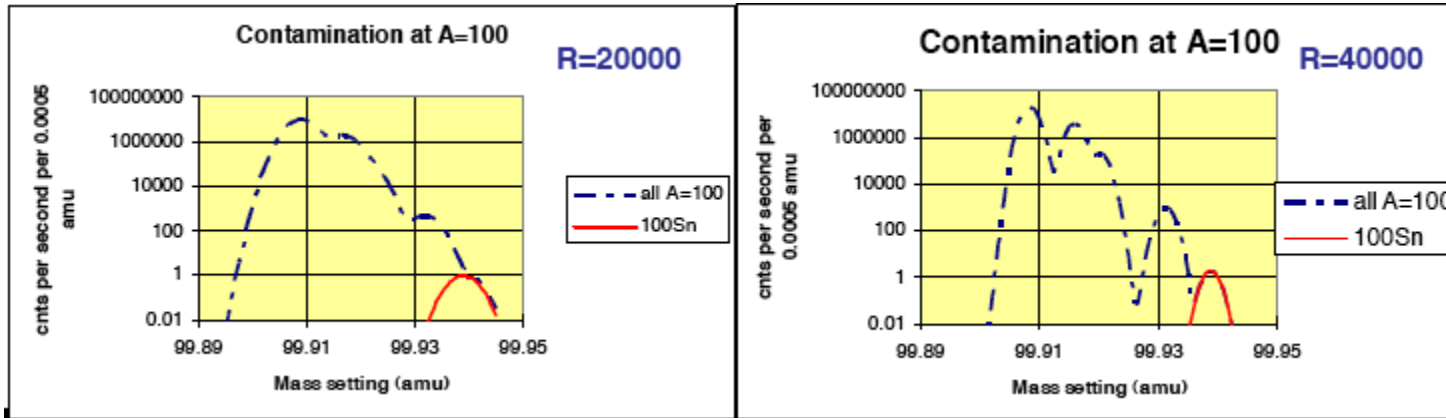
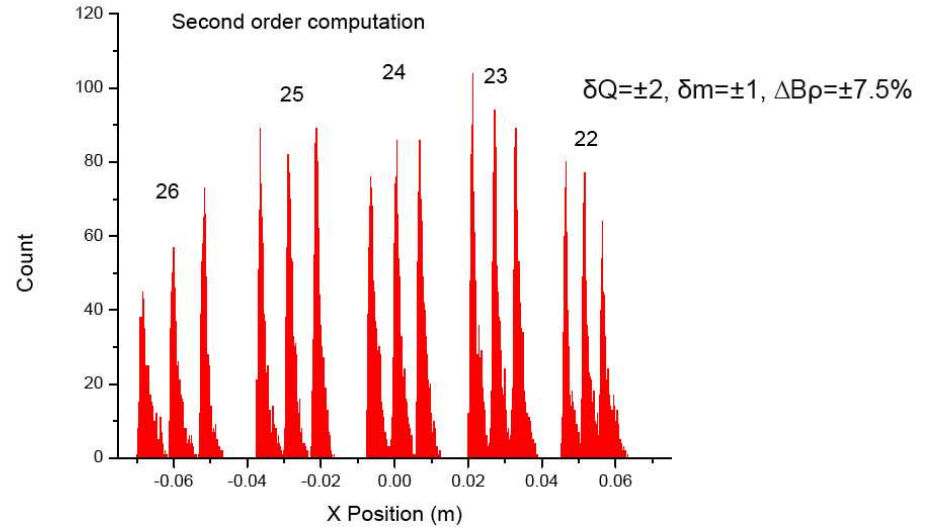
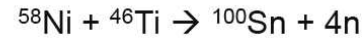


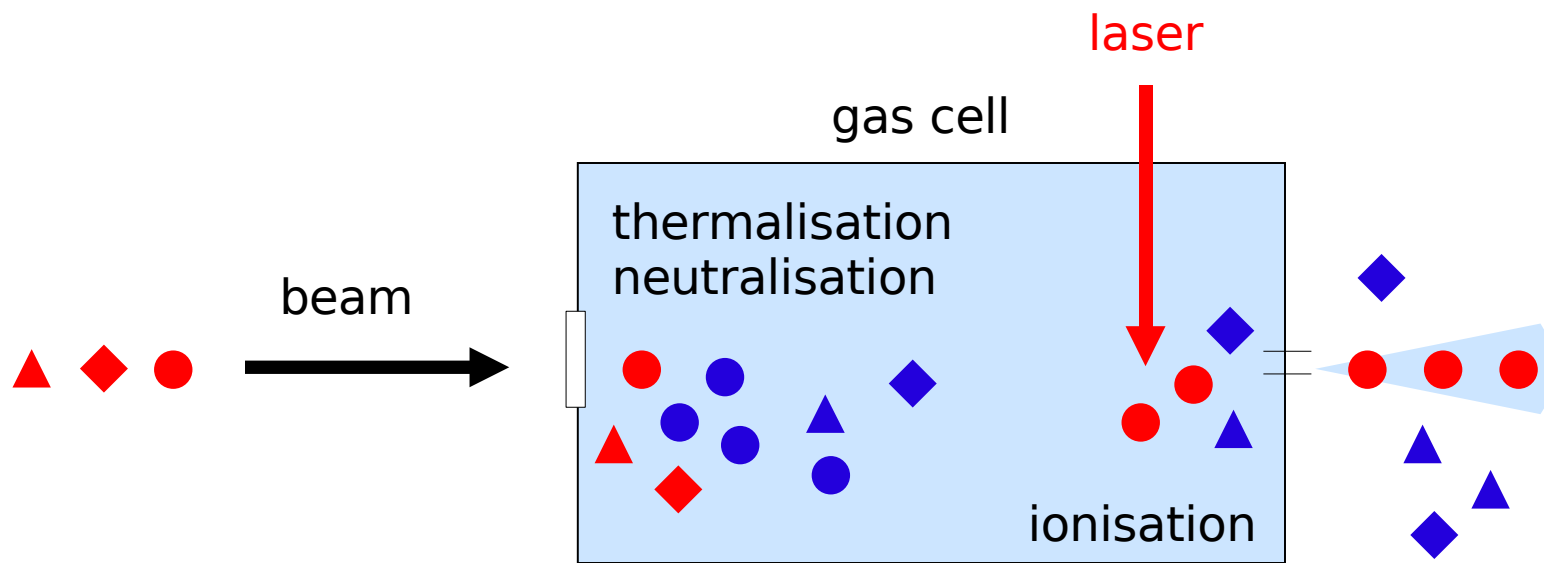
a Gas catcher for Laser spectroscopy and Production of  
atomic ions at Ganil's S3 facility

