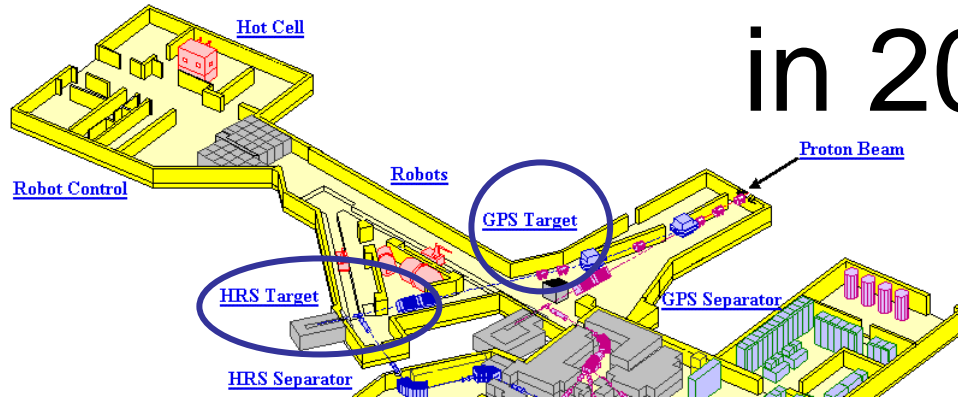


Target and Ion Source - Development in 2006



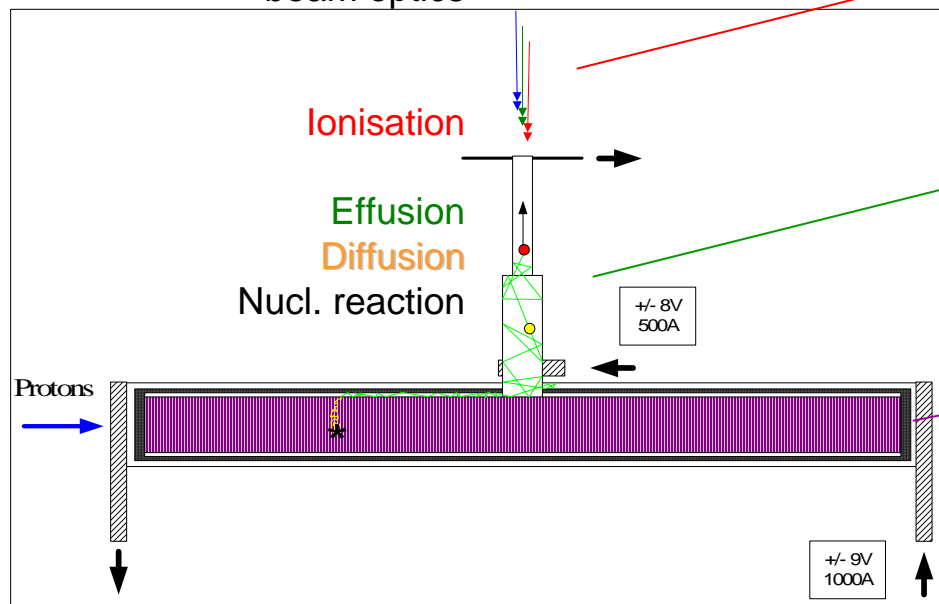
**Negative surface ion source
MiniMono 1+ ECR
Cavities + RILIS**

Temp. Control. Line v2.0

**Sub- μm SiC
CeO (+MK5)**

Thierry Stora AB-ATB-IF

Pre-Separation,
Separation, Extraction,
beam optics





ISOLDE TISD

E. Barbero
D. Carminati
R. Catherall
B. Crepieux
M. Eller (fellow doct)
S. Fernandes (fellow doct)
S. Marzari
H. Richter (fellow doct)

