

# Beam Strategy Meeting

March 3, 2014, 2:00pm -3:00 pm

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## Agenda:

- Target module refurbishment
- Development Projects
  - TRILIS kicker (starts operation in S126)
  - Beam scanning magnet
  - Neutron converter
  - Thorium target
- Beam Development requests

# Target Module Refurbishment

- Currently building inventory of parts for 3 source trays. It is expected all parts will be in hand during the second week of April
  - Ceramics (current eta last week of March) and Optics Tray the largest risk
- On schedule to have module delivered by December 9<sup>th</sup>, 2014.
- It is recommended that TM2 not be scheduled for any runs until 2015.
  - From experience with other modules there has always been something that doesn't go as planned.
- TM2 will be ~60kV (tested to 58kV) FEBIAD capable.

# Path Forward

- **TM4 with a new source tray**
  - Shortest timeline
  - High risk IGLIS capability lost due to damage to 9 pin connectors
    - Mitigation design new chase for connectors
      - Make time line much longer
- **TM3 new HV chase**
  - Significant understanding of the module design is required.
  - Requires significant time with no module moves and temporary “shed” to prevent contamination spread

Or

  - Additional infrastructure such as North Hot Cell, temporary “shed”(?), and rotating silo
- **TM5**
  - New module design significant time
  - Significant Cost
  - Requires decommissioning of TM(1?).

Overall module design not totally understood. This is being corrected this year. Science requirements would be helpful in determining path forward. Discussion is required.

# Neutron Converter

| Description   | Date       |
|---|------------|
| Definition of additional requirements regarding licensing and operation | 2014-03-31 |
| Target container and converter design concept and thermal analysis      | 2014-04-15 |
| CNSC operating permission   | 2014-05-30 |
| Target container and converter fabrication                              | 2013-06-30 |
| Heat shield and uranium carbide fabrication                             | 2013-06-30 |
| Assembly and offline tests at TRIUMF                                    | 2014-07-31 |
| Implementation of operational safety requirements                       | 2014-09-15 |
| Online test at TRIUMF   | 2014-09-15 |

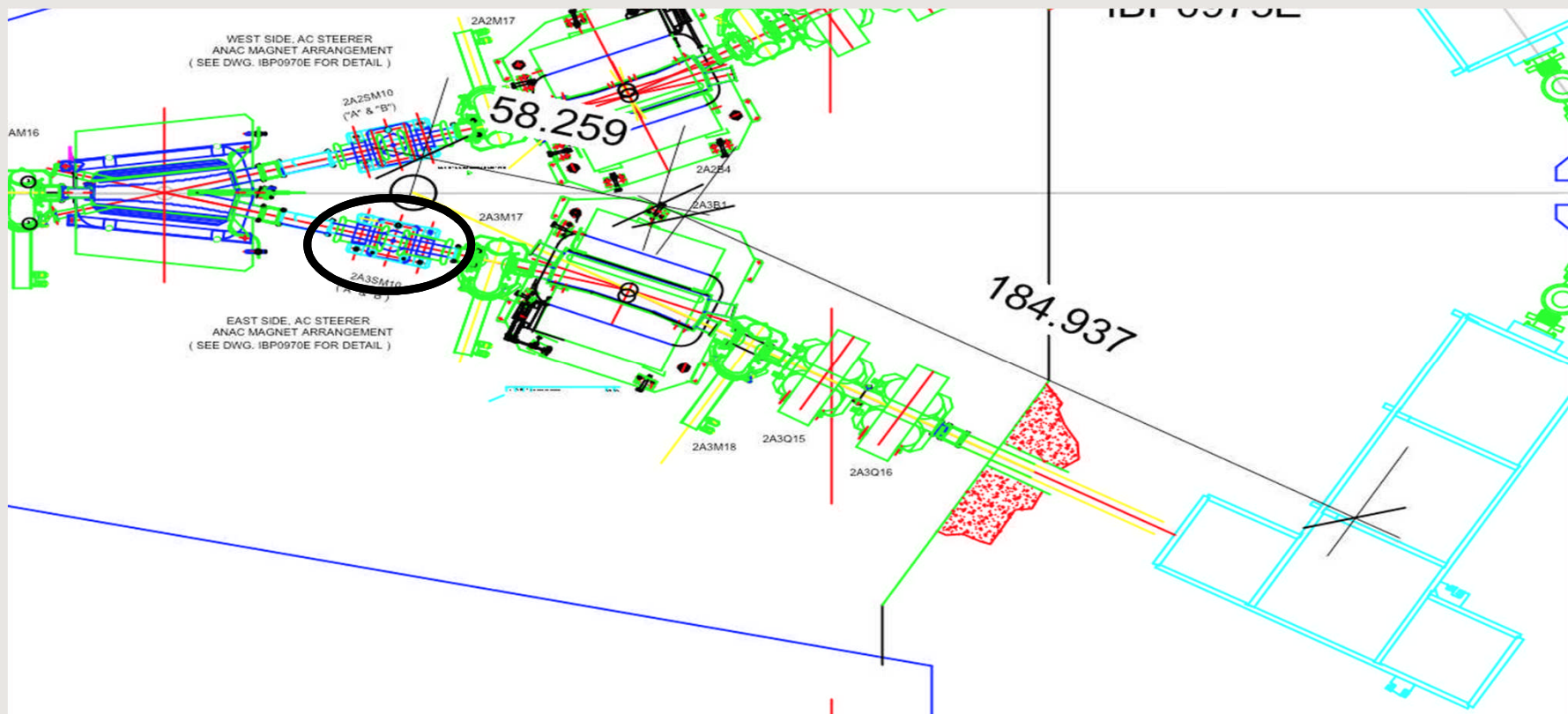
## SCOPE:

