ISOLDE Technical Report

INTC Meeting 31st October 2012

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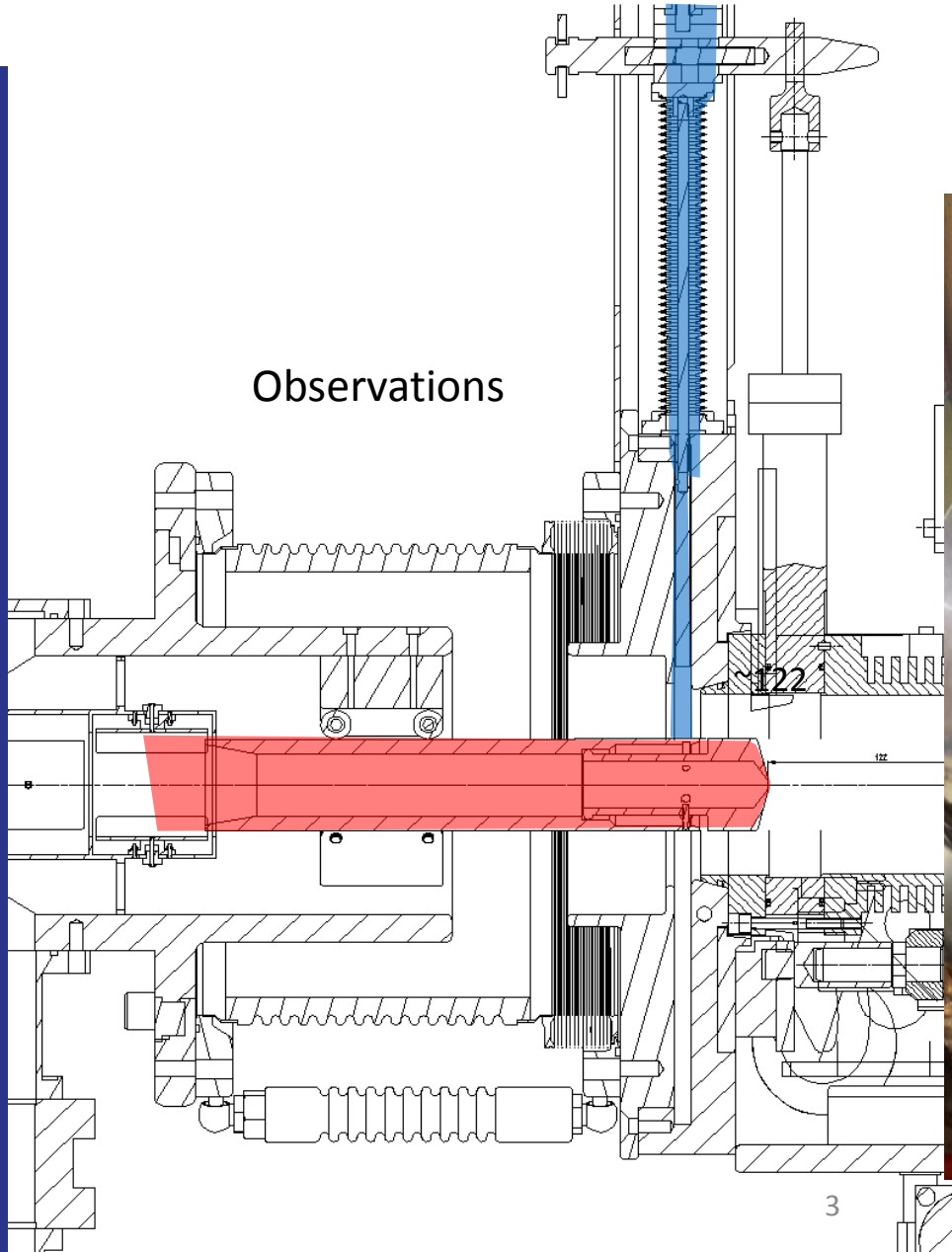
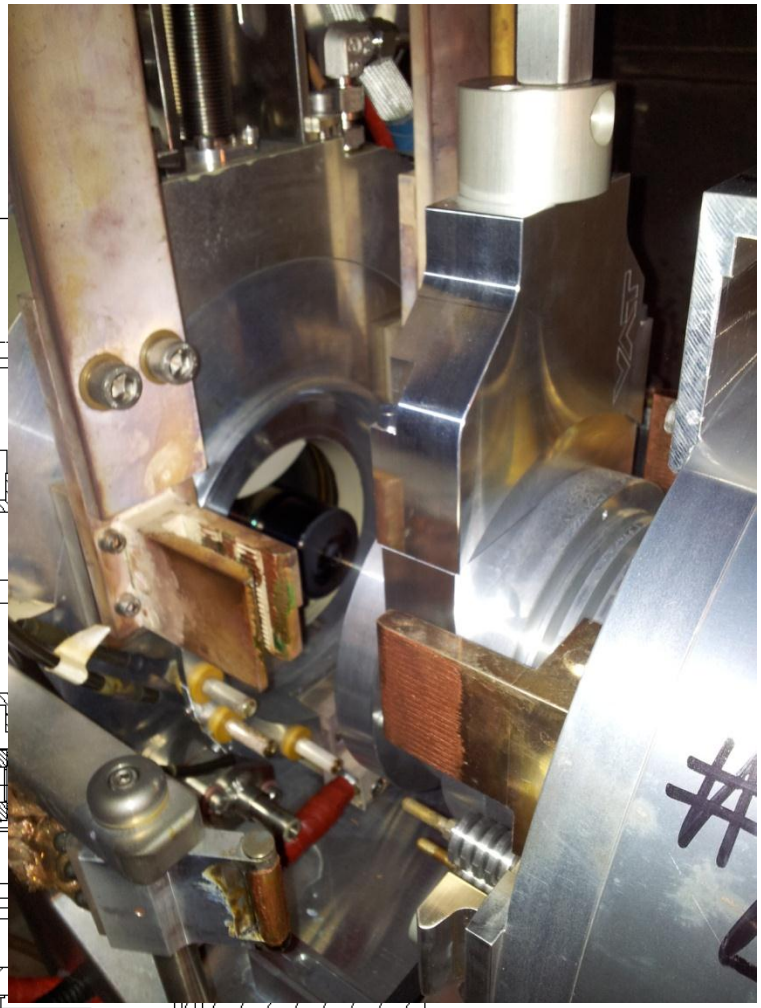
Outline