# Gas catcher for S3

contamination at focal plane  
still significant

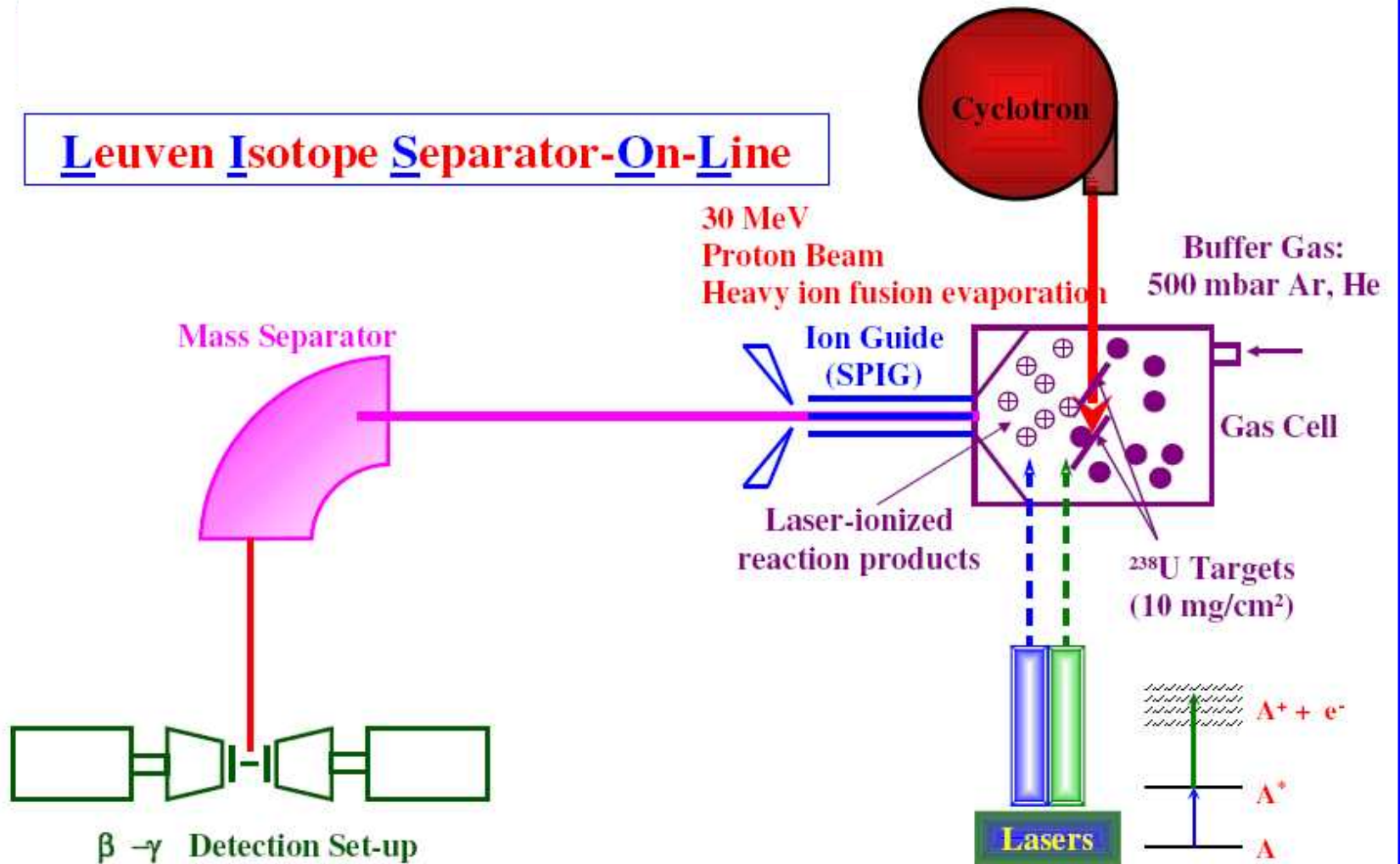


# Gas catcher for S3



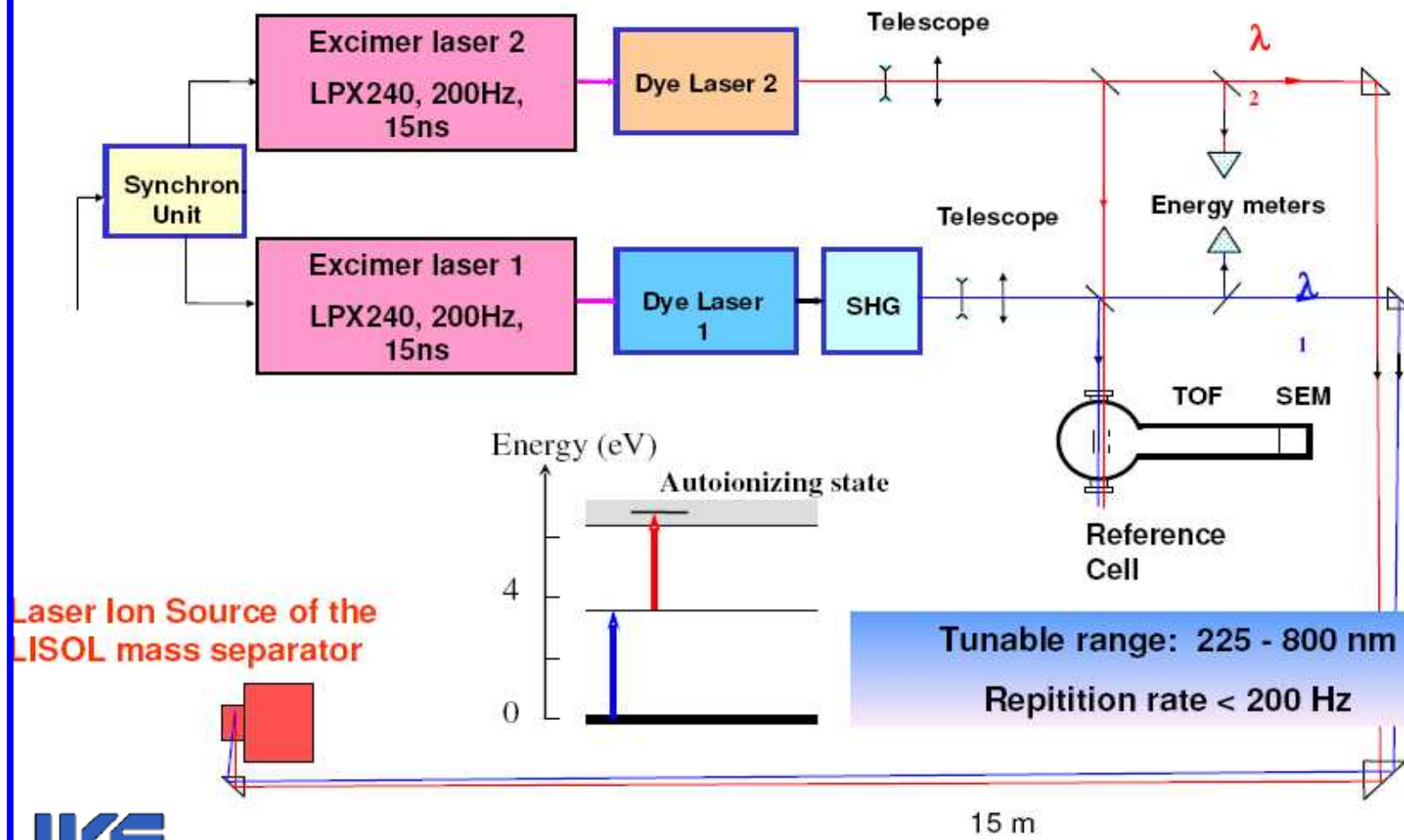
$$\left. \begin{array}{l} \text{selectivity} \\ \text{efficiency} \end{array} \right\} = \frac{\text{peak