"Recoil Transfer Chamber" Commissioning at *TASCA*

People actively involved in the commissioning experiments:

W. Brüchle, Ch.E. Düllmann, E. Jäger, M. Schädel, E. Schimpf, A. Semchenkov, GSI Target Lab

R. Schuber, A. Yakushev

K. Eberhardt, J. Even, H. Hummrich, J.V. Kratz, D. Liebe

J.P. Omtvedt, K. Opel, A. Sabelnikov, F. Samadani

R. Eichler

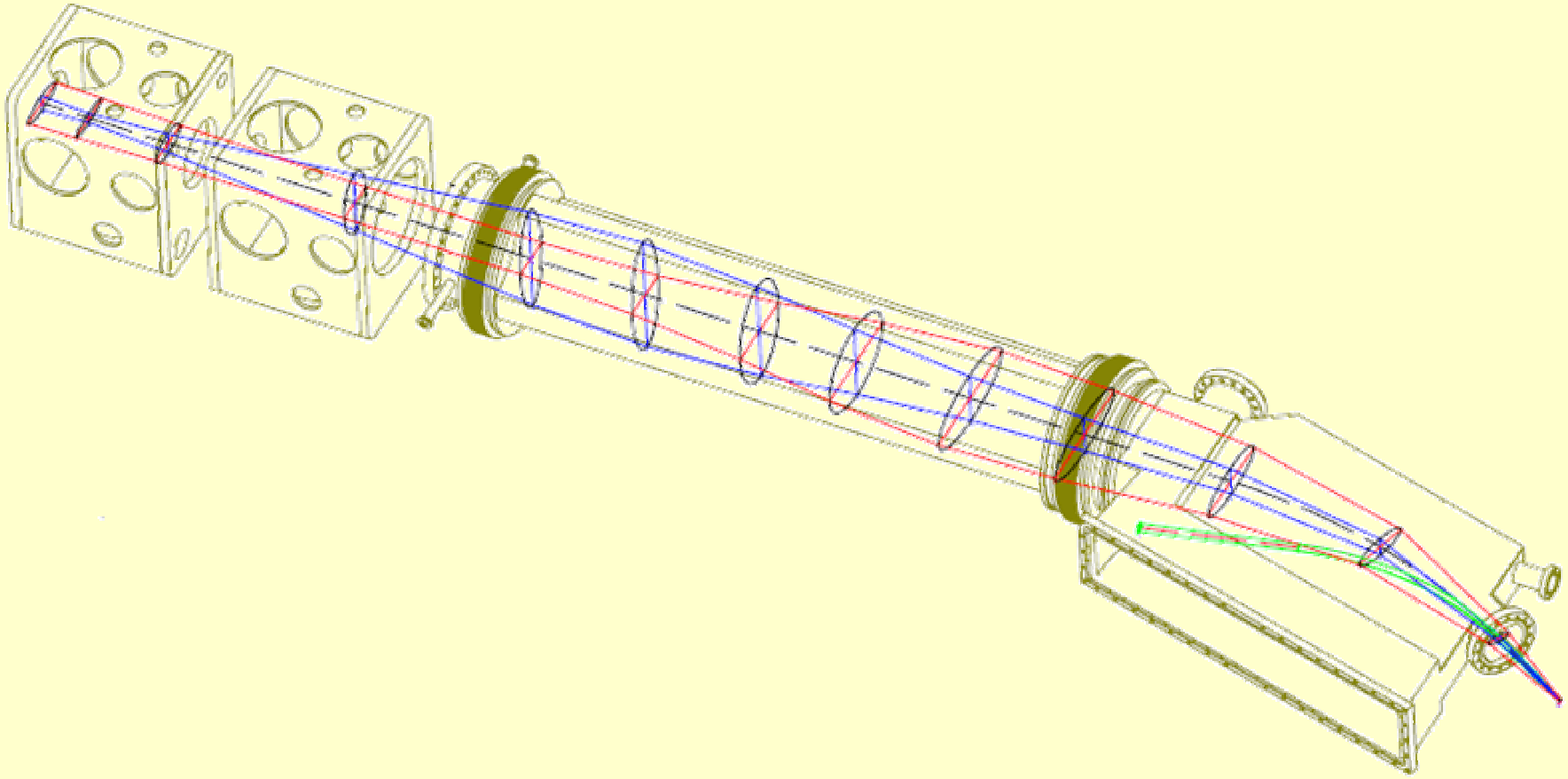
TAN poster by K. Opel *et al.*

Presented on the 6th workshop on Recoil Separator for Superheavy Element Chemistry *TASCA 07*, September 28, 2007, DAVOS, CH