- Separator Operations
  - GPS extraction electrode failure
  - Interventions
  - Controls
- Targets
- REX
- RILIS
- Radiation protection monitoring

Separator Operations: GPS Frontend

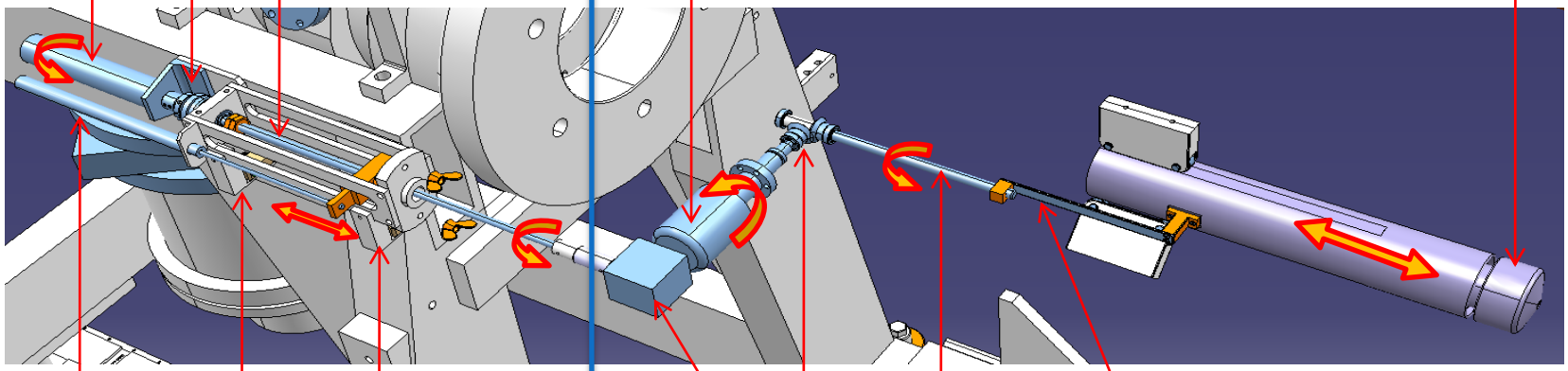




Separator Operations: GPS Frontend

OK → Test positive

NOT OK → Failure on transmission



GPS FE Status

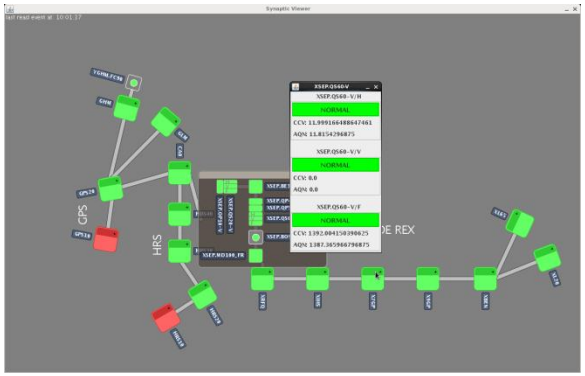
- Intervention to confirm/remove target was successful.
- Plug target has been installed by the robot
- The Helicon target can be accommodated on the GPS FE with little modifications required.
  - Extraction electrode ideally positioned with respect to ion source.
  - Decision approved by ALARA level 3 committee
- Possibility to save ~ 2 weeks of physics
  - ^{9}C, $^{31, 35}Ar$ -> CaO target
- A plug target to be put back on after Helicon target.
- Full repair to be carried out during LS1
  - Not a trivial matter. Cause unknown

