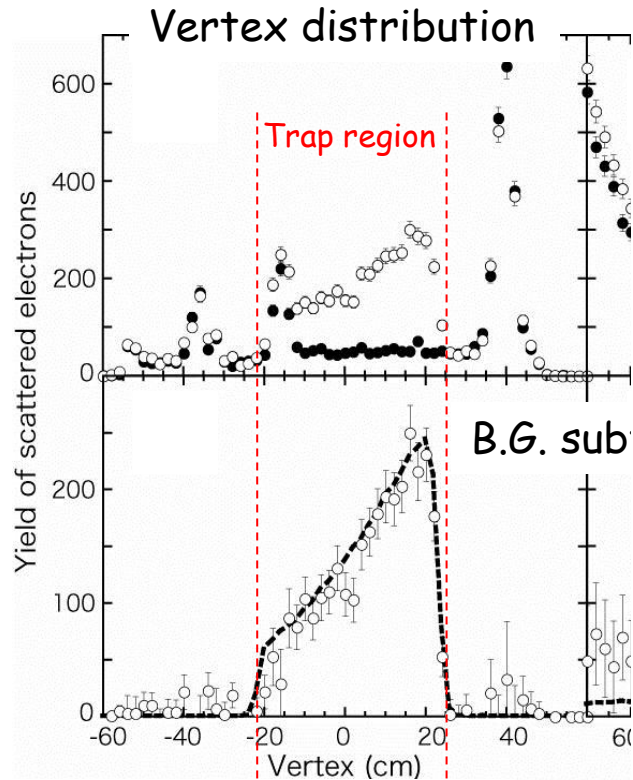
➡ Poster 160 (R.Ogawara et al.)

Achieved Luminosity

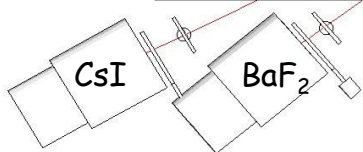
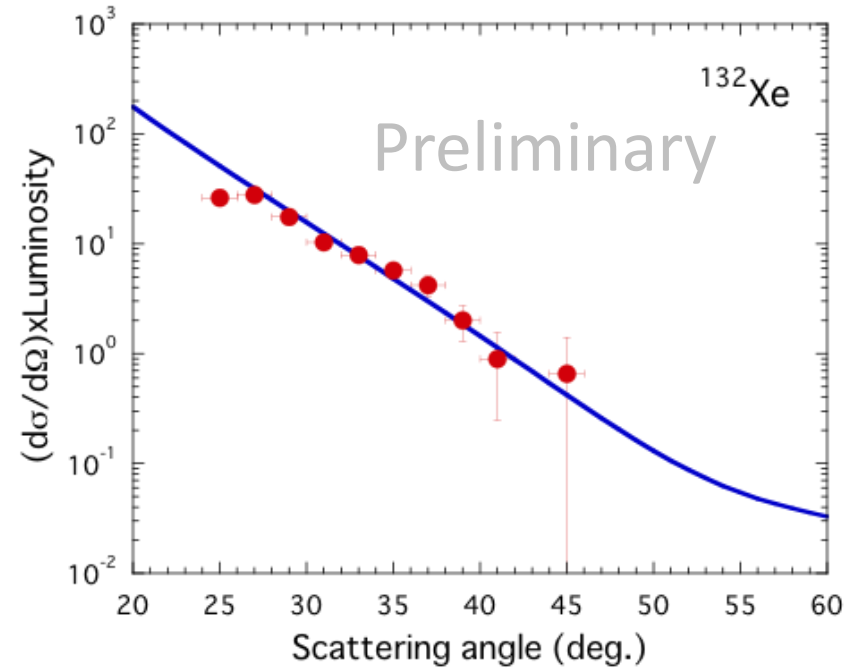


	^{133}Cs	^{132}Xe
Number of injected ions	4×10^8	1×10^8
Achieved Luminosity ($\text{cm}^{-2}\text{s}^{-1}$)	$\sim 10^{27}$	4×10^{26}
Trapping efficiency	$\sim 85\%$	$\sim 90\%$
Overlapping factor	$\sim 8\%$	$\sim 15\%$