area with lasers}}{\text{peak area without lasers}}$$

**Leuven Isotope Separator-On-Line**



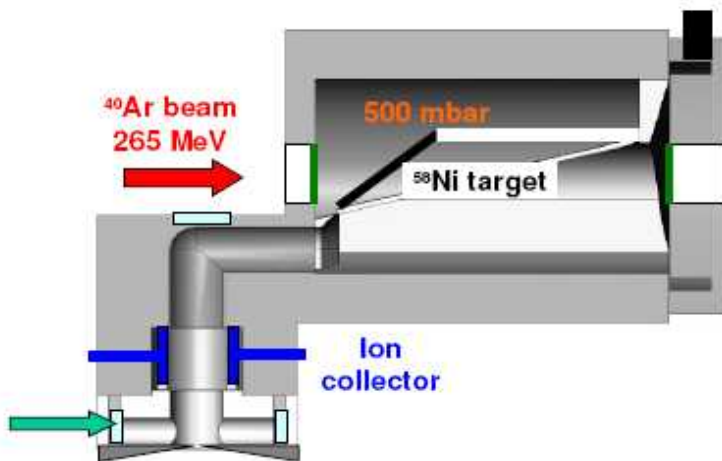
Y. Kudryavtsev, T.Cocolios, J.Gentens, M.Huyse, O.Ivanov, D.Pauwels, T. Sonoda,  
P.Van den Bergh, P.Van Duppen