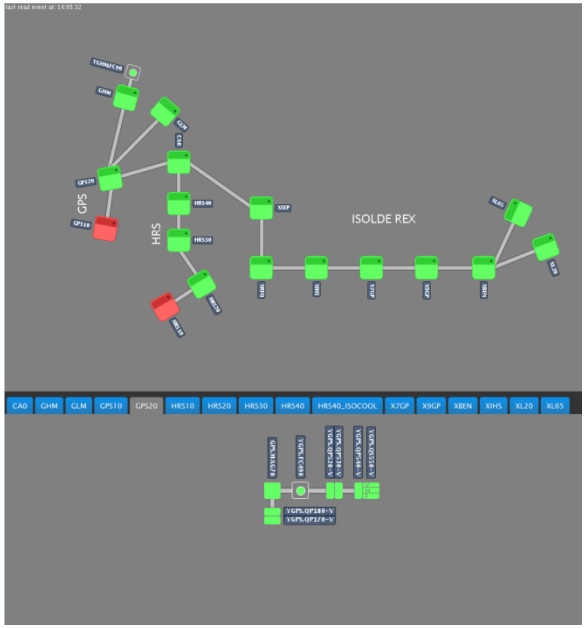
Separator Operations: Interventions

- GPS.FC490
  - Greasing of faraday cup piston
  - Replacement of faraday cup with spare
    - ✓ Vacuum leak on lower flange of FC
  - Greasing of spare faraday cup.
- HRS.FC490…2 weeks later
  - Replacement of faraday cup with HRS.FC300
    - ✓ Vacuum leak on bellows
- Laser windows
  - Replacement of oring on laser window
    - ✓ Oring “seen” by laser light causing it to burn
- BTY line
  - Leak found at penning gauge near primary pumps

Separator Operations: Controls

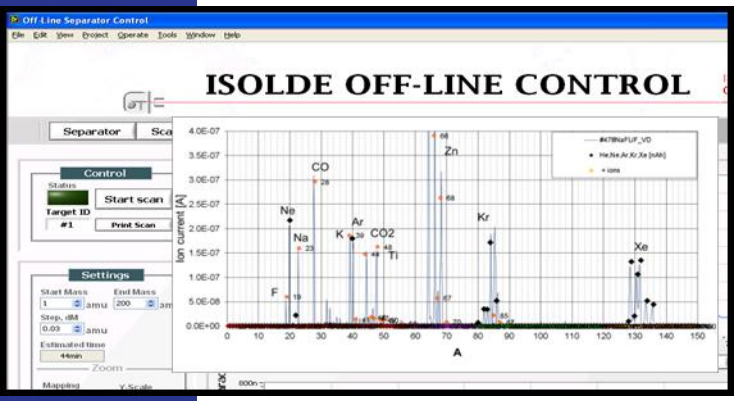
- ACCOR > Accelerator controls renovation project
  - More than 600 devices moved from GM to FESA (CERN standard)
- InCA > Injector Control Architecture
  - After 2 test days, implemented on the 8th October
- ISOLDE Synoptic Editor and player
  - Easy configuration
  - Global or detailed view
  - Visible on the web

