

# Beam Delivery Update

Martin Alcorta  
Science Week 2025



- Beam delivery statistics for 2024
- Update on beam development
- Update on user survey
- Scheduling in the ARIEL era

# 2024 Beam Delivery

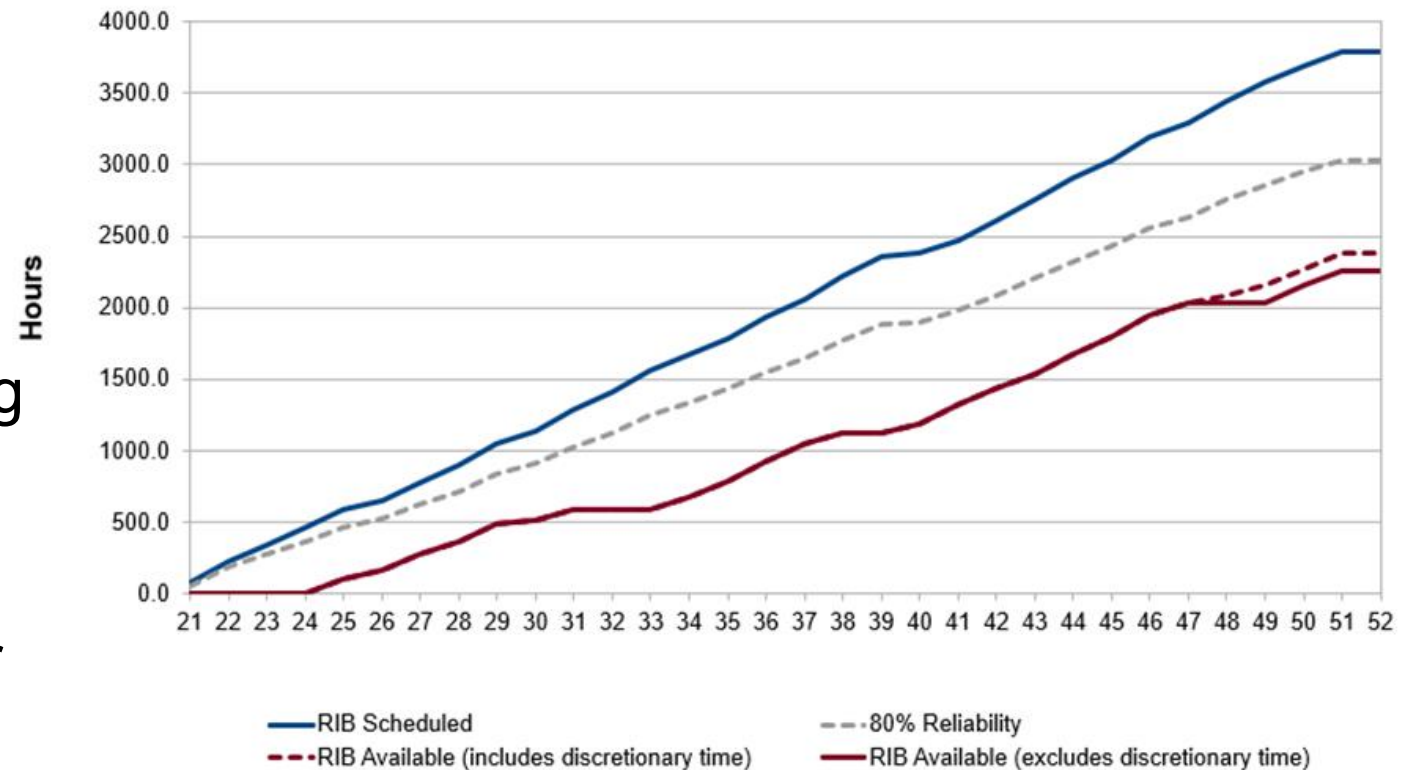
## ■ Sources of downtime:

- Cyclotron late startup RF
- TiC FEBIAD failure
- UC IGLIS end 2024 low yields

## ■ Highlights

- Successful delivery of  $^{26}\text{Al}$  using TM3 @ 53 kV
- IGLIS at the start of 2025 performed well, will run another IGLIS (Ta) end of 2025

ISAC RIB Availability - Schedules 146 and 147 (2024)  
Experiments and Development



# 2025 Beam Schedule

RIB shifts requested = 886  
(7,088 hrs, c.f. ~3,000 hr capacity)

- Mitigation of consequences to graduation timelines
- Equity between local NSERC-supported facilities/groups
- High-priority EEC-endorsed science

Number	Target Type
3	Ucx (1 IGLIS)
3	Ta (1 IGLIS)
2	SiC (1 FEBIAD)
1	Graphite
1	TiC

*Thanks C. Ruiz*

## **Reminder of our beam development process**

- Priority determined by NP collaborations at the start of each year
  - List top 5 for each (chosen from EEC approved LOIs)
- Inform spokespersons when development scheduled and of results after development
- Work on streamlining this process in preparation for 2027

