



IUPAP WG9, April 15<sup>th</sup>, 2026  
Rome, Italy

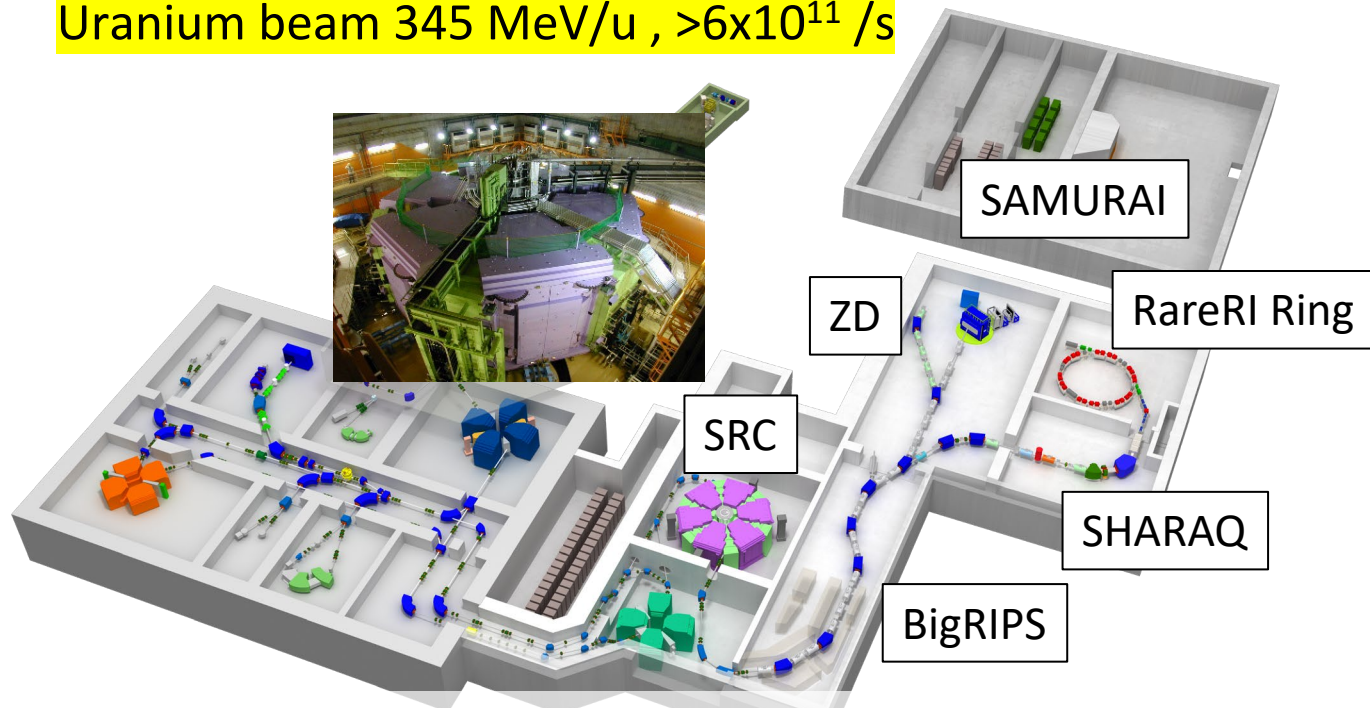
# RIBF Update

1. Recent research highlights
2. News on the facility upgrade

Hiroyoshi Sakurai  
RIKEN Nishina Center for Accelerator-Based Science

# Radioactive-isotope (RI) Beam Factory (RIBF)

SRC: Superconducting Ring Cyclotron  
World's First and Strongest K2600MeV  
Uranium beam 345 MeV/u ,  $>6 \times 10^{11}$  /s



BigRIPS Superconducting RI beam Separator

In-flight separator

World's Largest Acceptance

High magnetic rigidity 9 Tm

$\sim 250$  MeV/u



Three spectrometers

for reaction studies with fast RI beams

ZeroDegree



SAMURAI



SHARAQ + OEDO (univ. of Tokyo, CNS)



A storage ring (Rare RI Ring)

dedicated to mass measurement



# Seven New Pieces of the Nuclear Landscape Puzzle Uncovered Near Cerium-159

## 7 New Isotopes Identified in the Rare-Earth Region

$^{152}\text{Cs}$ ,  $^{155}\text{Ba}$ ,  $^{158}\text{La}$ ,  $^{159}\text{Ce}$ ,  $^{160}\text{Ce}$ ,  $^{173}\text{Gd}$ ,  $^{175}\text{Tb}$

Expanding the Frontier of the Nuclear Landscape  
Of ~7,000 predicted nuclei, only ~3,300 have been observed. Each new isotope fills a blank on the chart.