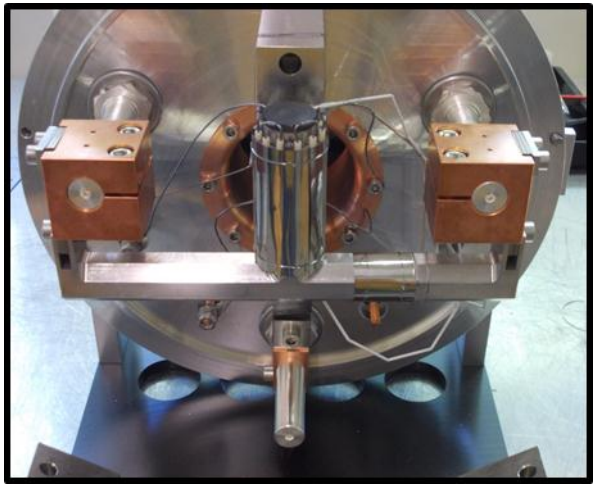




Static molten salt target for $^{18}Ne^{*}$ for β-beams

Featured (with ^{6}He beams) in CERN activity report and EPN (43/5)





* And record yields of 11C as CO+

T. Mendonca (CERN),
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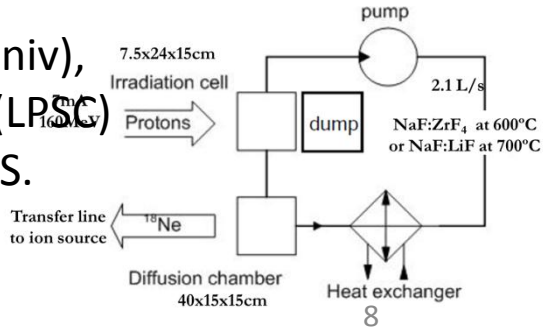
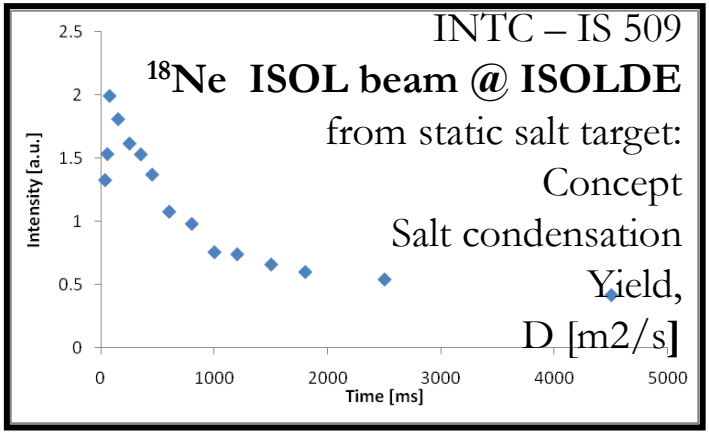
TISD team (S. Cimino, S. Marzari),
EN-MME, TE-VSC



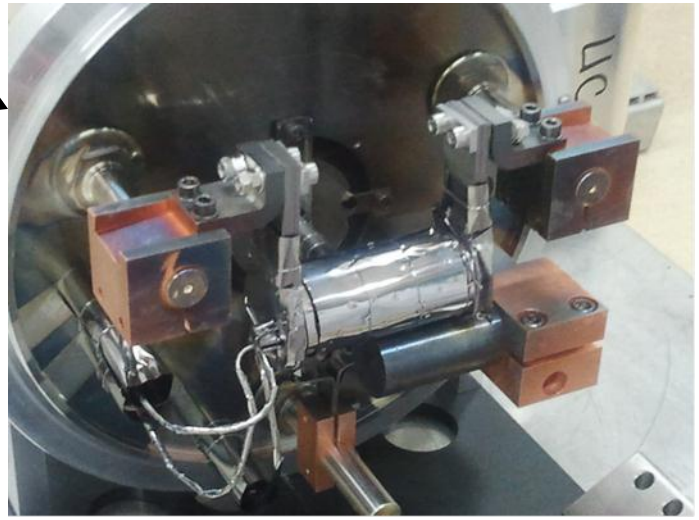


New n converter – phase I

Tests of simulations with geometry I:
Predicted n-rich Zn/Rb improvement of ~ x20

