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ANU HIAF 14UD

Enhanced beam injection for HIAF

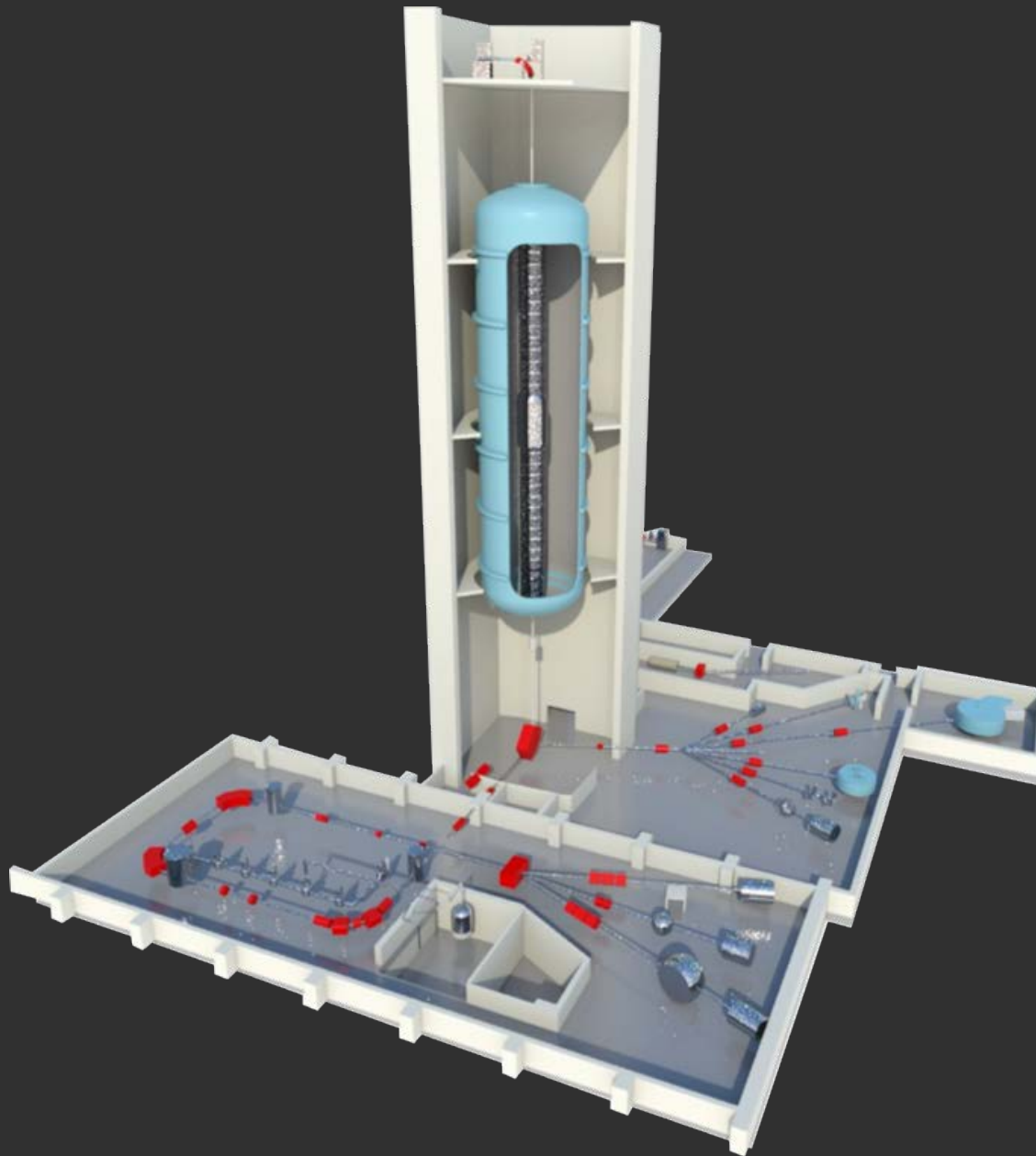
P. Linardakis, N. Lobanov, T. Tunningley, B. Tranter, S. Battisson, B. Graham, T. Kicthen,
J. Heighway