# Beam Development

- Optical target temperature measurement (A. Laxdal)
- TRILIS: Co ready to go on-line
- IG-LIS now available for ITE & ITW
- Polarizer
  - cw-TiSa ring laser frequency quadrupled to 216 nm for At and Cu collinear spectroscopy
- Machine development for ISAC
  - O. Shelbaya's presentation yesterday

Group

1A 1 2A 2 3A 13 4A 14 5A 15 6A 16 7A 17 8A 18

1 H 2 He

1 Hydrogen 2 Helium

3 Li 4 Be 5 B 6 C 7 N 8 O 9 F 10 Ne

11 Na 12 Mg 13 Al 14 Si 15 P 16 S 17 Cl 18 Ar

Lithium Beryllium Boron Carbon Nitrogen Oxygen Fluorine Neon

19 K 20 Ca 21 Sc 22 Ti 23 V 24 Cr 25 Mn 26 Fe 27 Co 28 Ni 29 Cu 30 Zn 31 Ga 32 Ge 33 As 34 Se 35 Br 36 Kr

Sodium Magnesium Aluminum Silicon Phosphorus Sulfur Chlorine Argon

37 Rb 38 Sr 39 Y 40 Zr 41 Nb 42 Mo 43 Tc 44 Ru 45 Rh 46 Pd 47 Ag 48 Cd 49 In 50 Sn 51 Sb 52 Te 53 I 54 Xe

Rubidium Strontium Yttrium Zirconium Niobium Molybdenum Technetium Ruthenium Rhodium Palladium Silver Cadmium Indium Tin Antimony Tellurium Iodine Xenon

55 Cs 56 Ba 57-71 \* 72 Hf 73 Ta 74 W 75 Re 76 Os 77 Ir 78 Pt 79 Au 80 Hg 81 Tl 82 Pb 83 Bi 84 Po 85 At 86 Rn

Cesium Barium Lanthanum Hafnium Tantalum Tungsten Rhenium Osmium Iridium Platinum Gold Mercury Thallium Lead Bismuth Polonium Astatine Radon

87 Fr 88 Ra 89-103 \*\* 104 Rf 105 Db 106 Sg 107 Bh 108 Hs 109 Mt 110 Ds 111 Rg 112 Cn 113 Nh 114 Fl 115 Mc 116 Lv 117 Ts 118 Og

Francium Radium Actinium Rutherfordium Dubnium Seaborgium Bohrium Hassium Meitnerium Darmstadtium Roentgenium Copernicium Nihonium Flerovium Moscovium Livermorium Tennessine Oganesson

Jens Lassen TRILIS status 12/2024

57 La 58 Ce 59 Pr 60 Nd 61 Pm 62 Sm 63 Eu 64 Gd 65 Tb 66 Dy 67 Ho 68 Er 69 Tm 70 Yb 71 Lu

Lanthanum Cerium Praseodymium Neodymium Promethium Samarium Europium Gadolinium Terbium Dysprosium Holmium Erbium Thulium Ytterbium Lutetium

89 Ac 90 Th 91 Pa 92 U 93 Np 94 Pu 95 Am 96 Cm 97 Bk 98 Cf 99 Es 100 Fm 101 Md 102 No 103 Lr

Actinium Thorium Protactinium Uranium Neptunium Plutonium Americium Curium Berkelium Californium Einsteinium Fermium Mendelevium Nobelium Lawrencium

Legend:

- T RILIS isotopes on-line
- tested TiSa schemes (incomplete)
- TiSa network: Mainz, TRIUMF, ORNL, JYFL, GANIL, ISOLDE
- Ti:Sa laser ionization scheme on paper (theory)