The project includes simulations, design, fabrication as well as offline and online test of a high-power uranium carbide target for neutron rich isotopes production using a neutron converter. Scientific and engineering staff of ISOLDE/CERN and TRIUMF will collaborate and work together to achieve the above goals. Scientists and engineers from both institutes will exchange visits to share and jointly develop technical expertise. They will use electronic communication tools to perform some work remotely.

The distribution of tasks between the ISOLDE/CERN and TRIUMF is outlined in a MOU.

# ISAC – AC Raster Magnet (1)

To rotate the p+ beam on the ISAC target a new pair of AC magnets (for x & y directions) would replace the ANAC magnets on the **East Leg** for the **East Target Station**.



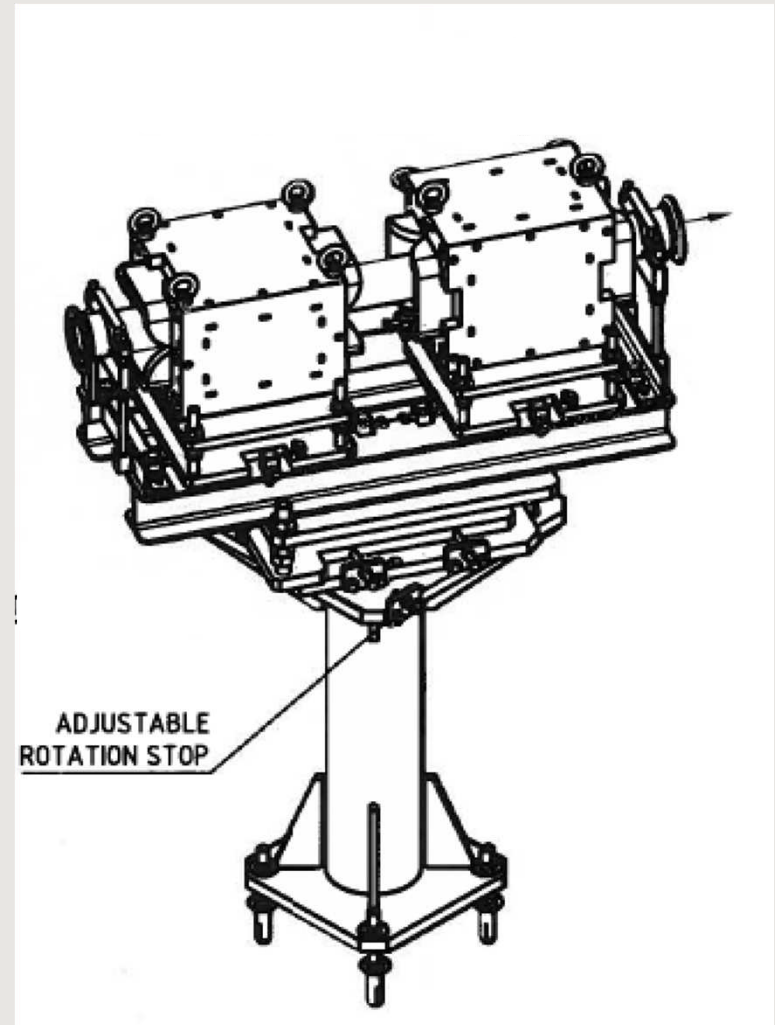
# ISAC – AC Raster Magnet (2)