Australian Technology Forum 2020



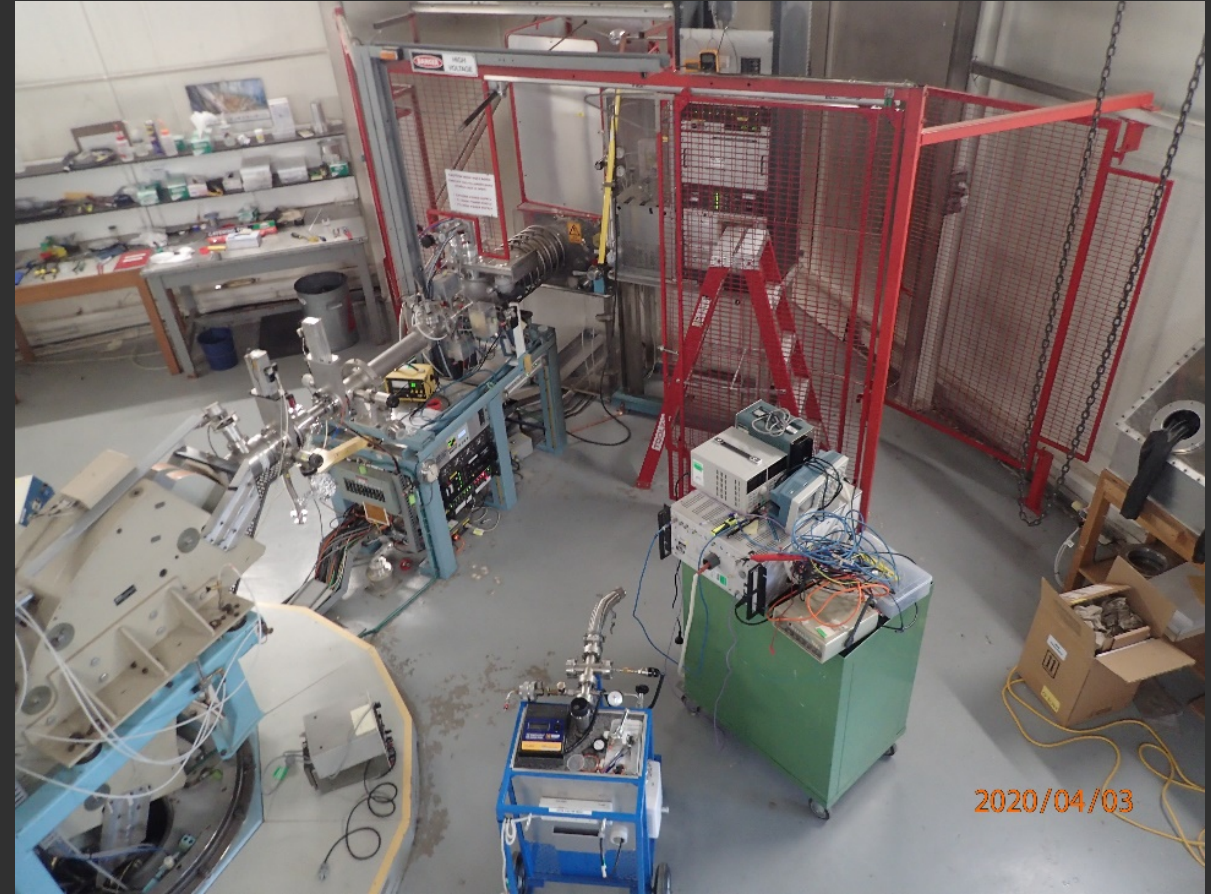
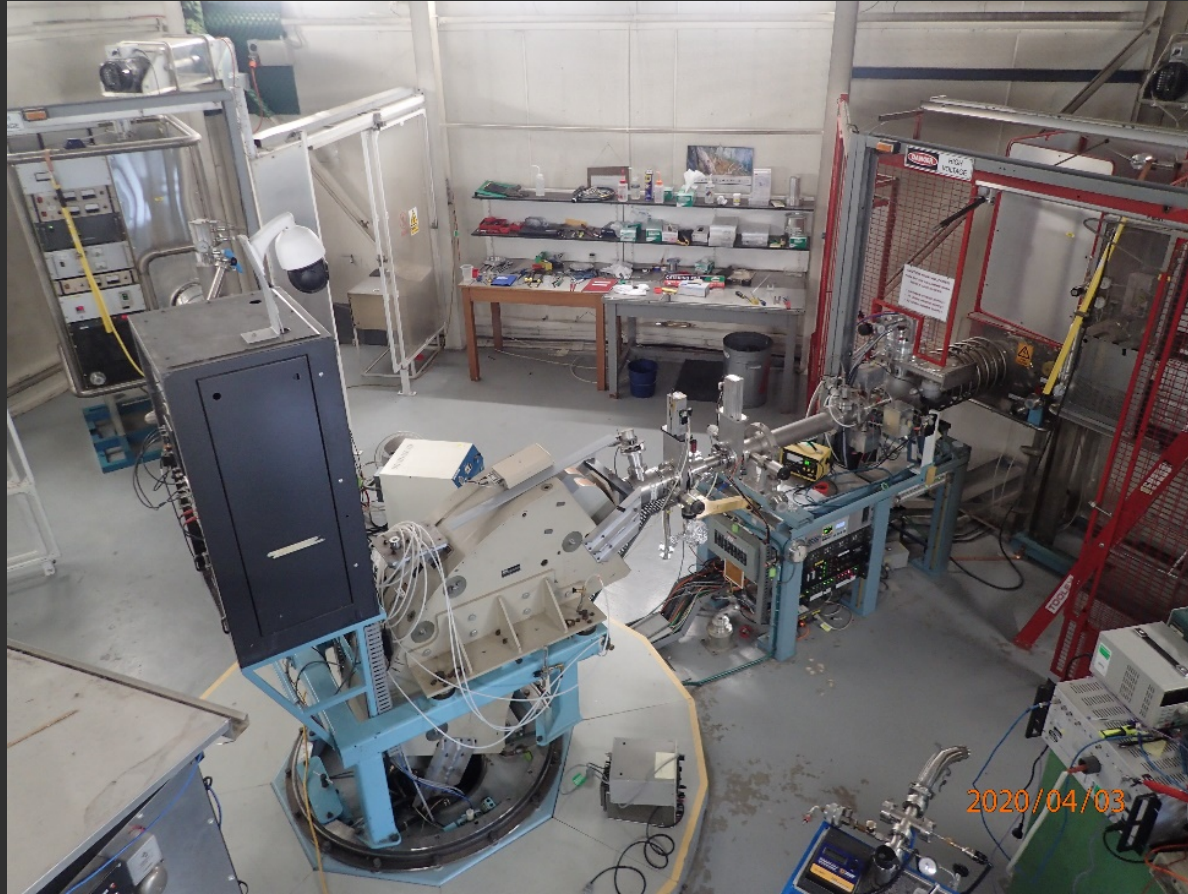