Elastic Scattering from Target Ions



Angular distribution of elastically scattered electrons



Total solid angle of calorimeter meters 17msr
Measurement time 3.8 h

The SCRIT Electron Scattering Facility

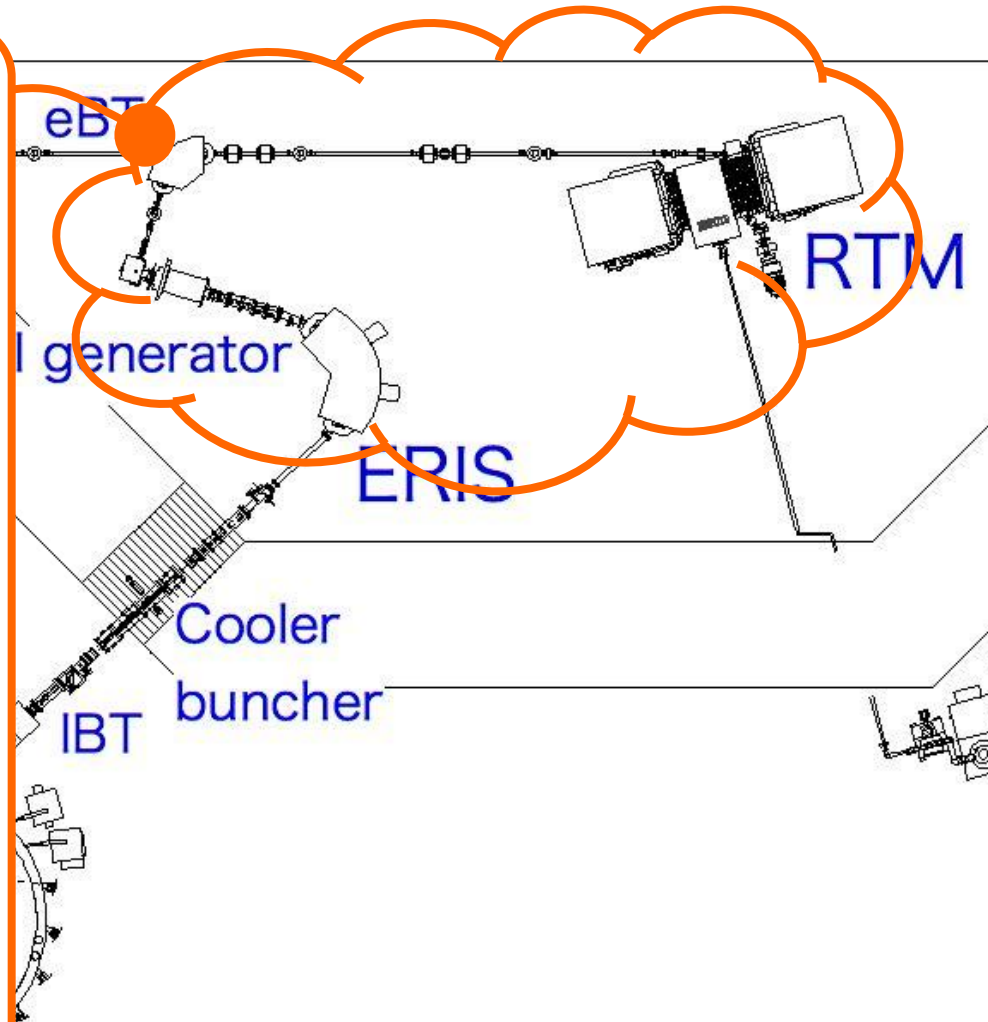
☆Preparation of UC_x Target and Test of RI Production