E. Bouquerel (USAS)
L. Penescu (USAS)
M. Menna (Fellow)

E. Noah
R. Wilfinger (Fellow)

High power
targetry



ISOLDE PH, AB

L. Fraile
H. Franberg
H. Jeppensen
K. Johnston
F. Wenander

Production in 2006

| GPS Separator | | | |
|---------------|----------|------------|-------------|
| target number | target | ion source | date online |
| 320 | UC2 | MK8 W | 21-04 |
| 321 | ZrO | MK8 W | 08-05. |
| 254 | Sn | MK8 W | 17-05 |
| 324 | SiC-SG | MK8 W | 29-05 |
| 320 | UC2 | MK8 W | 06-06. |
| 329 | UC2-n-q1 | MK8 W | 07-07. |
| 326 | ThC | MK8 W | 24-07 |
| 333 | UC2 | MK8 Ta | 09-08. |
| 256 | Pb | MK3 | 21-08. |
| 333 | UC2 | MK8 Ta | 30-08. |
| 286 | LaC2 | MK8 W | 14-09. |
| 338 | UC2-q2 | MK8 W | 02-10. |
| 331 | UC2 | MK8 W | 17-10. |
| 343 | Nb | MK4 Ir5Ce | 10-11. |

| HRS Separator | | | |
|---------------|---------|------------|-------------|
| Target number | target | ion source | date online |
| 319 | CeO | MK5 | 27-04 |
| 322 | UC2-n | MK8 W | 10-05. |
| 323 | Ti | MK8 W | 19-05. |
| 325 | UC2 | MK5 | 30-05. |
| 326 | ThC-n | MK8 W | 13-06. |
| 328 | Nb | MK8 W | 26-06. |
| 330 | UC2-qv1 | MK8 W | 19-07. |
| 303 | UC2 | MK8 W | 04-08. |
| 334 | SiC-SG | MK5 | 14-08. |
| 335 | Ta | MK8 W | 23-08. |
| 336 | UC2-n | MK7 | 05-09. |
| 337 | CeO | MK5 | 22-09. |
| 339 | MgO | MK7 | 04-10. |
| 340 | UC2 | MK7 | 17-10. |
| 327 | Ta | MK8 W | 02-11. |

23 new units:

11 actinide targets

5 prototypes

Quality Insurance

24/05/2006 Target #323 Ti W Surface

Target Number Ti_266

Target Material Ti
Purity 99.80%
Geometry metal foils (rolls)
Thickness 18 μm
Quantity 45.8 g
Impurities ug/gU

| | | | | |
|----|----|----|---|----|
| Ca | Fe | C | F | Mo |
| 10 | 10 | 30 | 6 | 6 |

supplied by Johnson Matthey

Ion source W Surface

Base Number POL05005

Source distance 0 mm from base plate
 Leak rate 2.12×10^{-5} mbarl/s
 mass marker K 6000nAh

Off line Settings

| | Limits | |
|--------|-----------|-------|
| | Min. | Max. |
| Target | I (A) 350 | U (V) |
| Line | I (A) 330 | U (V) |

| Limits | | | |
|--------|-------|-------|-------|
| Min. | Max. | Min. | Max. |
| I (A) | U (V) | I (A) | U (V) |
| | | 400 | |
| | | 380 | |

Final documentation

Conformity check
(R. Catherall/T. Stora)

Handed to OP-ISO

Paper copy (*or draft*)
in ISOLDE Control Room

Electronic version on
ATB-IF web site

CeO + Hot FEBIAD (MK5)

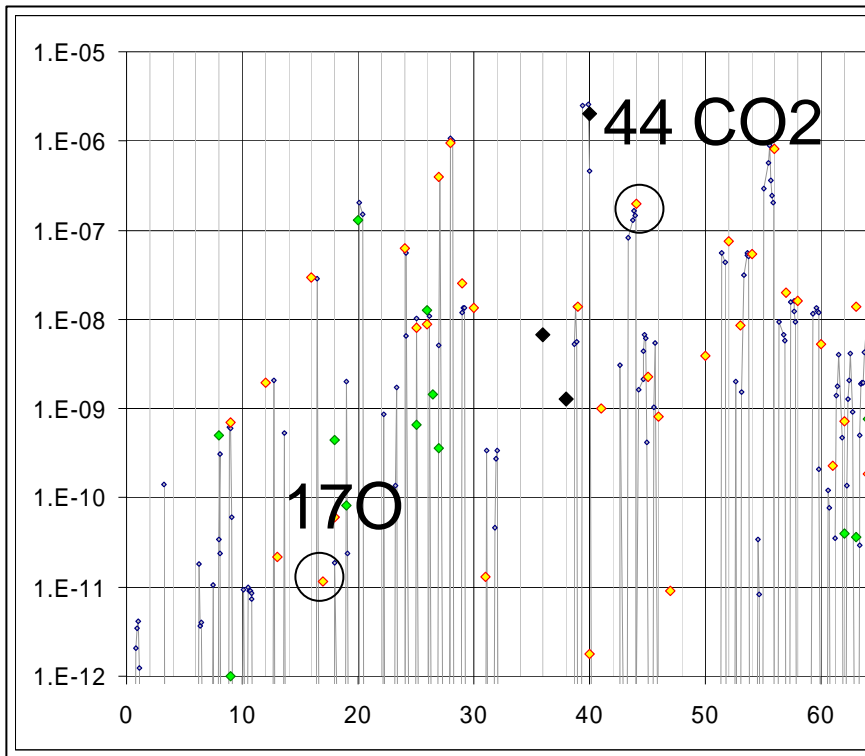
| Isotope | cumulated yld (pps) |
|---------|---------------------|
| 112 Sb | 2e5 |
| 117 Sb | 2e6 |
| 114 I | 3e5 |
| 117 I | 1e5 |
| 117 Te | 2e5 |