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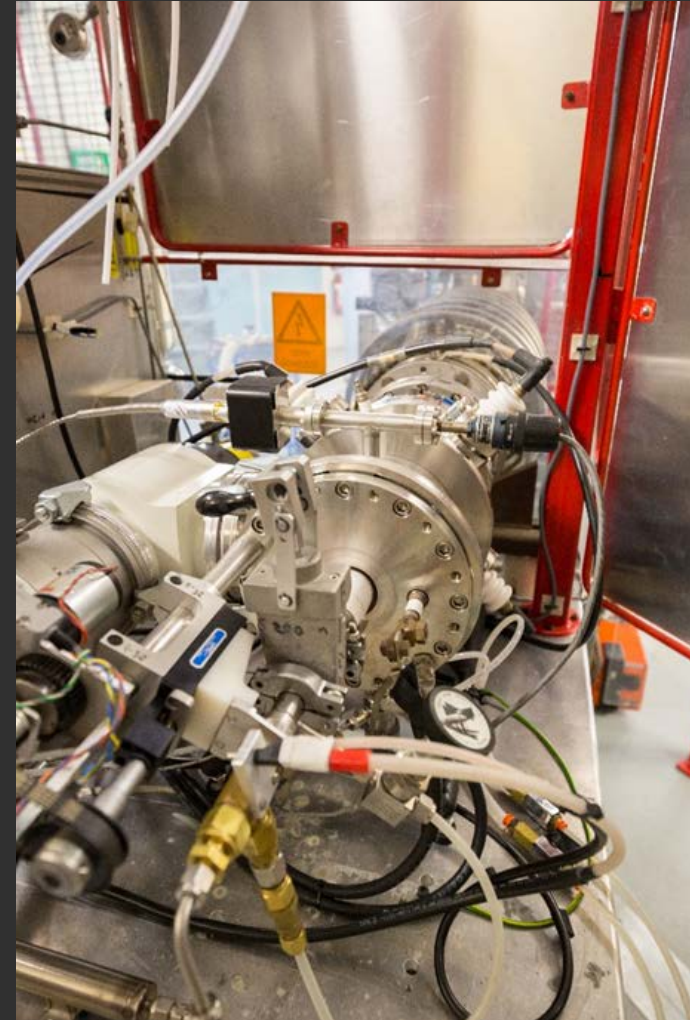
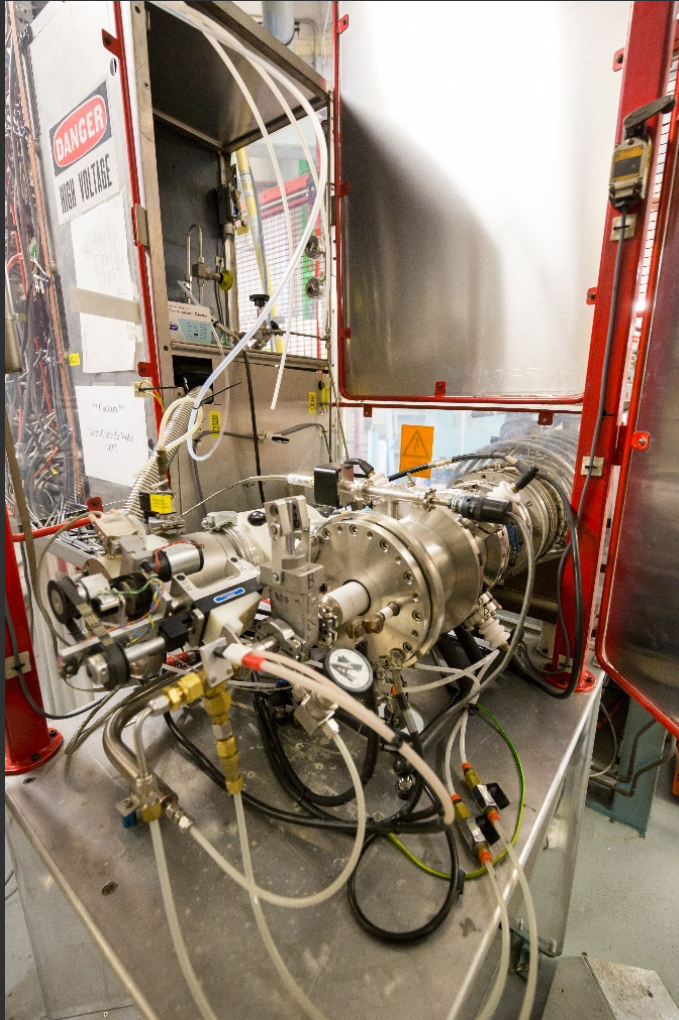