UO₂ impregnated in C fibers
→ UC_x in Target ~2000°C

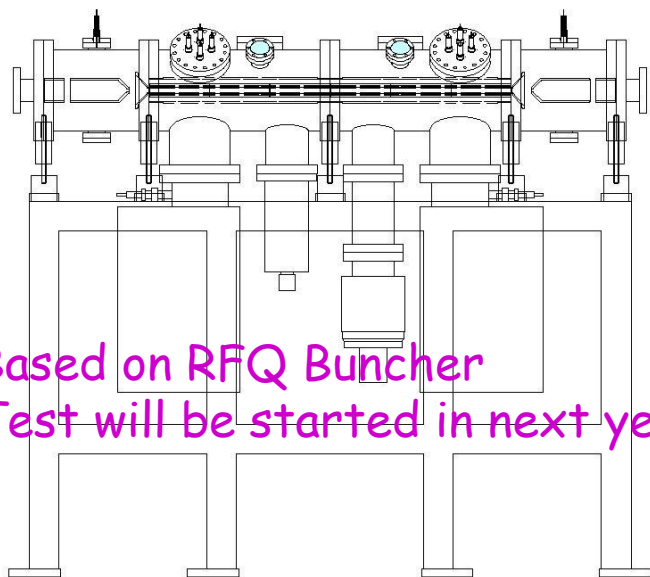
☆Upgrade RTM output power

	<Current>	<Upgraded>
Pulse width	1 μs	8 μs
	10 Hz	400 Hz
Peak current	3 mA	5 mA
Power	4.5 W	2.4 kW
fission rate	1x10 ⁹	5x10 ¹¹



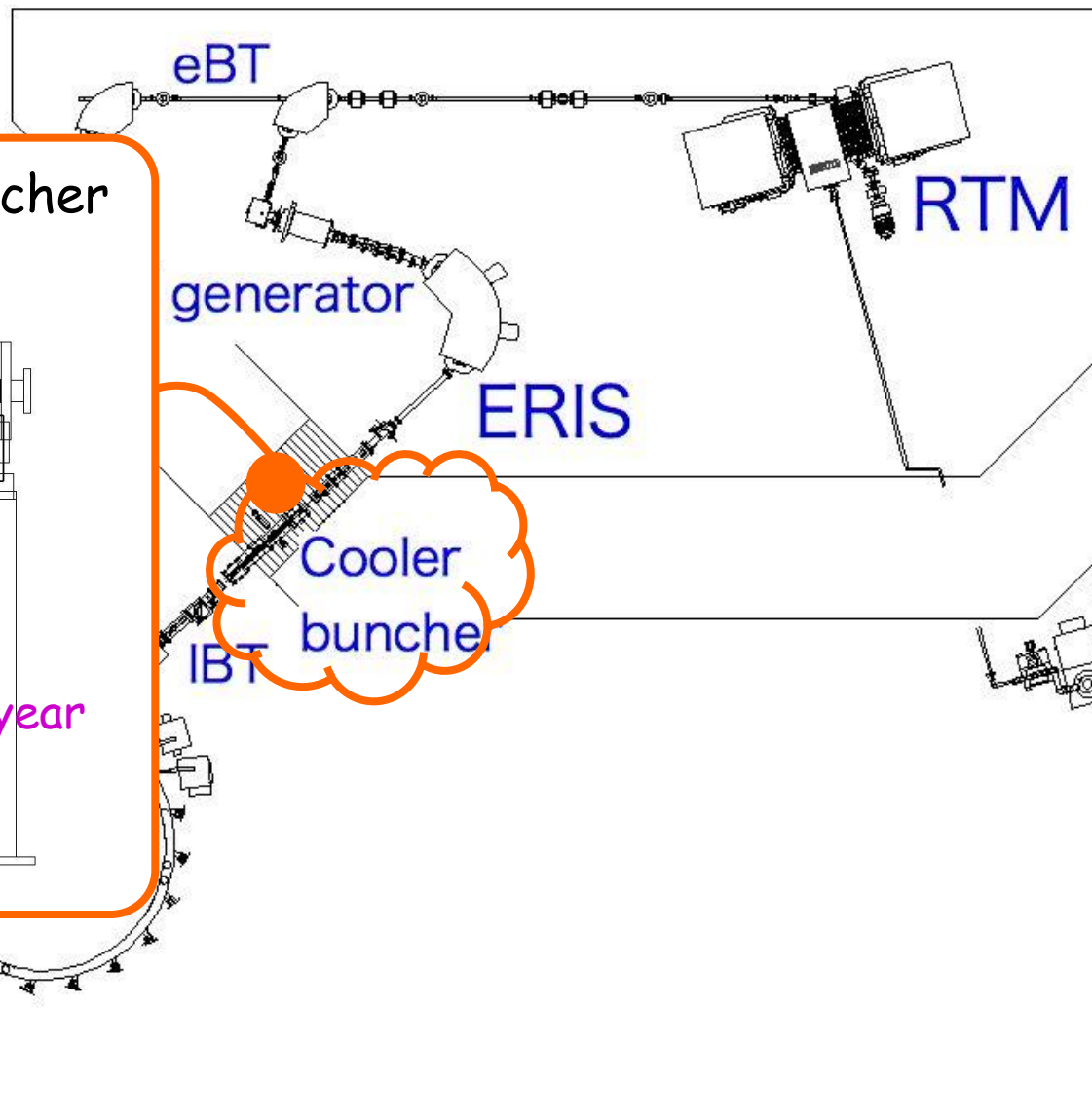
The SCRIT Electron Scattering Facility

Construction of Cooler Buncher
(under manufacturing)