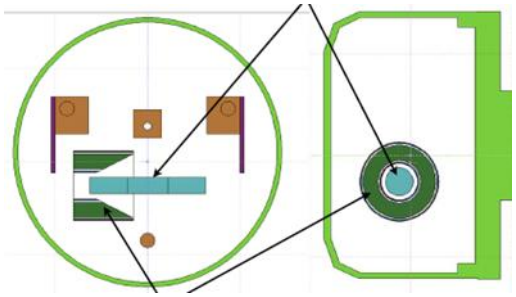
New converter geometry I :
5^e3 80Zn, 5^e1 80Rb /μC
600 81Zn, ~5^e2 81Rb/μC

➔ Measured improvement ca x200 (instead of x20)



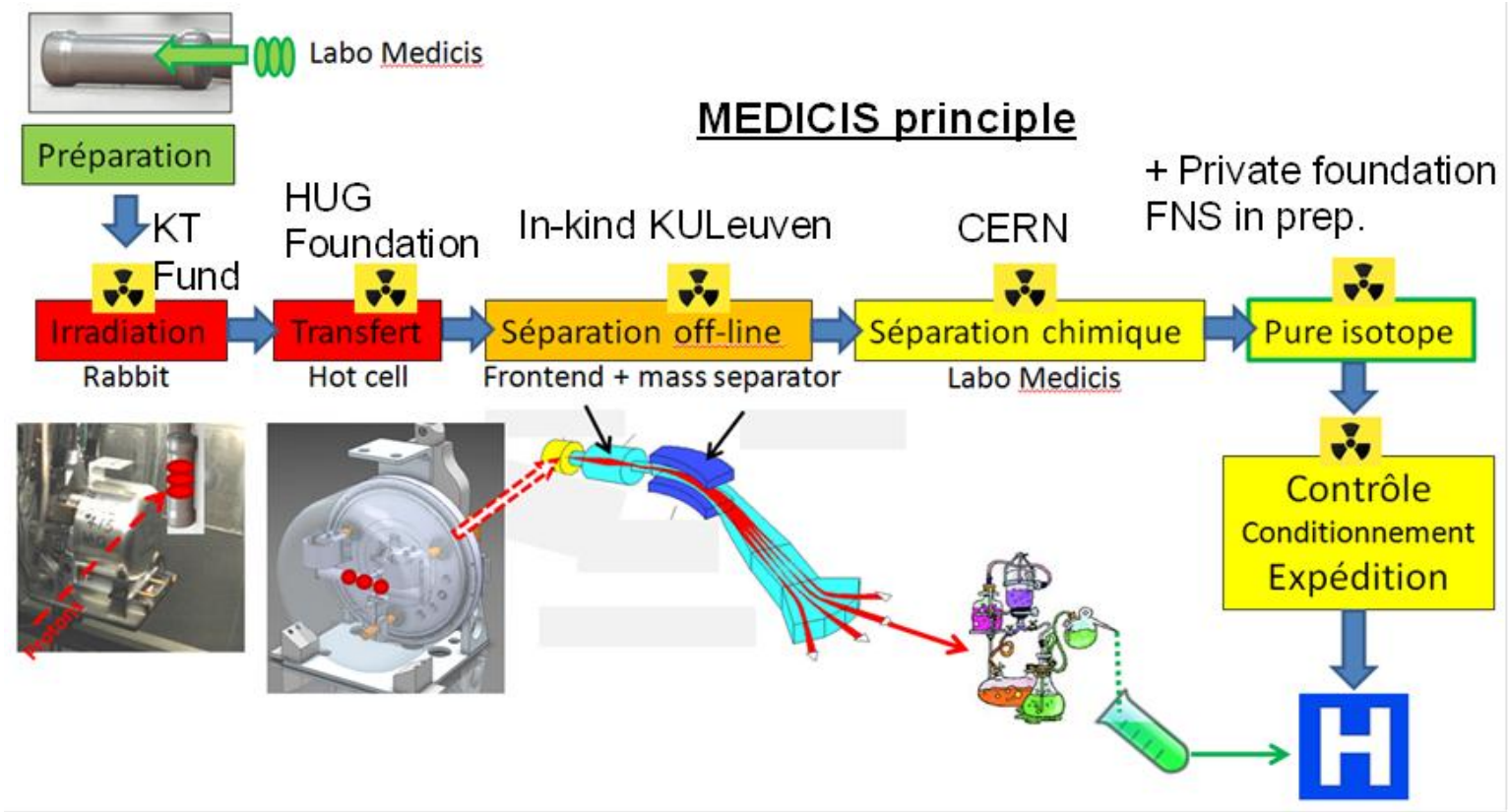
Yet some teething problems:
clear thermal and mechanical weaknesses