Existing ion sources





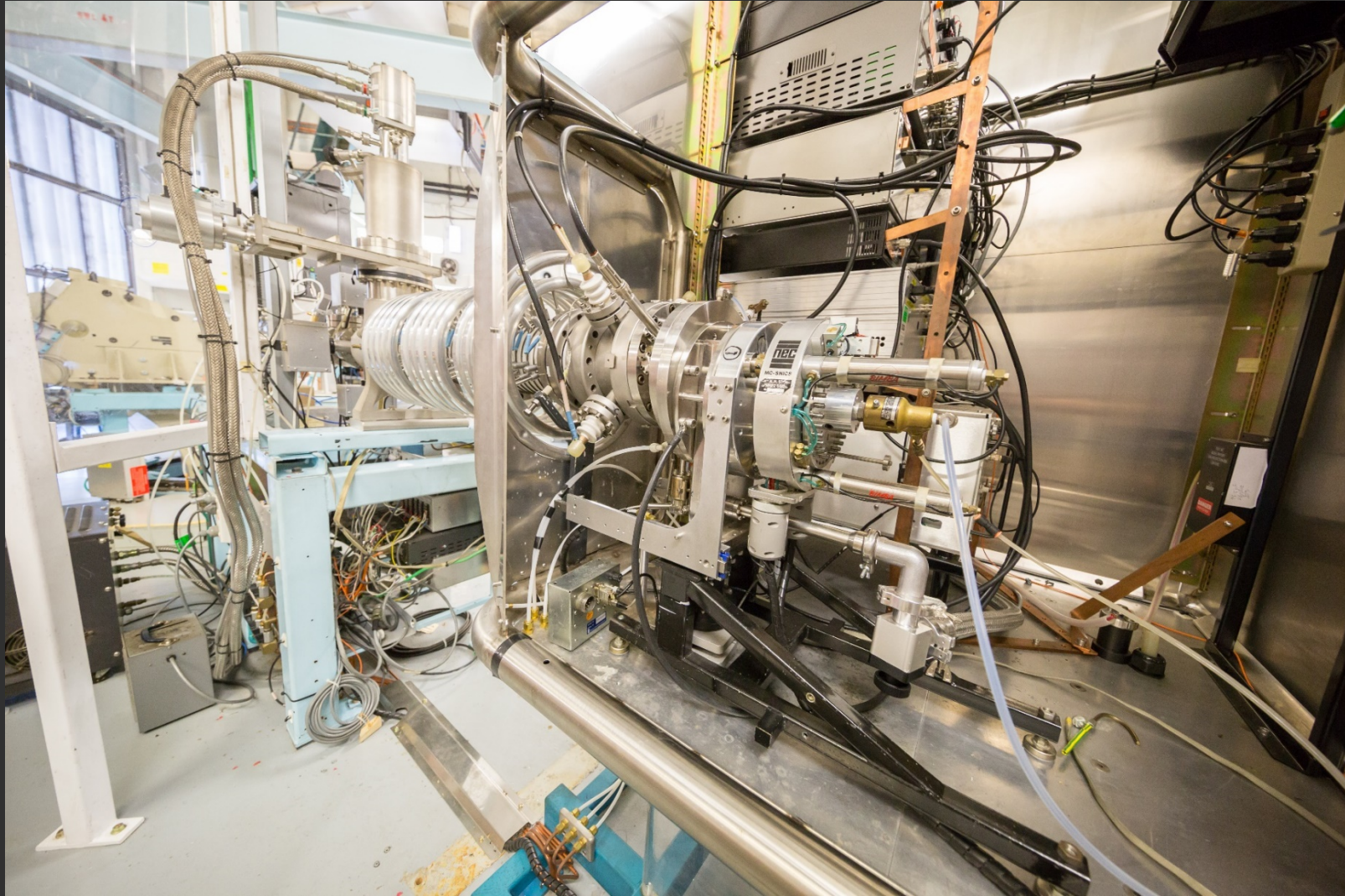
SSNICS source





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MSNICS source



Motivation

1. The sensitivity of AMS for heavier nuclide detection is currently constrained by high backgrounds from neighbouring isotopes due to low- and high-energy tails
2. Users are demanding ^3He and ^4He (alpha particles) for research problems

The project