- Further Te beam development possible:
 - RILIS
 - Target development

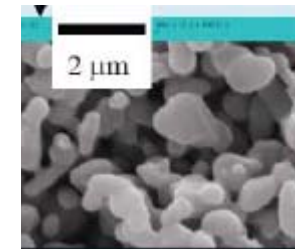
E. Noah, B. Roussiere (COMPLIS) et al.

Sub- μm SiC for 17F

- Synergy with high power targetry



17F, 20F, 25Al, 28Al, 30Al not isotopically pure



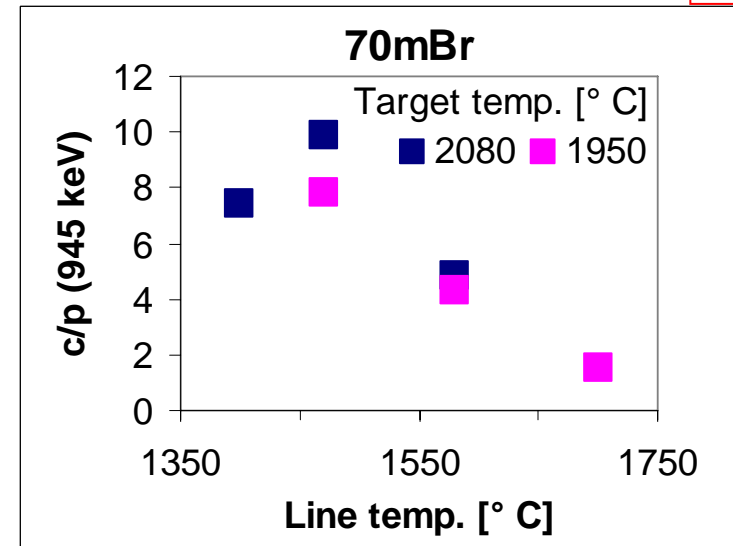
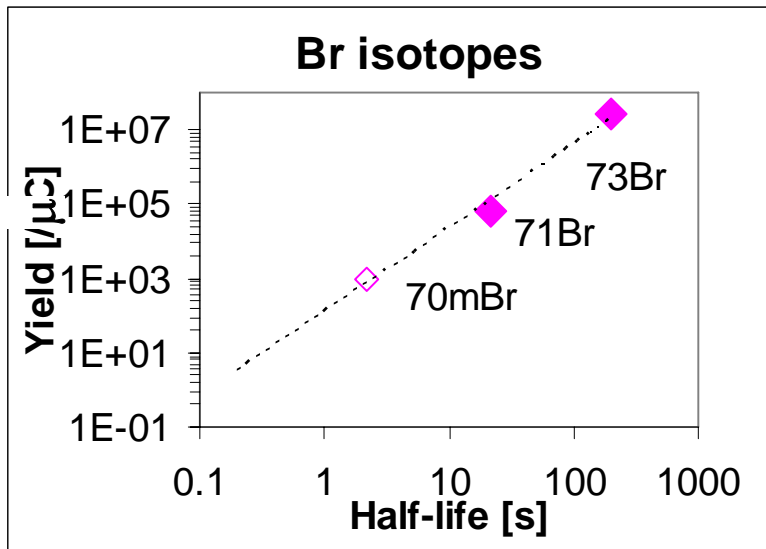
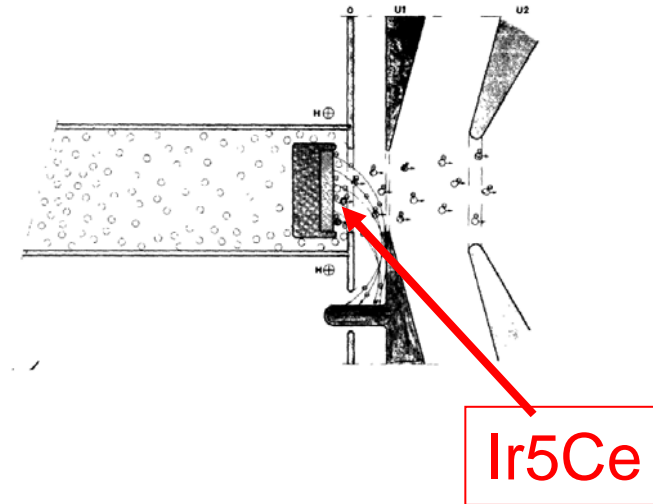
yield Al+17F: $4.4e6/\mu\text{C}$
 17F: $1.3e5/\mu\text{C}$