Onboard for phase II (2014): Keeping the same Impurity/beam improvement, and increase of yield

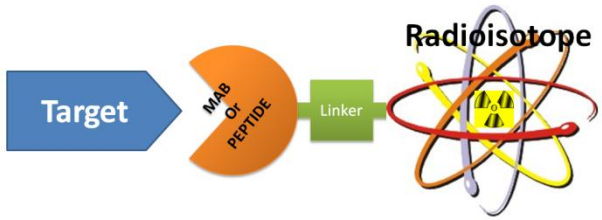


R. Luis et al, EPJ A 2012
TISD team, S. Marzari, B. Crepieux

152Tb MEDICIS test batch shipped in August to Lausanne



Prostate Cancer cells



152Tb From ISOLDE

REX-ISOLDE

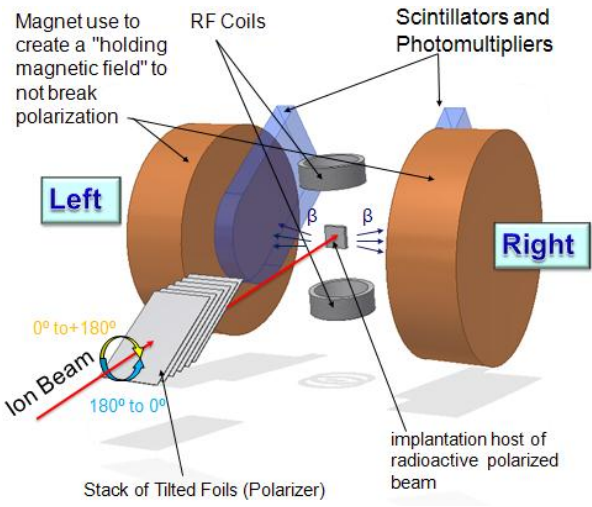
• First spin-polarized beam (8Li) produced with the tilted foils method after the REX linac.

• Difficult ^{6}He through REX to Optical Time Projection Chamber (OTPC).

• TwinEBIS cryostat repaired;
B-field being aligned.