# Laser System

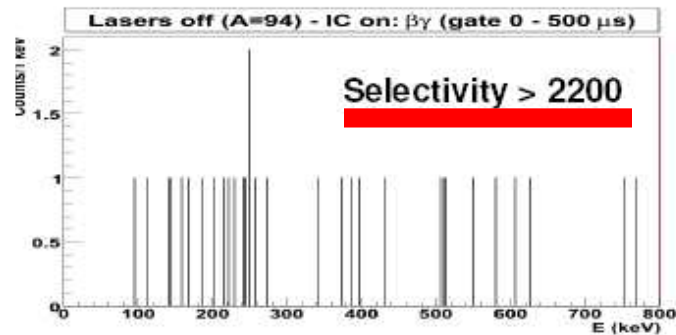
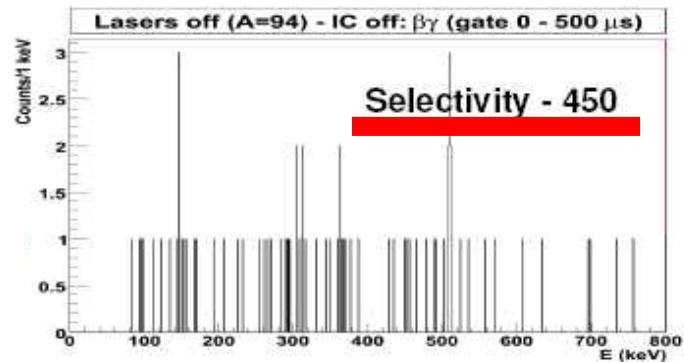
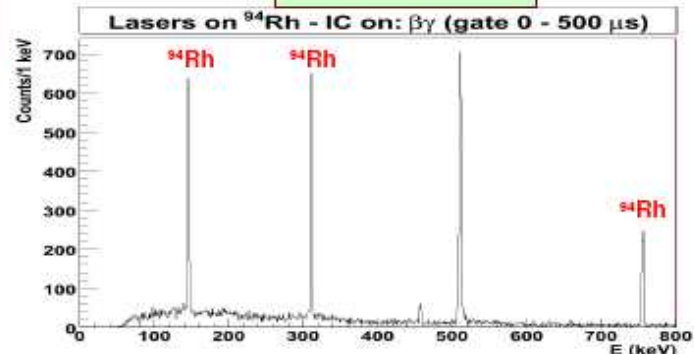