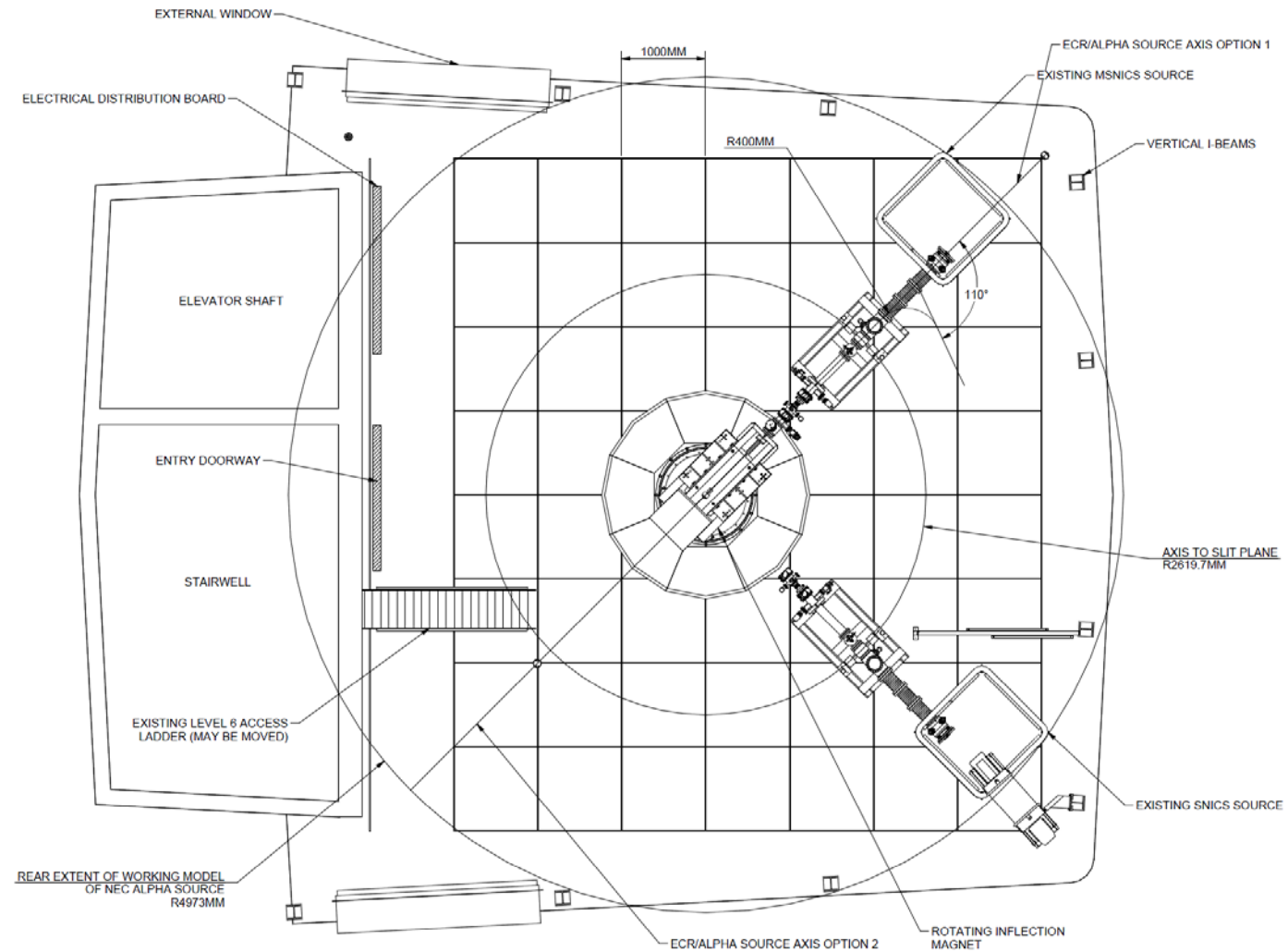
- Installation of a new ion source to produce negative helium ions (ECR/RB ion source)
- Installation of a new 110° electrostatic analyser (ESA)
- Repositioning the existing multi-cathode MSNICS ion source to integrate with the ESA
- Plus additional associated work
 - Installation of new safety cages around all three ion sources
 - Reconfiguration and upgrade of the high-voltage functional safety interlock system