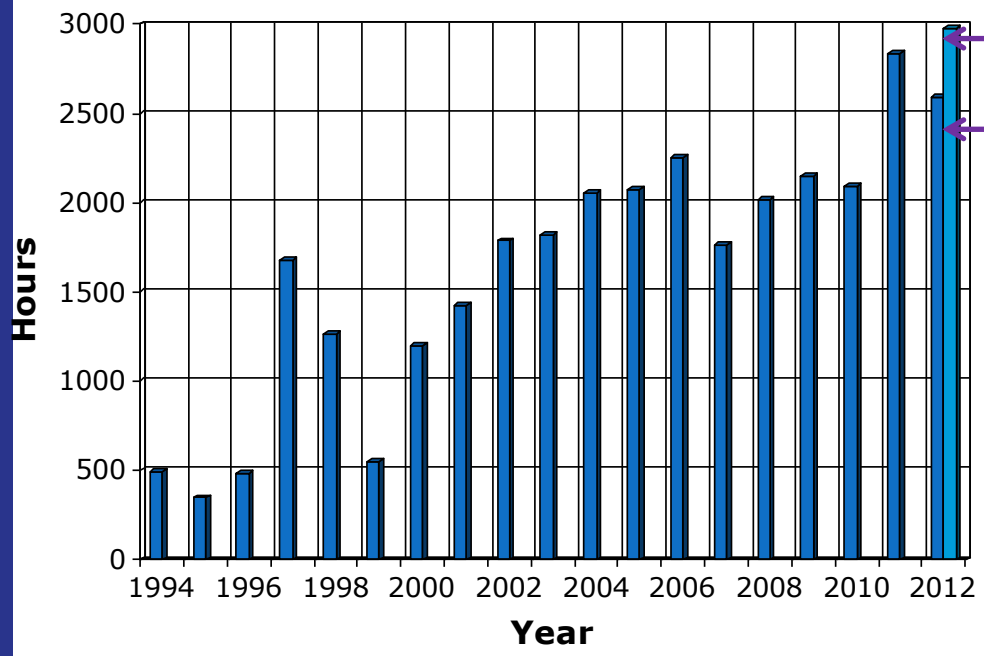
• REX separator and linac successfully tested with A/q=2 => important for TSR.

• Positive preliminary tests of pulse shortening from REXEBIS => important for TSR.



RILIS operation

By now ion beams of 10 elements were produced with RILIS in 2012



Laser ON time in 2012:

3000 h – Expected by end of 2012

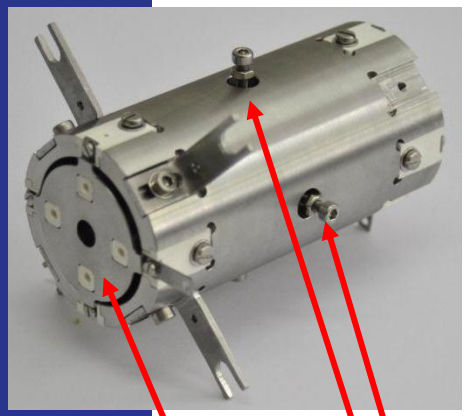
2590 h – by 25 October

Availability of two complementary laser systems (Dye and Ti:Sapphire) has ensured the increase of RILIS beam time

Beam	Sm 2 runs	Ca 2 runs	Cd	At 2 runs	Au 2 runs	Be 3 runs	Dy	Mg 4 runs	Po 2 runs	Ag 2 runs	Zn	Cu	Mn
Planned	208	272	192	300	172	446	88	296	206	96	198	112	148
Real	212	359	253	345	262	278	111	378	206	65	124		

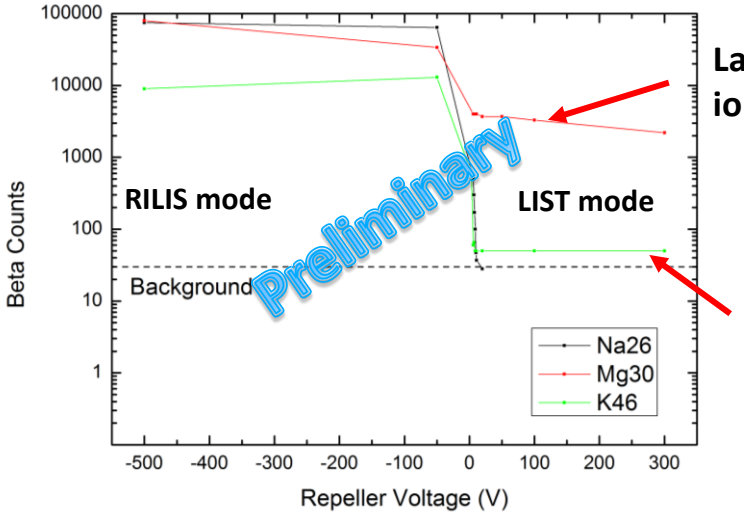
Laser Ion Source and Trap (LIST) On-Line at ISOLDE

LIST device:



LIST assembly:

Ionization and suppression of contaminants by LIST:



- LIST was successfully tested with UCx-target -> No loss of performance over 5 days
- Suppression of Na-, Al-, K-, Fr-, U-isotopes studied -> Suppression factors varied from 100 to 1000
- Laser ionization of radioactive Mg and Po in LIST