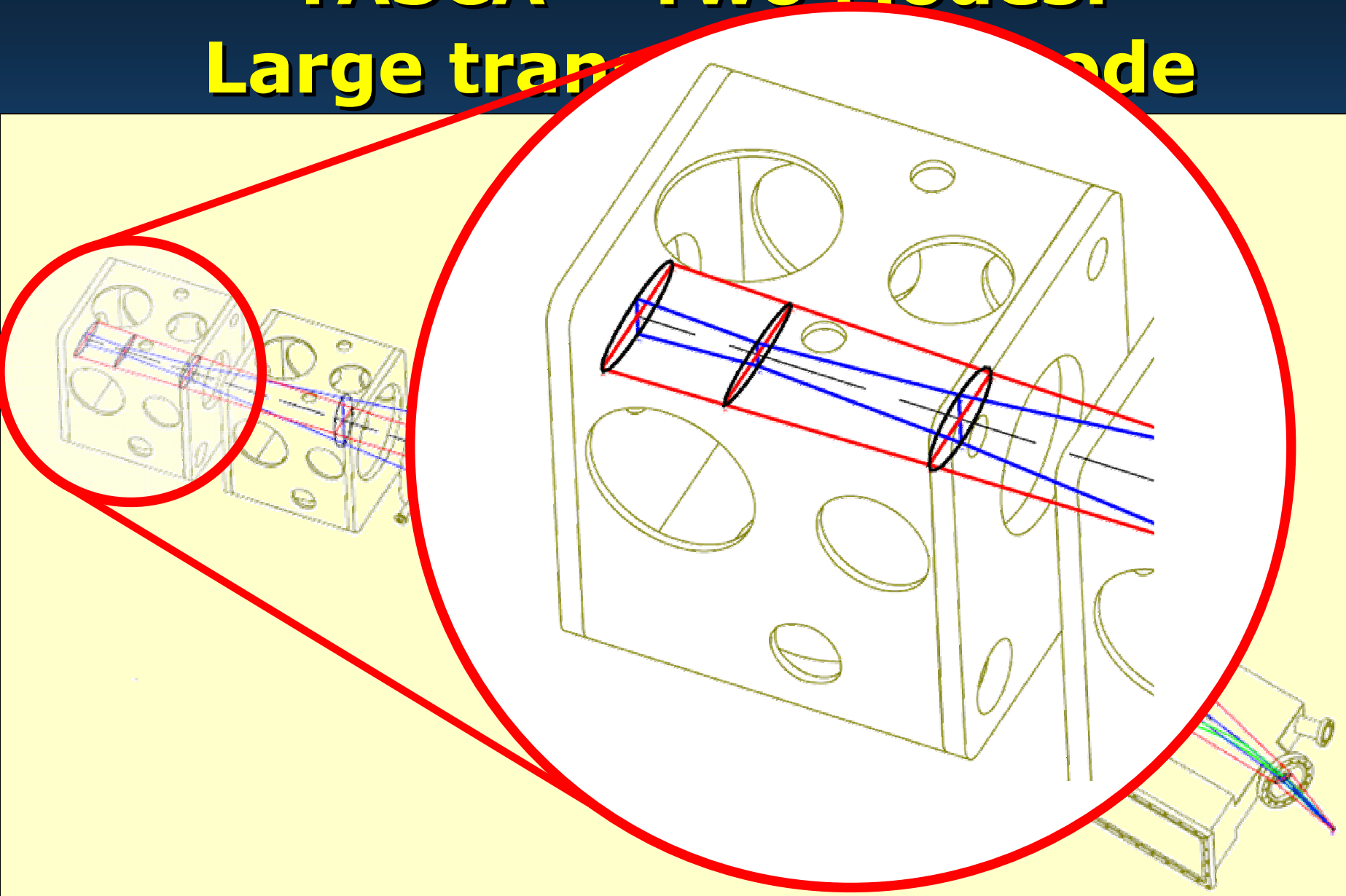
Large transmission mode (DQ_HQ_V)