Laser Ion Source of the LISOL mass separator

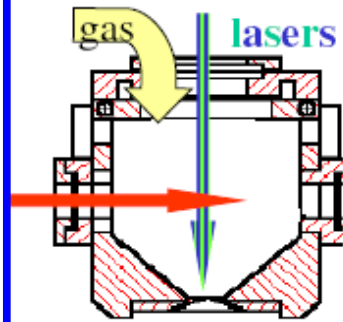
# Gas cell at Leuven : selectivity



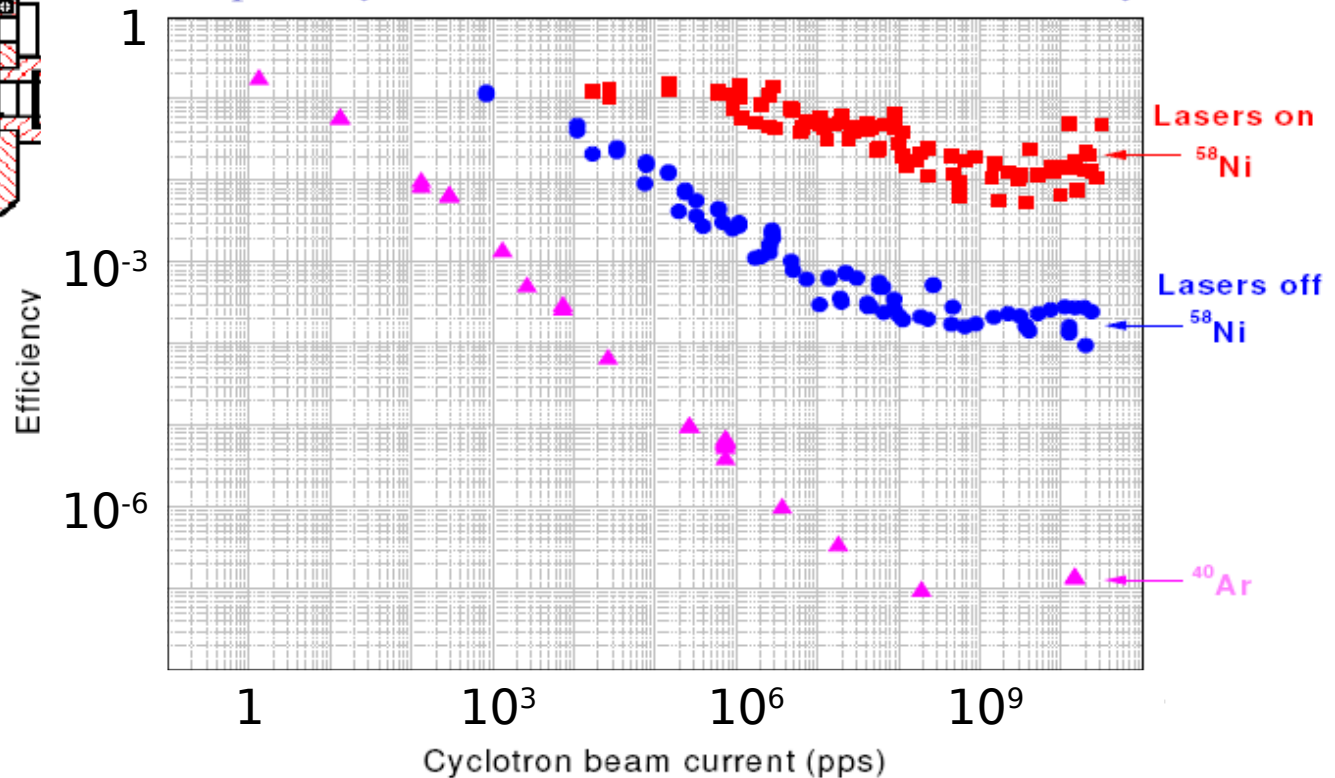
Shadow cell



## Efficiency of laser ionization as a function of beam intensity

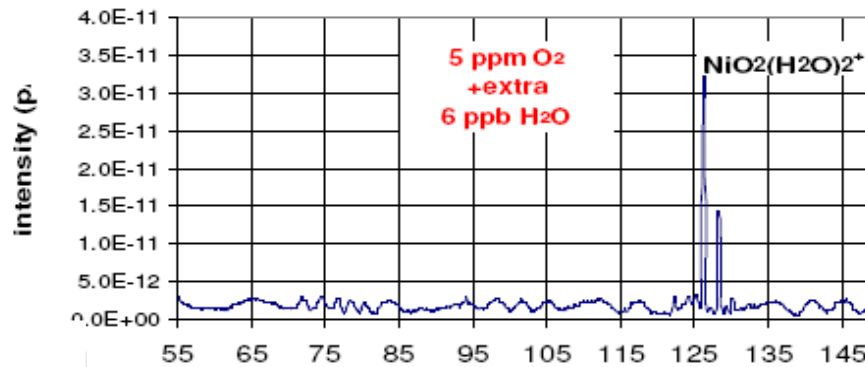
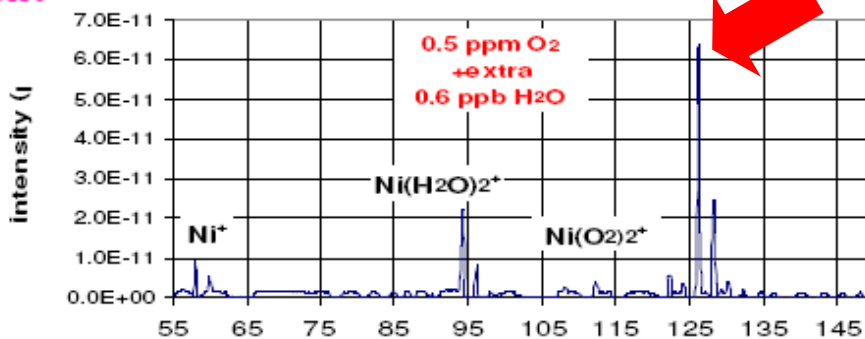
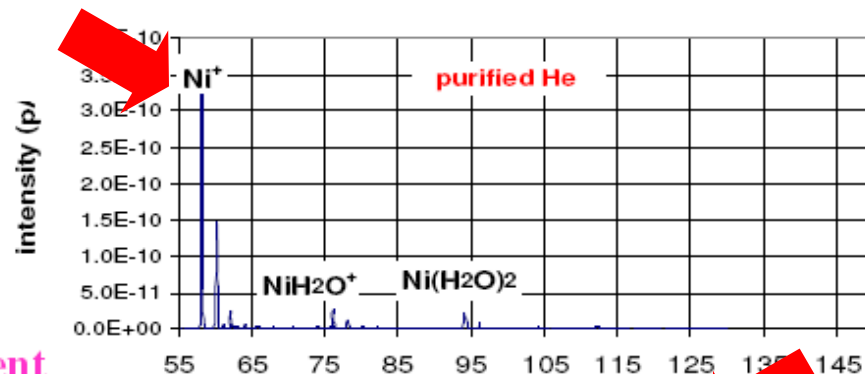
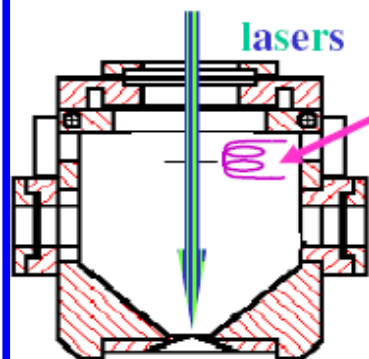


Extraction efficiency as function of primary  $^{58}\text{Ni}$  (185 MeV, cfr. S3) beam intensity



- Stopping of reaction products in 500 mbar Ar:  
beam intensity  $< 10^9$  pps: laser ionization efficiency  $> 10\%$   
without use of electrical fields