S. Fernandes et al.

Negative Halogen beams

(Nb-343 Ir5Ce)

- n-rich Cl, Br, I isotopes (UCx 263 subm. to EPJ A)
- p-rich Br isotopes, Cl



M. Menna , R. Catherall, L. Fraile , H. Jeppesen, K. Johnston, J. Lettry, T. Stora



Noble gas and molecular beams

- Off-line tests of 1⁺ ECRIS MiniMono
- Ar buffer gas

| Ion | Effic. |
|------------------------------|--------|
| He ⁺ | 6% |
| CO ₂ ⁺ | 7% |
| NO ⁺ | 5.6%* |

* 26% transm.

Hanna Franberg , Liviu Penescu, Fredrik Wenander



RILIS + Ta cavity (UCx-333)

| Isotope | Yield (/μC) |
|---------------|-------------|
| 75Ga (Ta) | 7e5 |
| 75Ga (2006) | 5-9e6 |
| 75Ga (ISOLDE) | 3e7 |

New UO2 batch?!



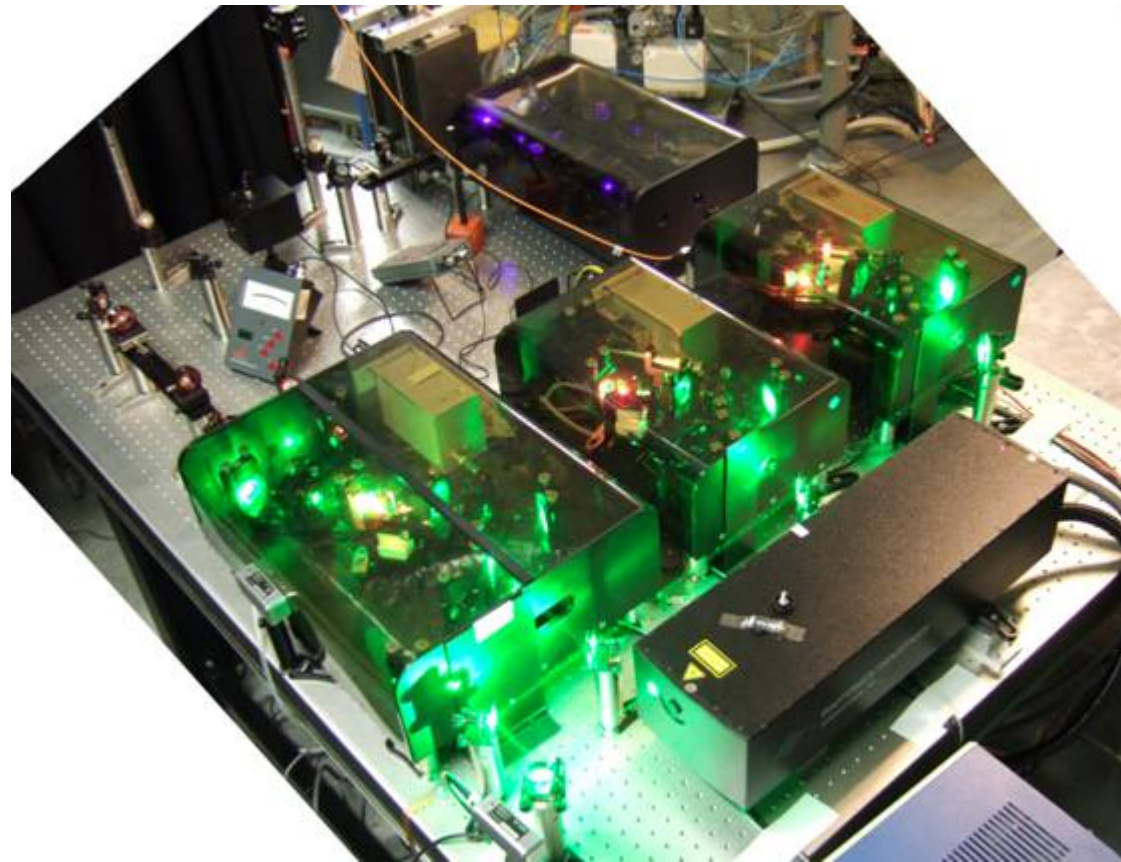
RILIS with different cavities

Mainz Ti:Sapphire @ ISOLDE offline separator

Comparison of different cavities
(ie low work function)

- GdB6 (ceramics)**
- BaO-SrO (coating on W)**
- C (insert in Ta)**
- Reference ISOLDE W**

- Efficiency
- Emittance
- Ion beam time structure
- Measurements ongoing

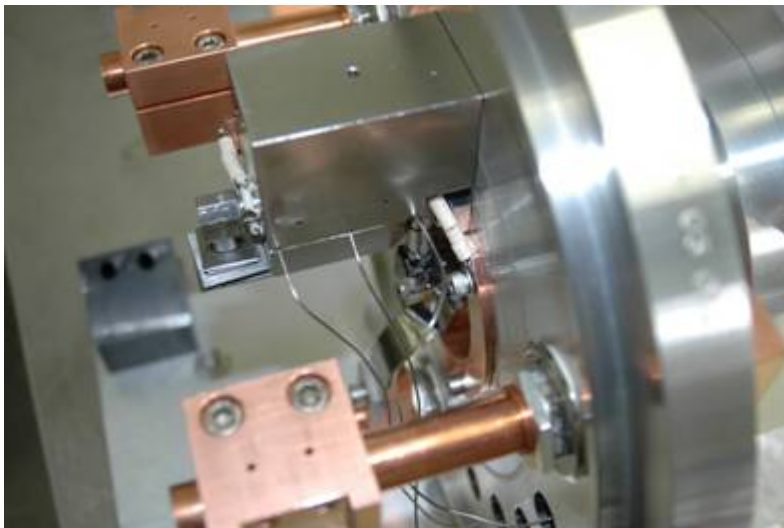


MAINZ:
Fabio Schwellnus, Christoph Mattolat, Sebastian Raeder, Christian Ohlert and Klaus Wendt

CERN:
Fabian Österdahl, Mariano Menna, Valentin Fedosseev, Liviu Penescu, Thierry Stora and the ISOLDE collaboration