# 203

## Isotopes Discovered

RIKEN has discovered over 200 new isotopes using the in-flight separation method – a world-leading achievement.

# 52%

of Global Discovery  
in the 2020s

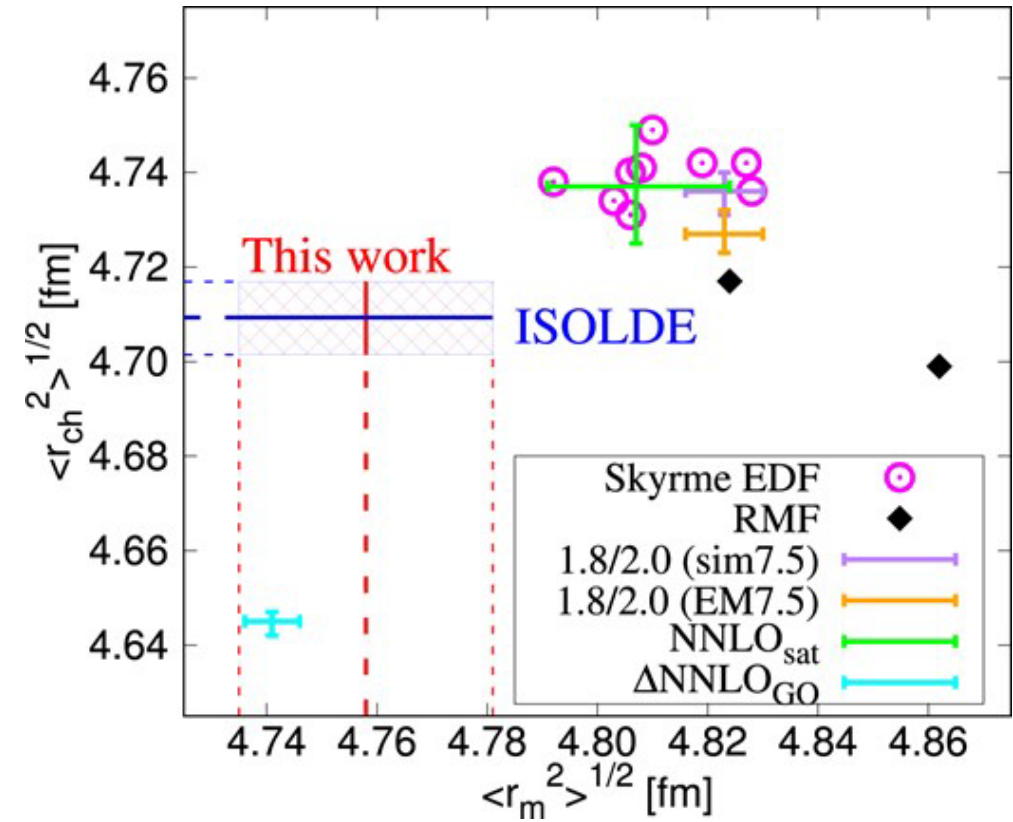
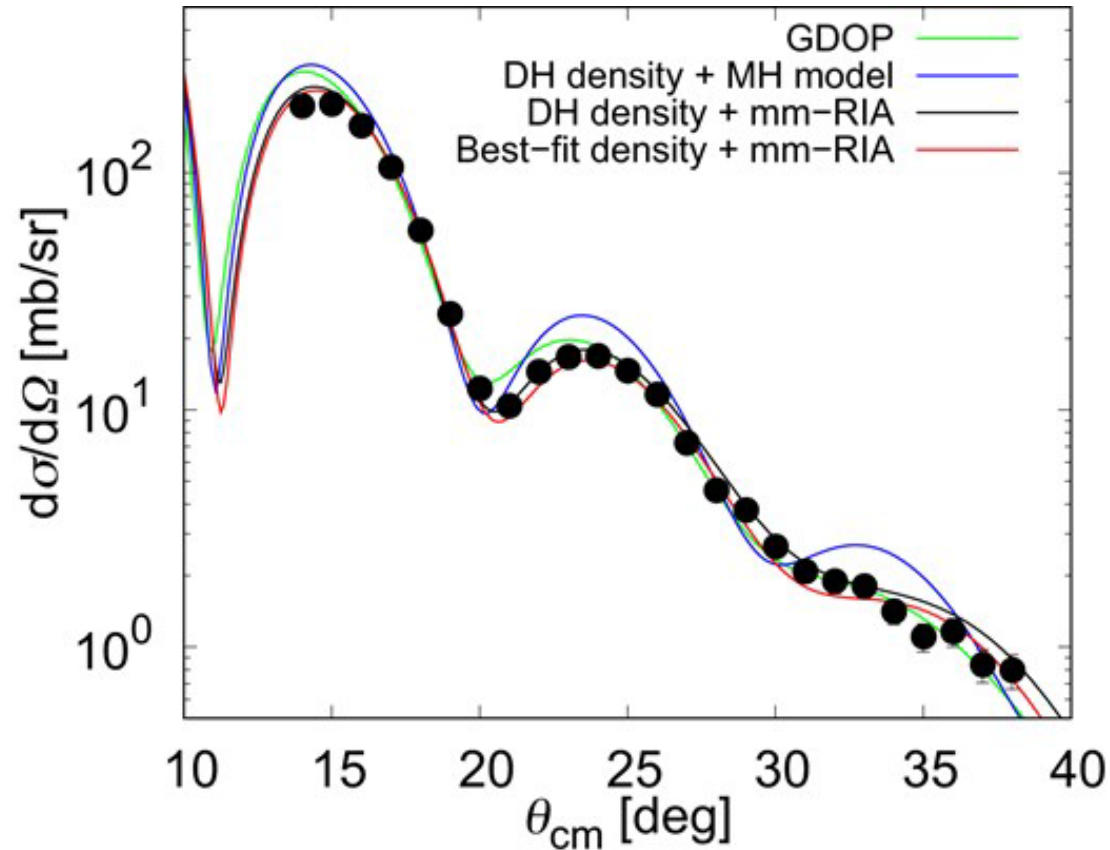
More than half of all new isotopes discovered worldwide this decade were found at RIKEN RIBF.