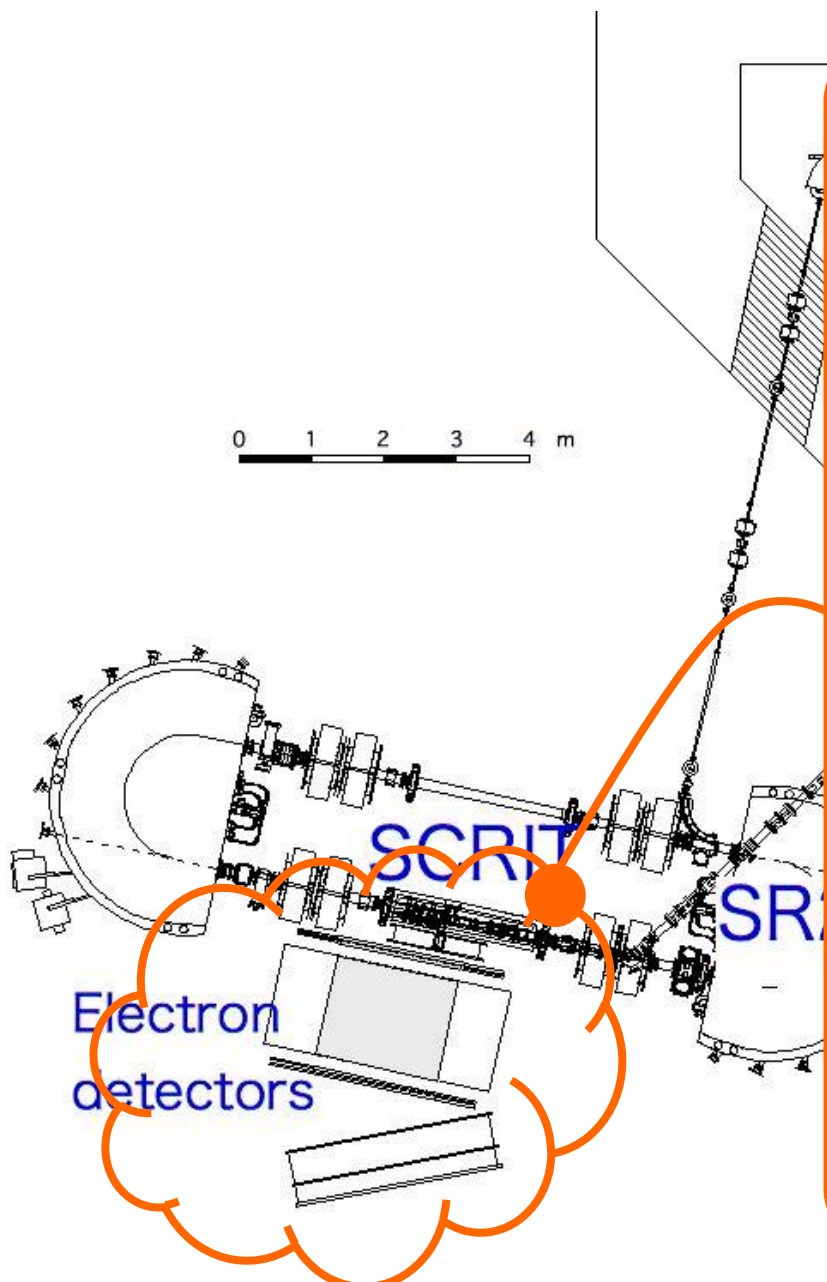


Based on RFQ Buncher
Test will be started in next year

Electron
detectors



The SCRIT Electron Scattering Facility



Installation Detector System

Combination of
High-Resolution Spectrometer
and Drift Chambers

Scattering angle 30~60 deg.

Solid angle ~100 msr

Momentum resolution 10^{-3}

Magnetic field 0.8T at 179 kAT



Summary

Thank you for your attention

- 80% of construction has been completed
- We found in test experiments that
 - SCRIT system works well
 - Trapping properties are controllable
 - Required luminosity is achievable
- EIRS is ready for RI production