Outcomes will enable

- improved isotope tracing in environmental applications;
- assessment of detectors for dark matter searches;
- searches for interstellar particle influx to the Earth;
- new research into the quantum mechanics of nuclei and;
- new astrophysics and medical applications.

Existing layout

ANU HIAF 14UD LEVEL 5 UPGRADE PROJECT
MOCKUP OF EXISTING LAYOUT AT 14 FEB 2019



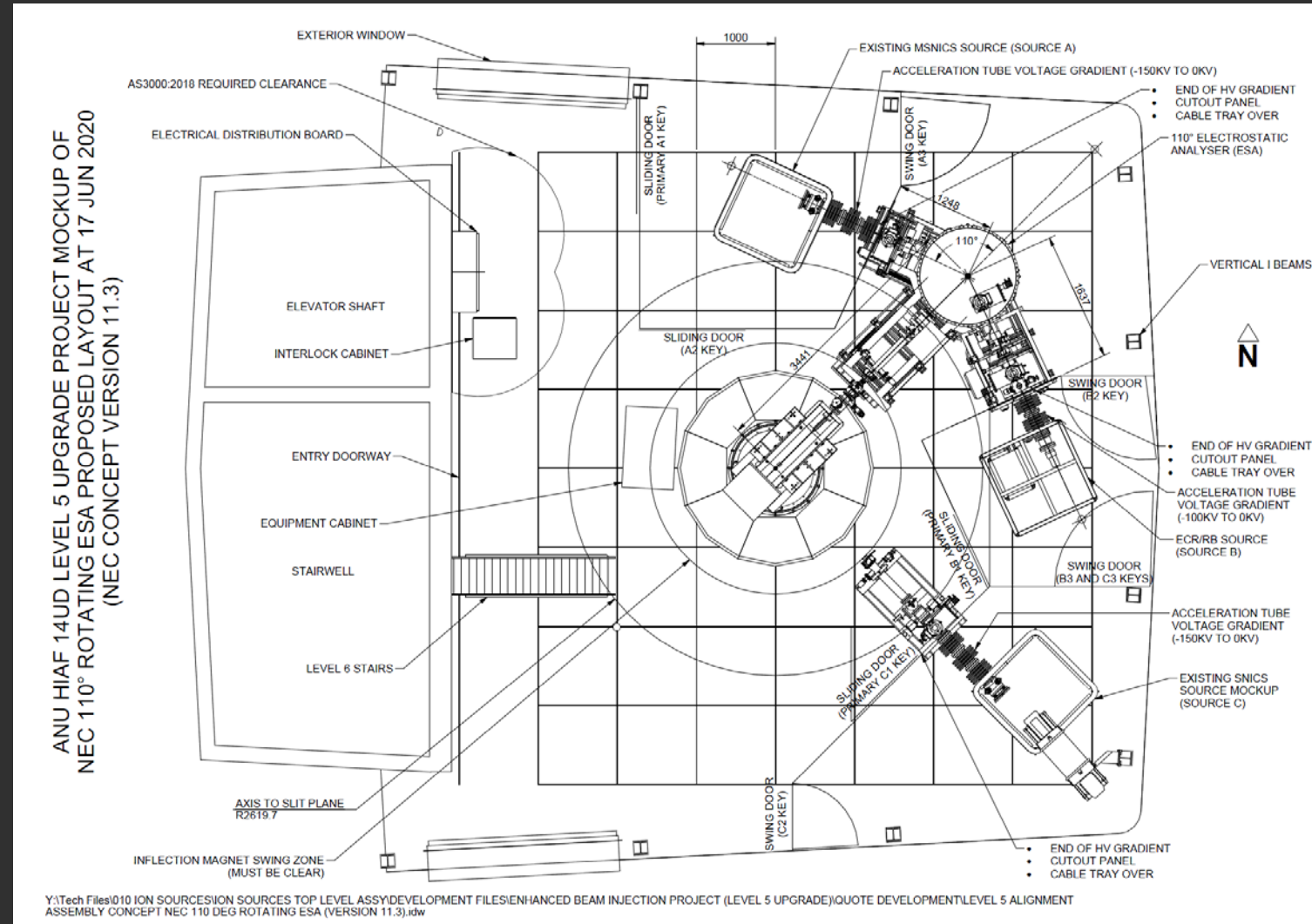


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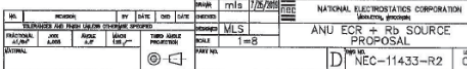
It's a busy area



Planned layout

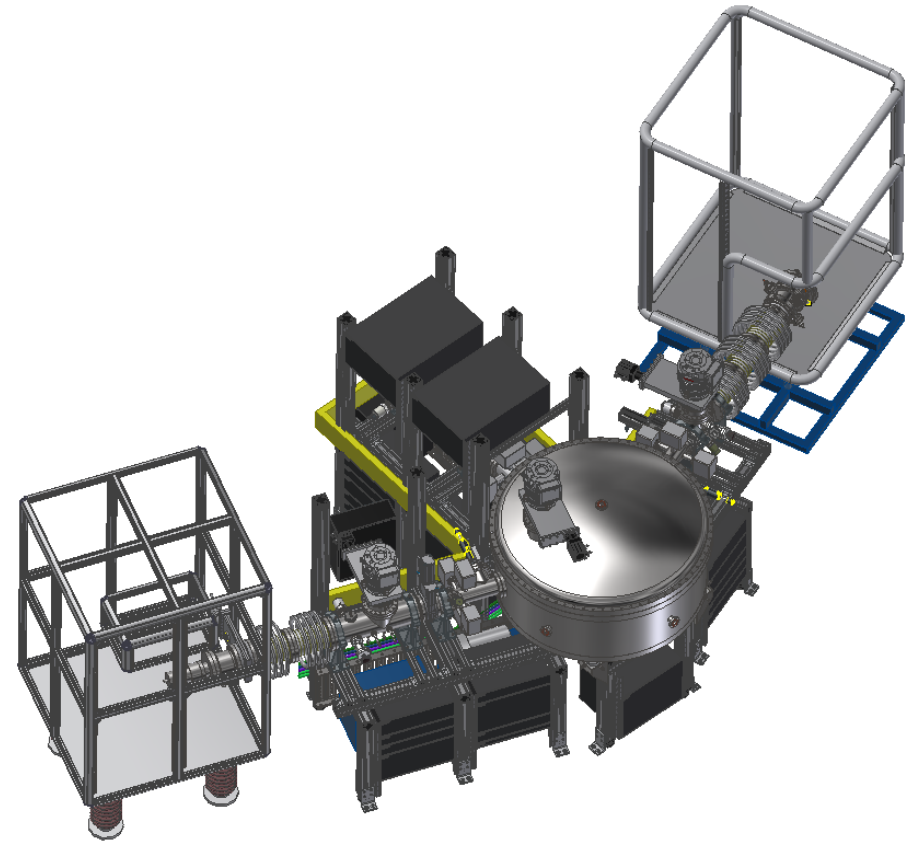
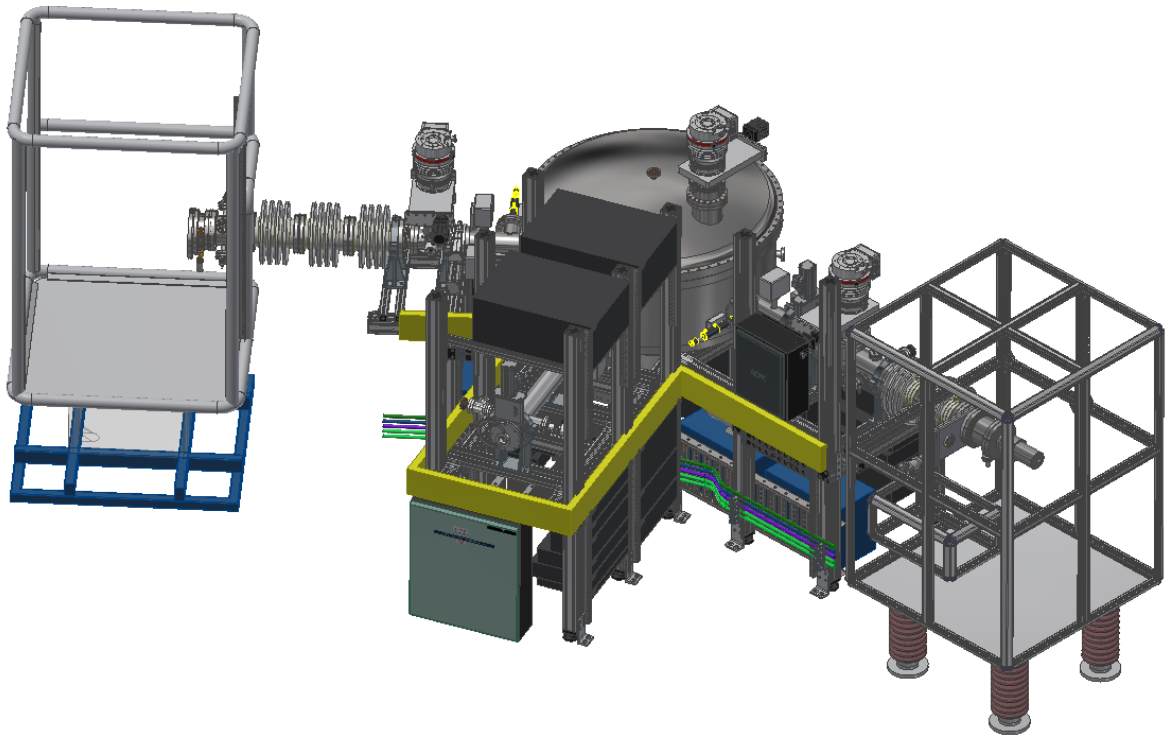