## Ferrite H-frame magnet designed & manufactured by ACSI

- adjustable frequency up to **400 Hz**
- integral field up to 150 G-m
- ceramic vacuum tube
- rotatable stand

### Project Schedule

|  |                         |
|--|-------------------------|
| Design Proposal delivered to TRIUMF        | March 12, 2014          |
| Final Design Review                        | May 1, 2014             |
| TRIUMF to approve drawings for manufacture | May 15, 2014            |
| Factory Tests                              | August 1, 2014          |
| Delivery to TRIUMF                         | August 15, 2014         |
| Installation                               | September Mini-shutdown |

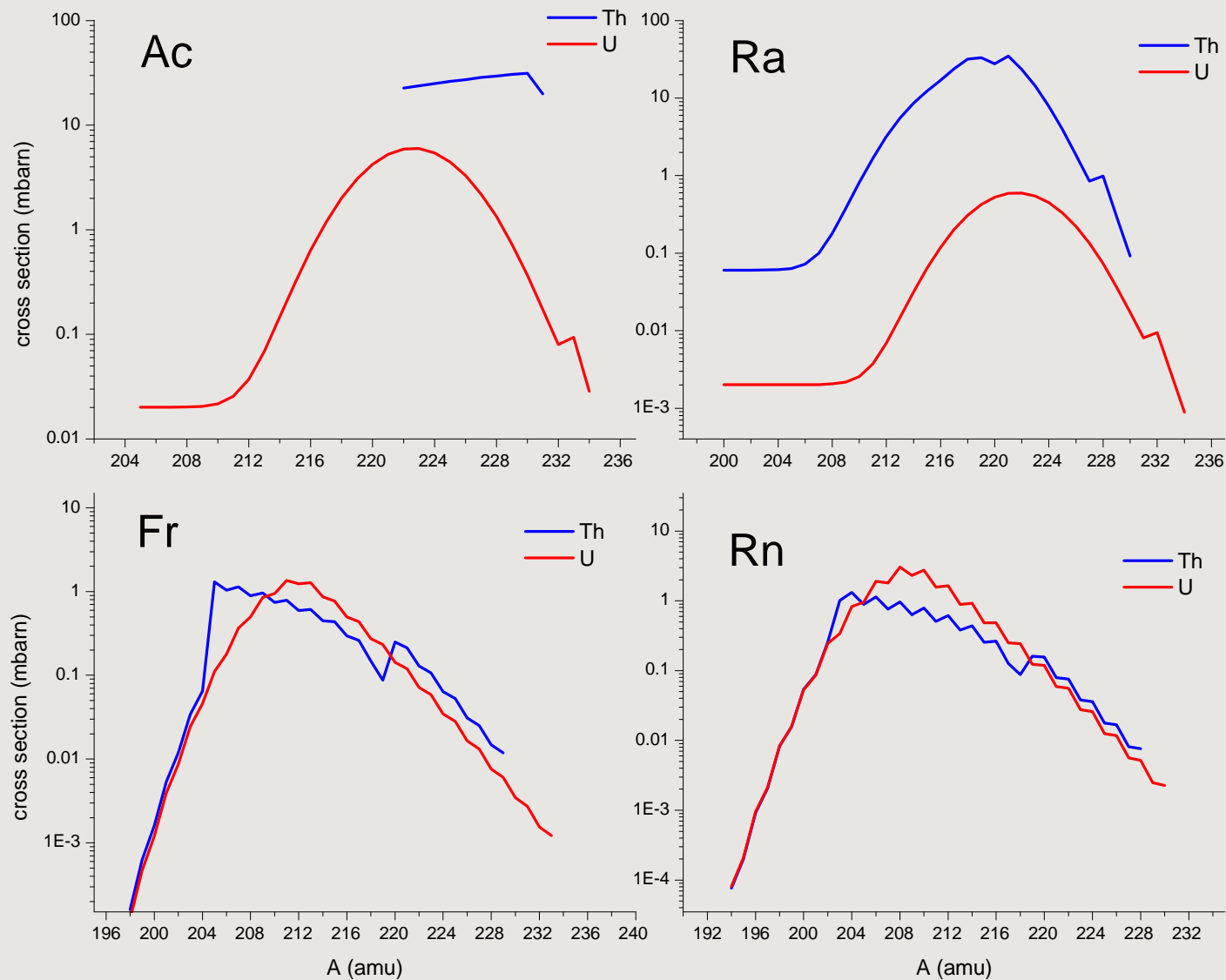


# ThO targets

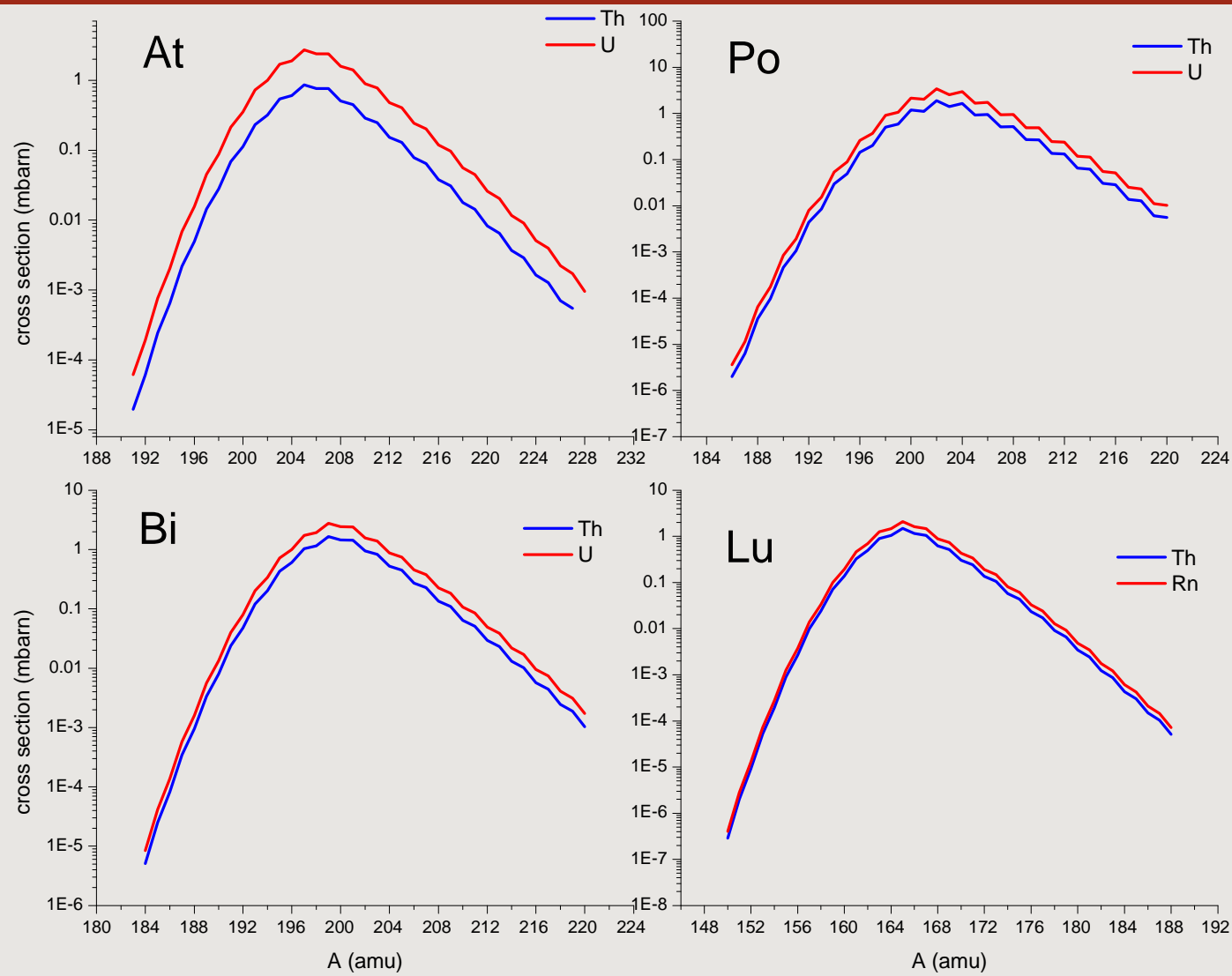
- Material in hand
- Need license amendment