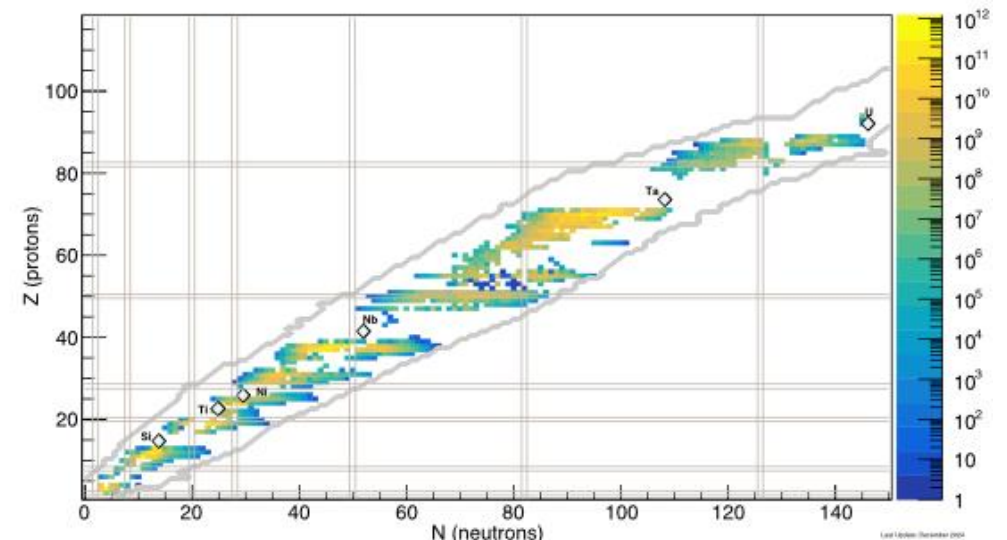
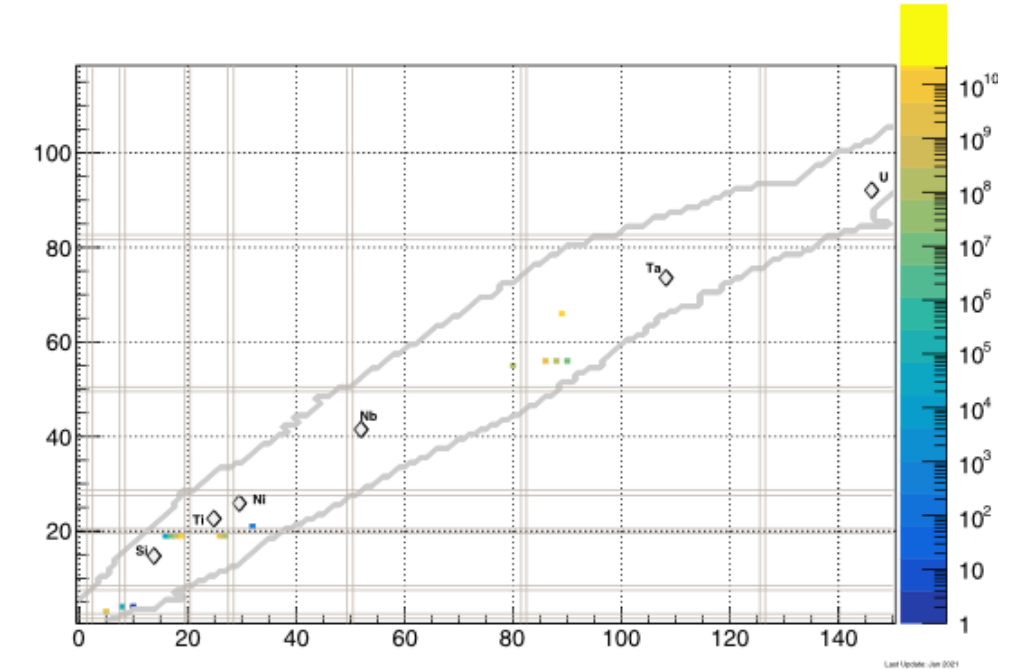
status: 12/2024

Thanks J. Lassen & P. Kunz

# Beam Development - Yields

- Thin (25um) Ta foil target – for quick release of short-lived isotopes
  - $^{12,14}\text{Be}$  yields improved (A. Laxdal presentation yesterday)
- Improved yields from TiC target with the new graphite insert design
- Reliable operation of C targets for  $^8\text{Li}$  and  $^7\text{Be}$  delivery
- Neutron rich Cu isotope yields (from UCx) planned for 2025
- Hardware & software overhaul of yield database

*Thanks J. Lassen & P. Kunz*





# User Beam Time Satisfaction Survey

- As of summer 2024, new user survey introduced to ensure relevance, questions based on input from beam delivery, beam physics, TIS, and operations
  - Focus on quality of beam delivery
  - Want to know where room for improvement
- Representatives from above groups have direct access to the results for faster response time
- Received 12 responses from users after new survey rollout in 2024
  - *Working with IT to recover results; automatic survey email tentatively paused*



# Scheduling in the ARIEL era

- ARIEL schedule will be more rigid (*factory mode*)
  - Will require clear communication, coordination, and planning among many groups
- Fit experiments to the schedule, not vice-versa
  - Allocate fixed increment time periods to an experiment
  - May restrict setup shifts b/w experiments to certain shifts, possibly adding buffers to experiments (e.g. beam dev if required)
- Changes to beam development scheduling
  - Options to have fixed beam development targets or fixed periods at beginning/end of production target

Week	Exchange
1	ITE
2	APTW
3	AETE
4	ITW
5	APTW
6	AETE
7	ITE
8	APTW
9	AETE
10	ITW
11	APTW

# Scheduling in the ARIEL era

- Aim to reduce overhead for experiments
  - Combine specific facility configurations beam requests to reduce frequency of changes withing experimental facilities
- Updated scheduling application
  - Working group with members of Science Division and Accelerator Division currently defining requirements for beam scheduling application
  - Will aim to link scheduling application with EEC proposals application

# Avenues of Communication

- Beam delivery mailing list
  - updates on major beam delivery issues. Sign up at [lists.triumf.ca](http://lists.triumf.ca)
- User newsletter
  - for updates on general activities
- Science week
- TUG email list
- Emailing [RIBdev@triumf.ca](mailto:RIBdev@triumf.ca)
  - to discuss any questions about beam development
- ISAC User Beamtime Feedback

# Summary

- Beam development ongoing on several fronts
- Several methods of communication open to users who have questions or want to collaborate
- Scheduling of future beamtimes will be revamped in preparation of ARIEL era
- **We want to maximize the probability of success for every experiment**



Thank you  
Merci

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