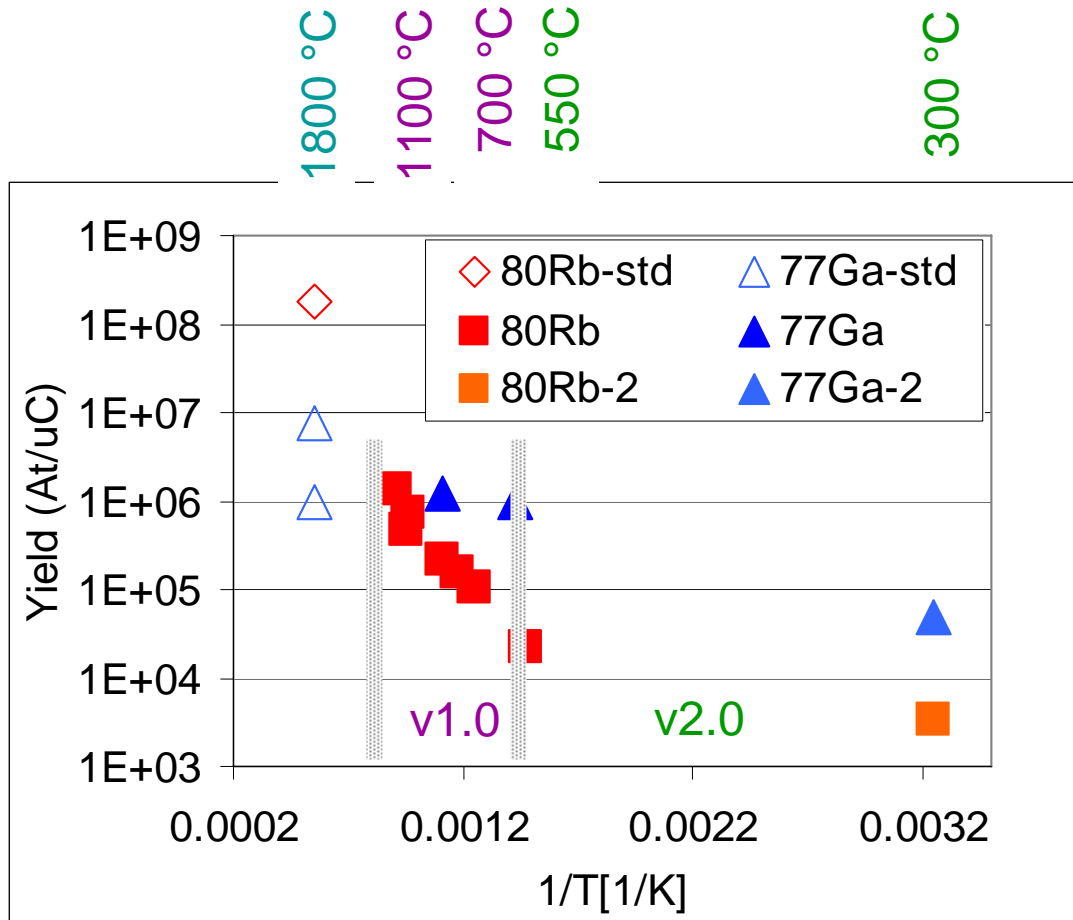
Temperature controlled transfer line

- Radiative cooling (v1.0) (Bouquerel et al, submit. to EPJ A)
- Water cooling + Ohmic heating (v2.0)



Impurity trapping
by selective adsorption on quartz
in the temperature controlled
transfer line