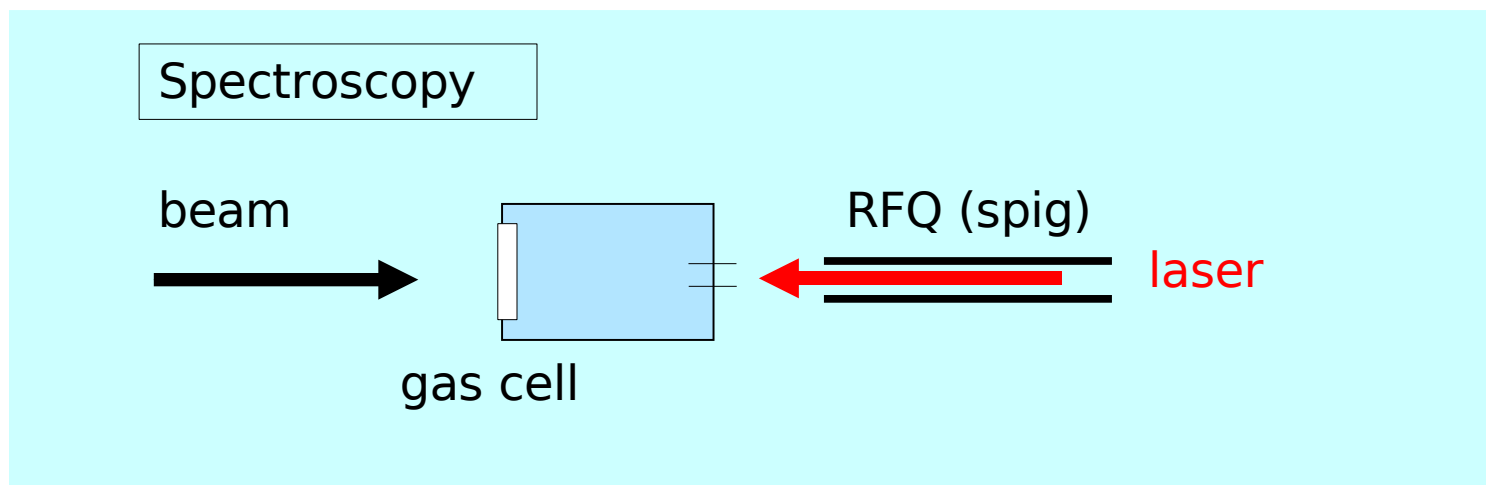
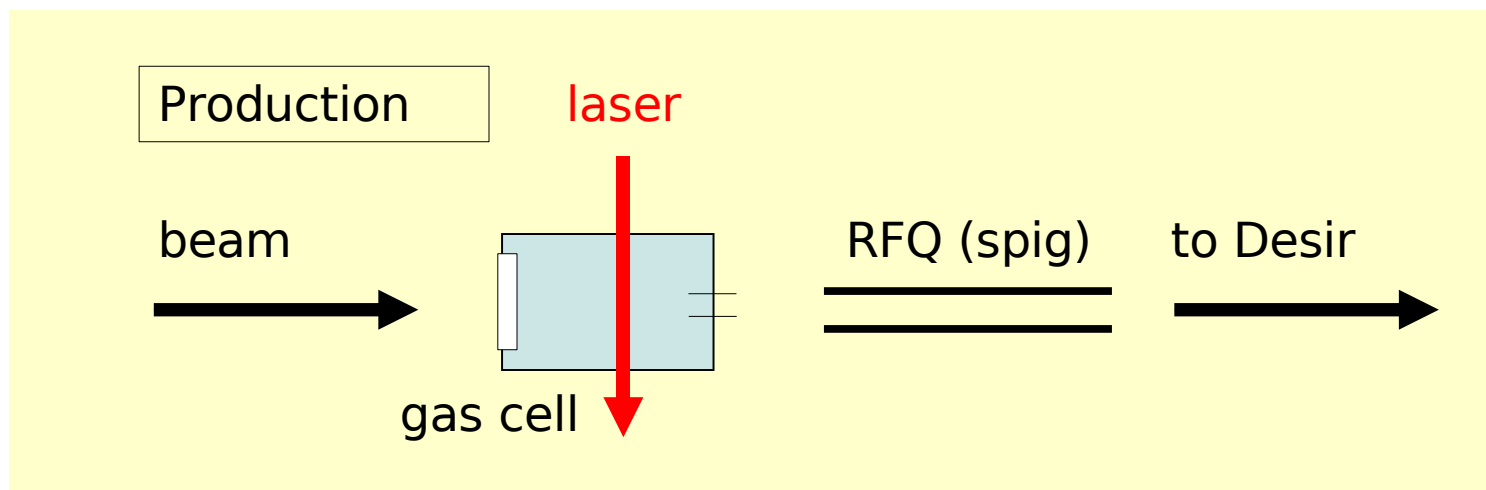
## Utmost importance of gas purity