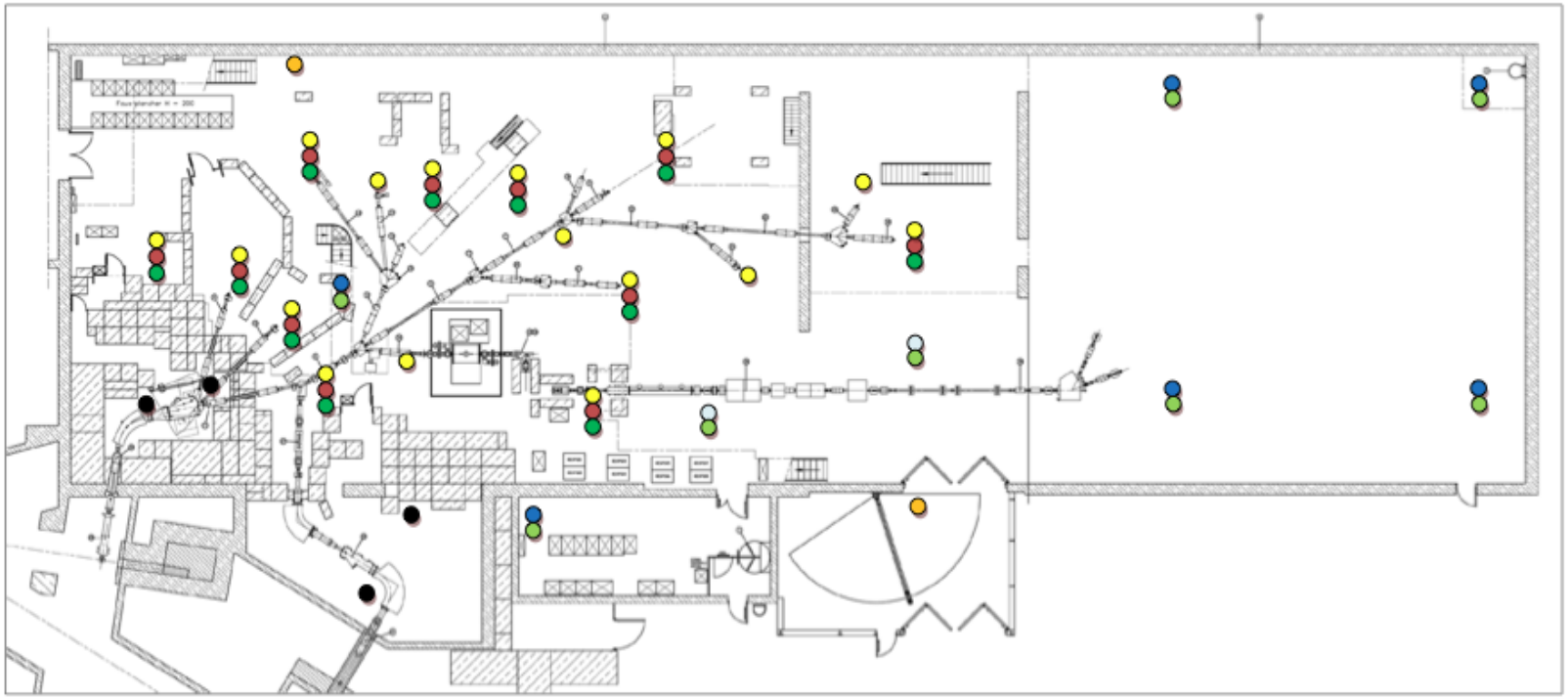
Fr suppression and laser ionization of Po in LIST → **First ever LIST on-line physics result: hyperfine structure of ^{217}Po**

By Daniel Fink

Radioprotection

New radioprotection monitoring to be installed during LS1

→Additional stations to allow more accurate survey of dose rates around beam line



Instrumentation GRAMS

- Sonde gamma (16)
- Unité centrale (11)
- Unité d'alarmes (11)

Instrumentation RAMSES

- Chambre d'ionisation XRM (2)
- Chambre d'ionisation AMF (6)
- Chambre d'ionisation IAM (4)
- Unité d'alarmes (8)
- Moniteur mains-pieds HFM (2)

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