National Electrostatics Corporation Proposal





Integration



ECR source



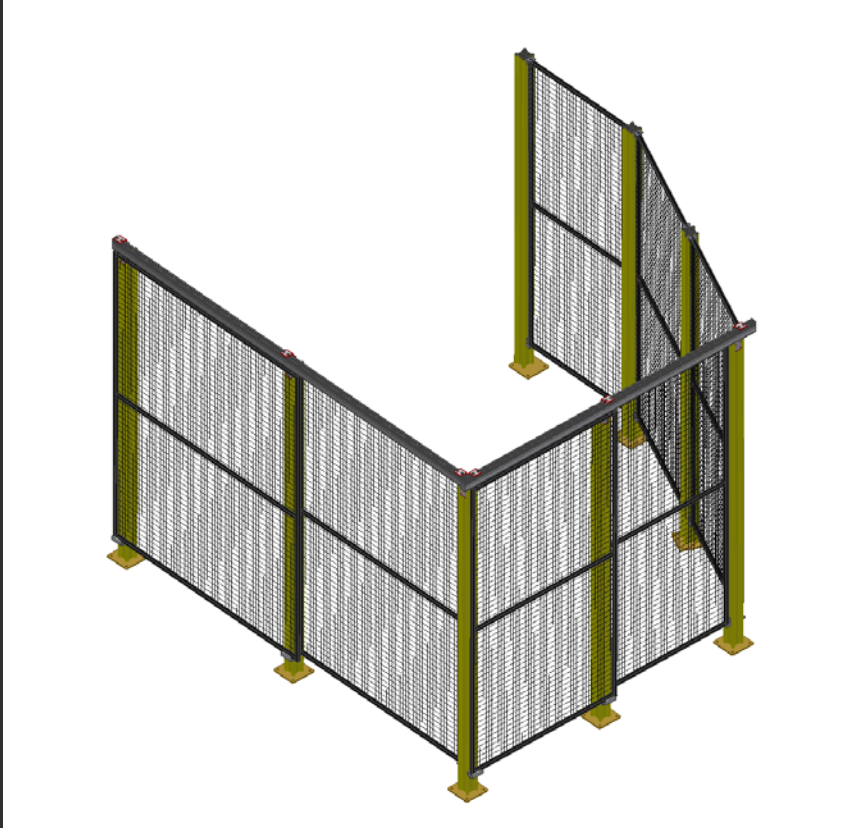
- Pantechnik Monogan M-100
- 2.45 GHz 30W RF
- Rubidium charge exchange cell

Control and I/O

- Integration into existing EPICS control
- ADAM-5000 Series Modular I/O System
- ESA bouncing system (AccelNet)



Functional safety systems



- AS/NZS 4024 Series (Safety of Machinery)
- AS 61508 Series (Functional safety of electrical/electronic/programmable electronic safety-related systems).

Timeline and challenges to it

- Original planned delivery in October 2020
 - But COVID (NEC is US based)
- System design pretty much finalised
- Building infrastructure upgrades
- Mid 2021?



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Thank you