Rb vs Ga Yields





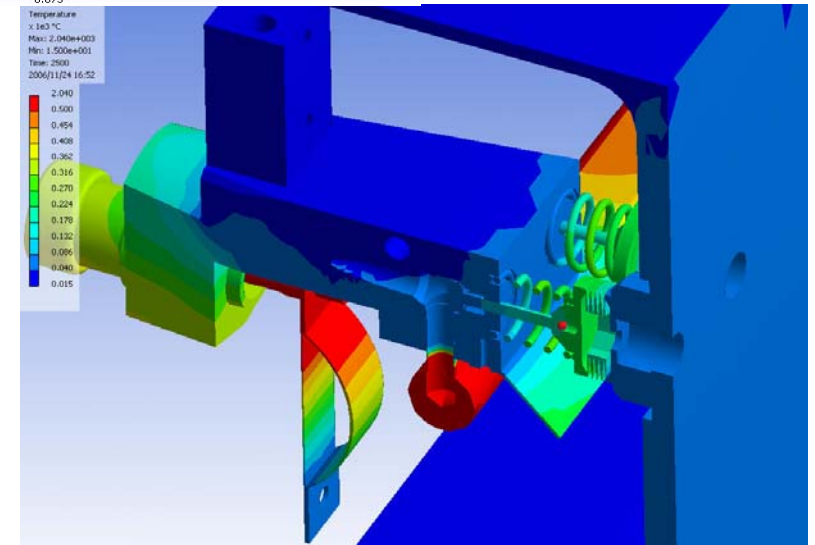
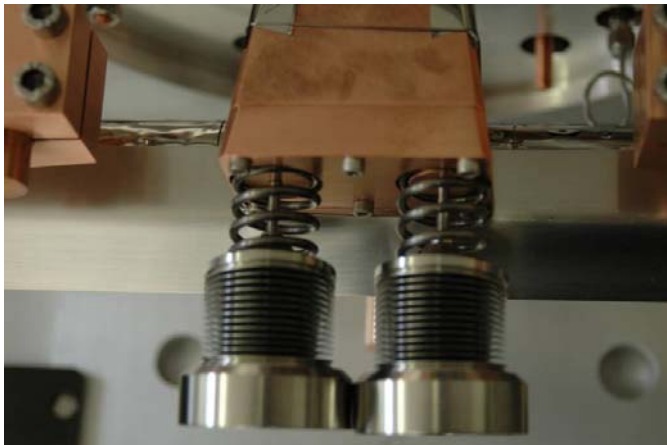
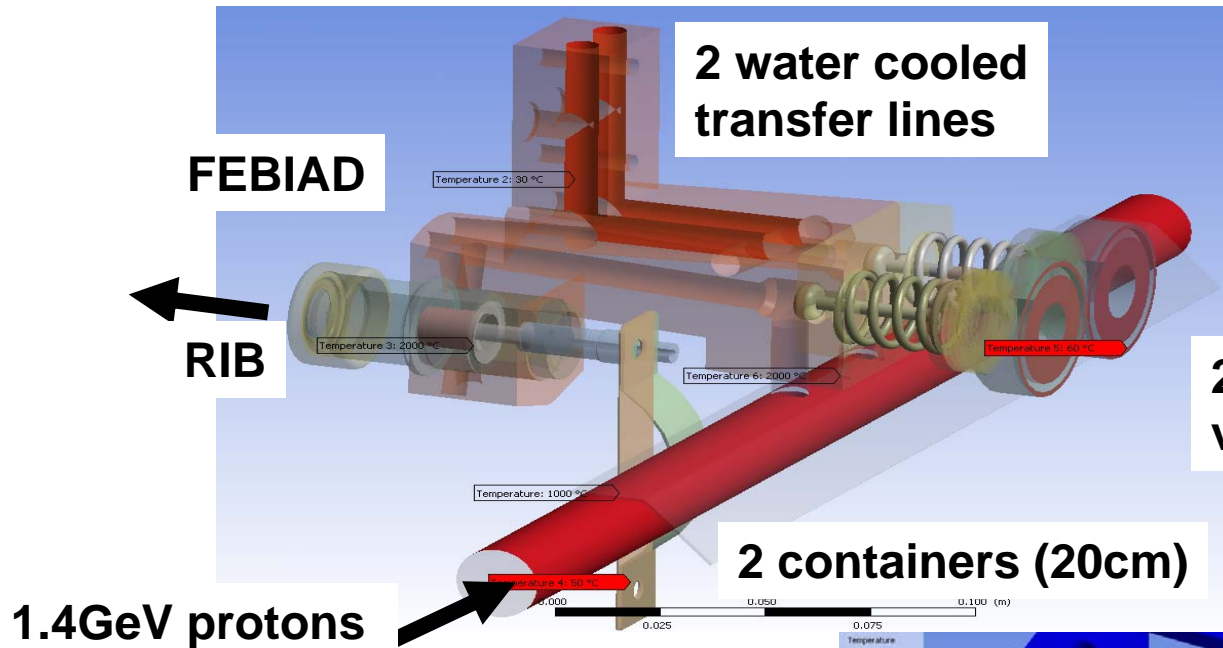
Other isotopes

| Isotope | Proto # | Yield (/μC) | Ref yield |
|---------|---------|-------------|-----------|
| 8Li | v2.0 | 1e5 | 4e7 |
| 21Na | v2.0 | 9e2 | 2e4 (SC) |
| 46K | v2.0 | 5e5 | 5e7 |
| 126Cs | v2.0 | 2e3 | 1e8 (SC) |
| 114In | v1.0 | 3e5 | 2e6 |