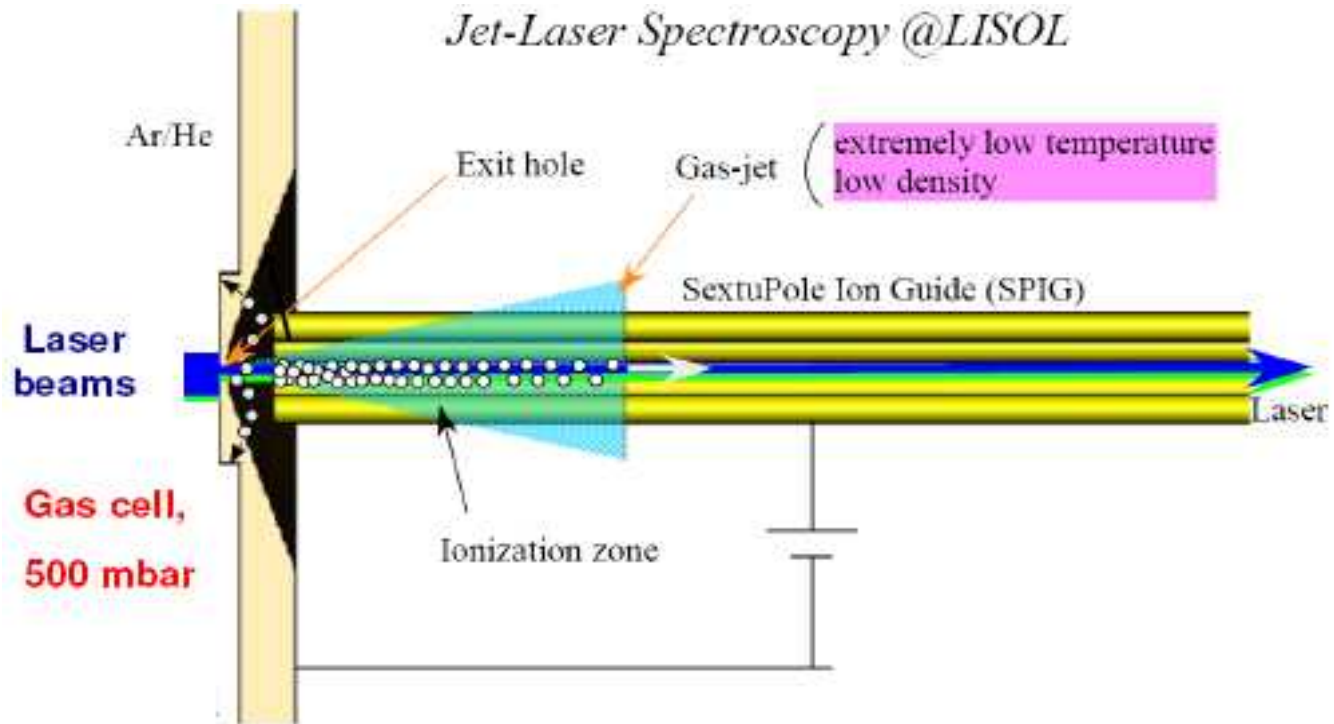
- gas purifier
- diagnostics



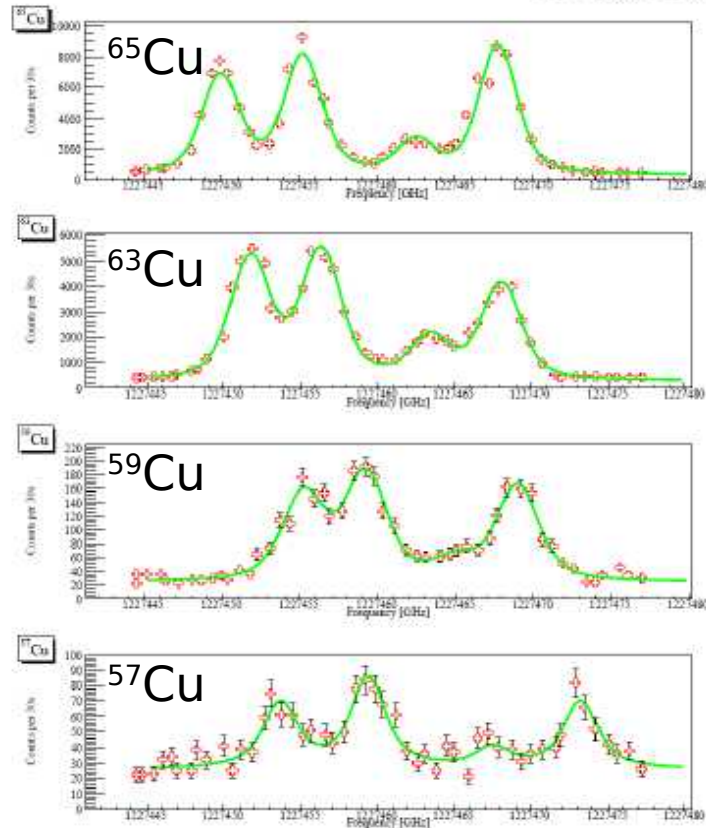
# Gas catcher for S3



# Gas cell at Leuven : spectroscopy

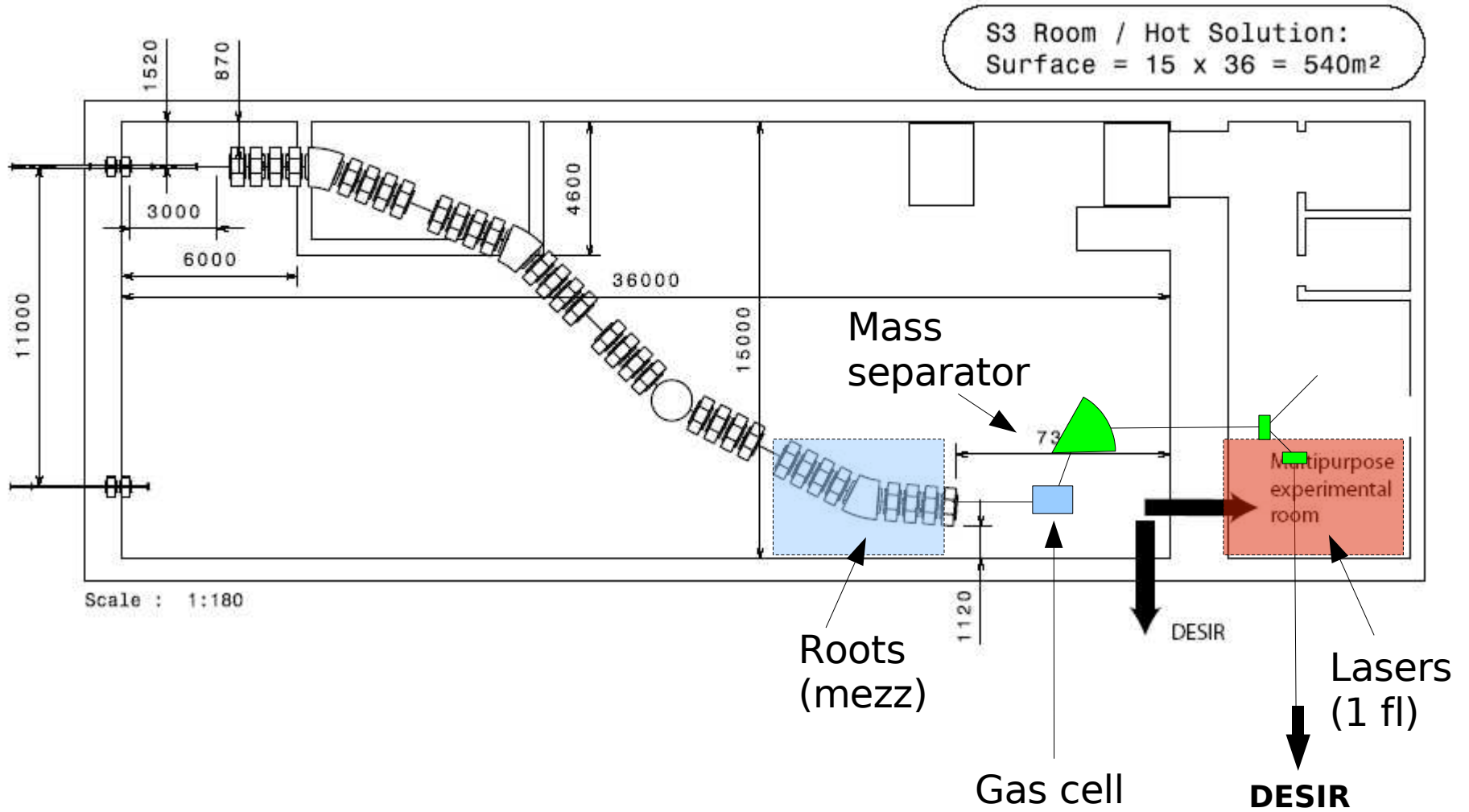


# In-source spectroscopy in a gas catcher: $^{57}\text{Cu}$



- $^{57}\text{Cu}$ :  $T_{1/2}=199$  ms,  $\sigma \sim 1$  mb
- Fusion evaporation of proton on natural Ni: both  $^{57}\text{Cu}$  and  $^{59}\text{Cu}$  are produced for direct comparison.
- Stable  $^{63}\text{Cu}$  and  $^{65}\text{Cu}$  are measured in parallel to account for systematic effects.