## The World's Most Powerful Separator: BigRIPS at RI Beam Factory (RIBF)

Uranium accelerated to 70% the speed of light  
– fragments collected and identified in flight.

# First Extraction of the Matter Radius of $^{132}\text{Sn}$ via Proton Elastic Scattering at 200 MeV/Nucleon

Y. Hijikata, J. Zenihiro et al., PTEP 2026, 013D02 (2026)



# JAXA Space Strategy Fund

Demands for semi-conductor test with heavy-ion beams are rapidly increasing.

6 years later, 1,100-hour test beam time will be additionally needed with heavy-ion beams in Japan.



A new scheme with Charge Stripper Ring was proposed so that heavy ions (Zn and heavier) accelerated at IRC will be shared by semiconductor test and nuclear physics programs to increase beam time for semiconductor test.

JAXA Space Strategy Fund officially approved our proposal on Feb. 13, 2026. One or two months later, the contract with JAXA will be made.

Five-year project: FY2026-to-FY2030

## Technology Development Themes – 2<sup>nd</sup> Phase Common Development (3 themes)



### [MEXT] Space diversion and new space industry seeds creation site

Total amount (max) : approx.11B Yen  
# of Project TBE : approx. 5  
Timing of SG : approx.3<sup>rd</sup> (and 5<sup>th</sup>) year  
Period (max) : approx. 5 years

Creating innovative results in featured technologies and fields through introducing non-space sectors' technologies and creating seeds leading to new space businesses by establishing a system with university researchers as its core to build internationally competitive centers focusing on such system and the region.

### [MEXT] SX (space transformation) core area breakthrough researches

Total amount (max) : approx.10B Yen  
# of Project TBE : approx.20~40  
Timing of SG : approx.2<sup>nd</sup> year  
Period (max) : approx. 3 years

Developing and conducting early demonstration of challenging and exploratory elemental technologies with the participation of various players from private companies and universities in the areas ("thermal and device" and "motion and control") identified to address bottlenecks in future space development and utilization.

### [METI] Solutions for spacecraft environmental testing challenges

Total amount (max) : approx.23B Yen  
#of Project TBE (A) approx. 2 (B) approx.4  
Timing of SG : approx.2<sup>nd</sup> year, 4<sup>th</sup> year  
Period (max) : approx. 5 years

Aiming to establish a space industry ecosystem, developing technologies to expand test capabilities, improve efficiency, reduce costs, and diversify and optimize test evaluation criteria, etc., to solve problems in (A) various environmental tests (excluding radiation tests) and (B) radiation tests for spacecraft, etc.



Image of environmental test

※For proposals involving space demonstrations that require launch and other coordination, the period may be extended depending on the results of the SG evaluation and other factors.

※Expenditures other than the above will be made as general and administrative expenses.