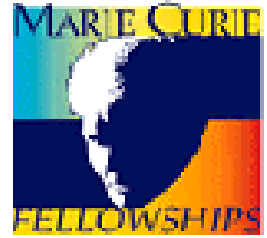
A few more data available, ie 94-97Sr

High power targetry

100kW

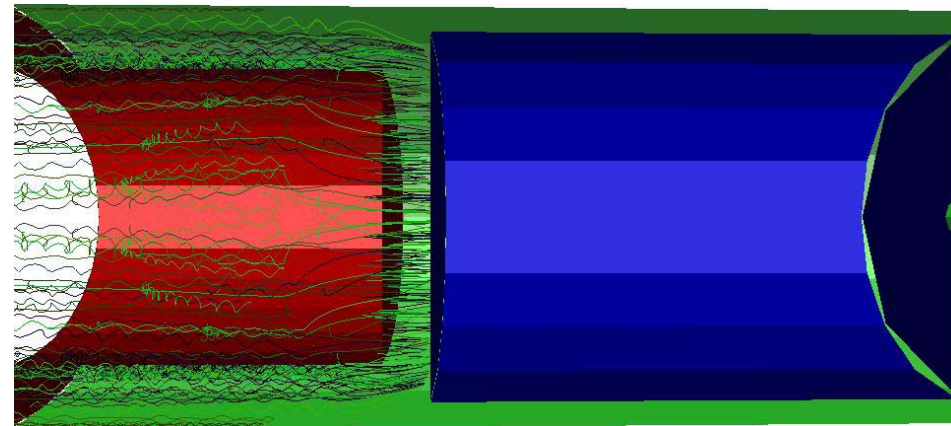
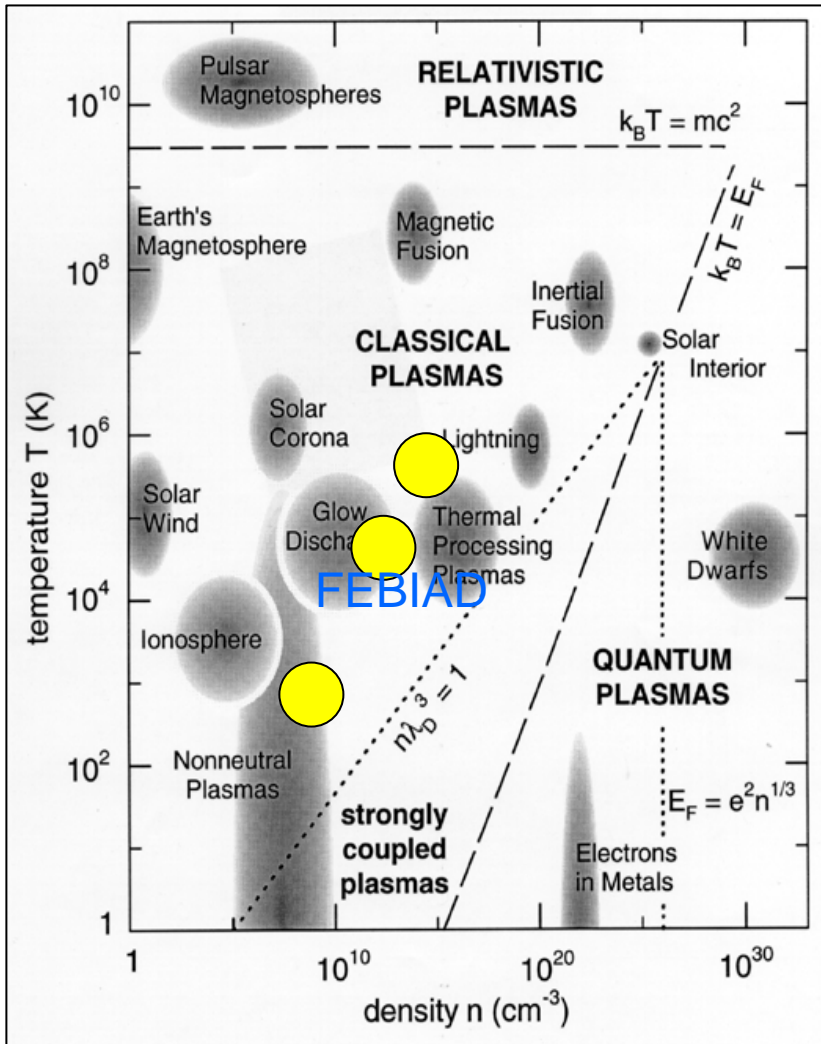


High power targetry



Liviu Penescu

HighInt



Charged particle simulation



Thank you !