- Measurement is fast ( $\sim 45$  min) with respect to changes in setup conditions.
- Resolution ( $\sim 2.5$  GHz FWHM) is better than with hot cavity.

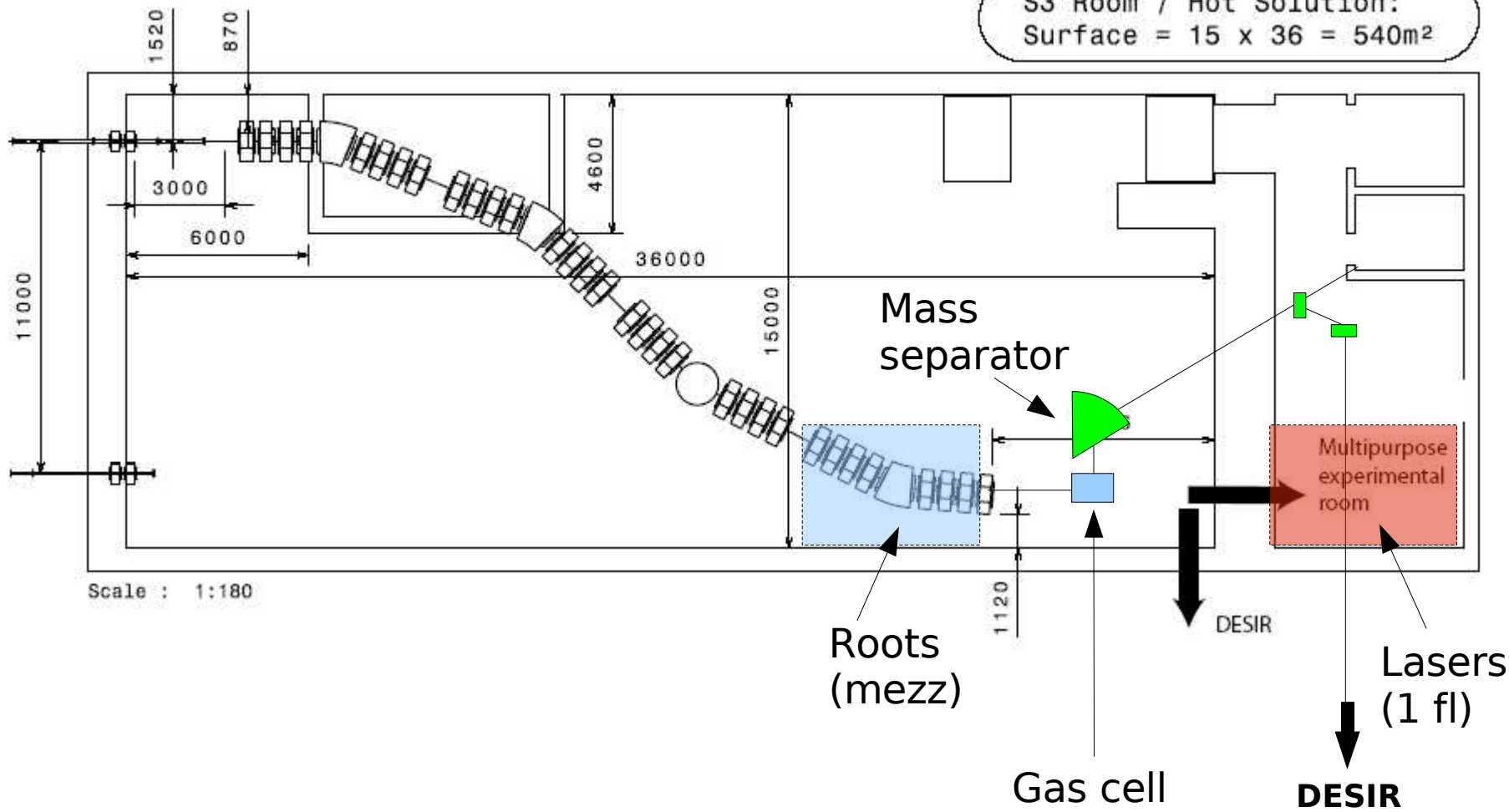
# Gas catcher for S3



## Gas catcher for S3



S3 Room / Hot Solution:  
Surface = 15 x 36 = 540m<sup>2</sup>



Scale : 1:180

Roots  
(mezz)

Mass  
separator

Gas cell

**DESIR**

Multipurpose  
experimental  
room

Lasers  
(1 fl)

DESIR

S3 Room / Hot Solution:  
Surface = 15 x 36 = 540m<sup>2</sup>