# Production Cross Sections (Silberberg-Tsao, 500 MeV p+)



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# Possible targets for 2014

| # | TM  | Target | Ion Source | Delivery goals  | Development goals                     |
|---|-----|--------|------------|---|---------------------------------------|
| 1 | TM4 | Ta-HP  | SIS/RILIS  | $^{11}\text{Be}$ (TIGRESS?), $^9\text{Li}$ (TUDA), $^8\text{Li}$ (bNMR)   | $^{101-106}\text{Sn}$ , $^7\text{Be}$ |
| 2 | TM3 | TiC-LP | SIS        | $^{38}\text{K}$ (DRAGON), $^{37\text{m}}\text{K}$ (TRINAT)  | $^{35-37}\text{Ca}$                   |
| 3 | TM1 | UC-LP  | SIS/RILIS  | $^{202-208}\text{Fr}$ (laser), $^{213}\text{Fr}$ (Nucl. Med),<br>$^{95}\text{Sr}$ (TIGRESS), $^{34}\text{Mg}$ (TITAN) |                                       |
| 4 | TM3 | SiC-LP | FEBIAD     | $^8\text{He}$ (ISACII), $^{14}\text{O}$ (TITAN, GPS)  |                                       |
| 5 | TM1 | Ta-LP  | SIS/RILIS  | $^{12}\text{Be}$ (IRIS), $^8\text{Li}$ (bNMR)   |                                       |
| 6 | TM4 | UC-LP  | SIS/RILIS  | $^{34}\text{Al}$ (TITAN), $^{31}\text{Na}$ (OSAKA)  | $^{30}\text{Na}$ , $^{70}\text{Ni}$   |

# Beam Developments

- Large number of yield measurements requested
- Substantial demand for development targets:
  - UC FEBIAD (w/ and w/o CTL)
  - Ta IG-LIS
  - UC IG-LIS
  - SiC FEBIAD (w/ and w/o CTL) (maximum yields needed)
- Some beams need new ideas:
  - 19,20C - ThO FEBIAD
  - 53,54Ca – metallic U or Th