For reactions leading to long-lived isotopes

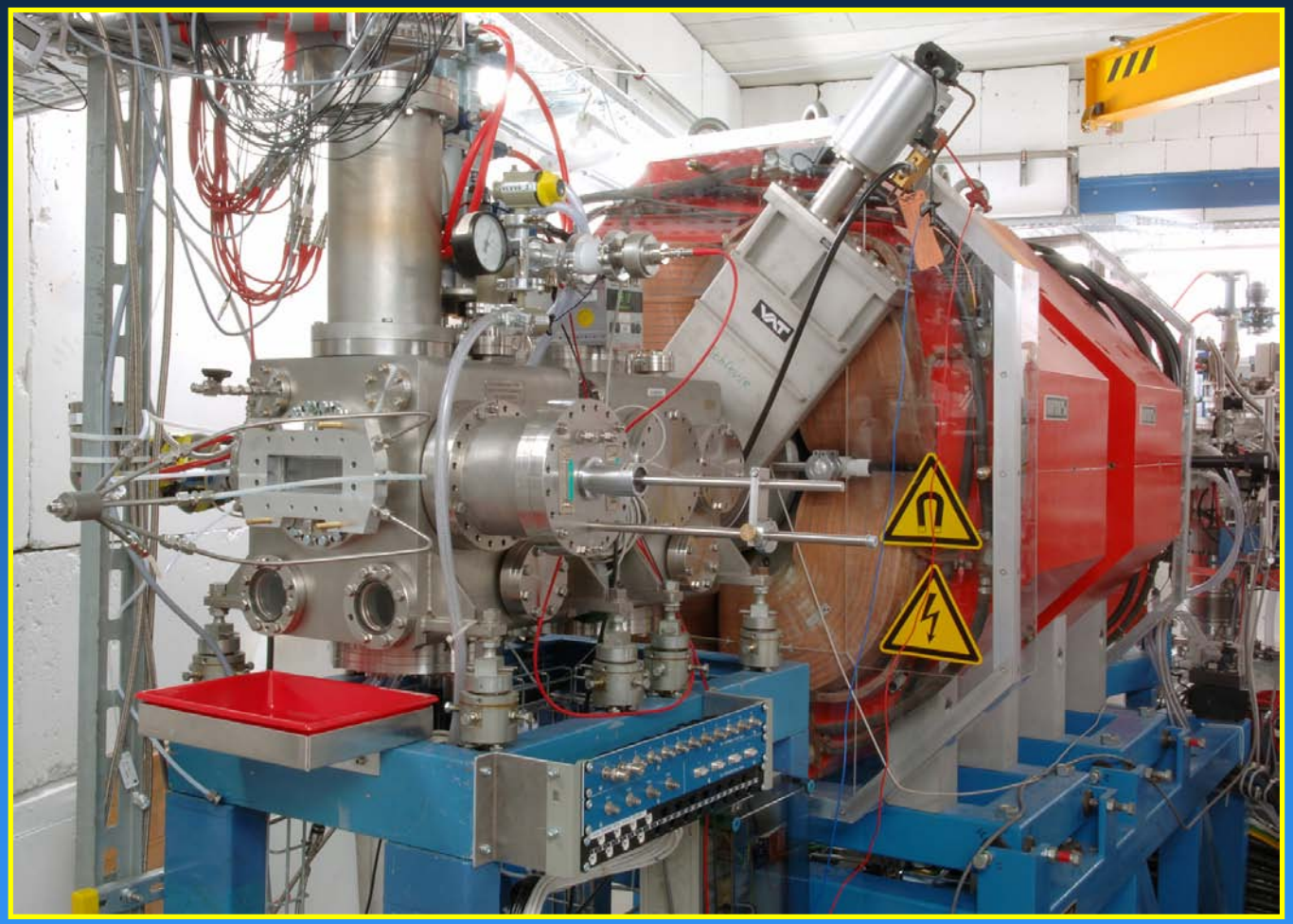
TASCA – Two Modes: Large transmission mode



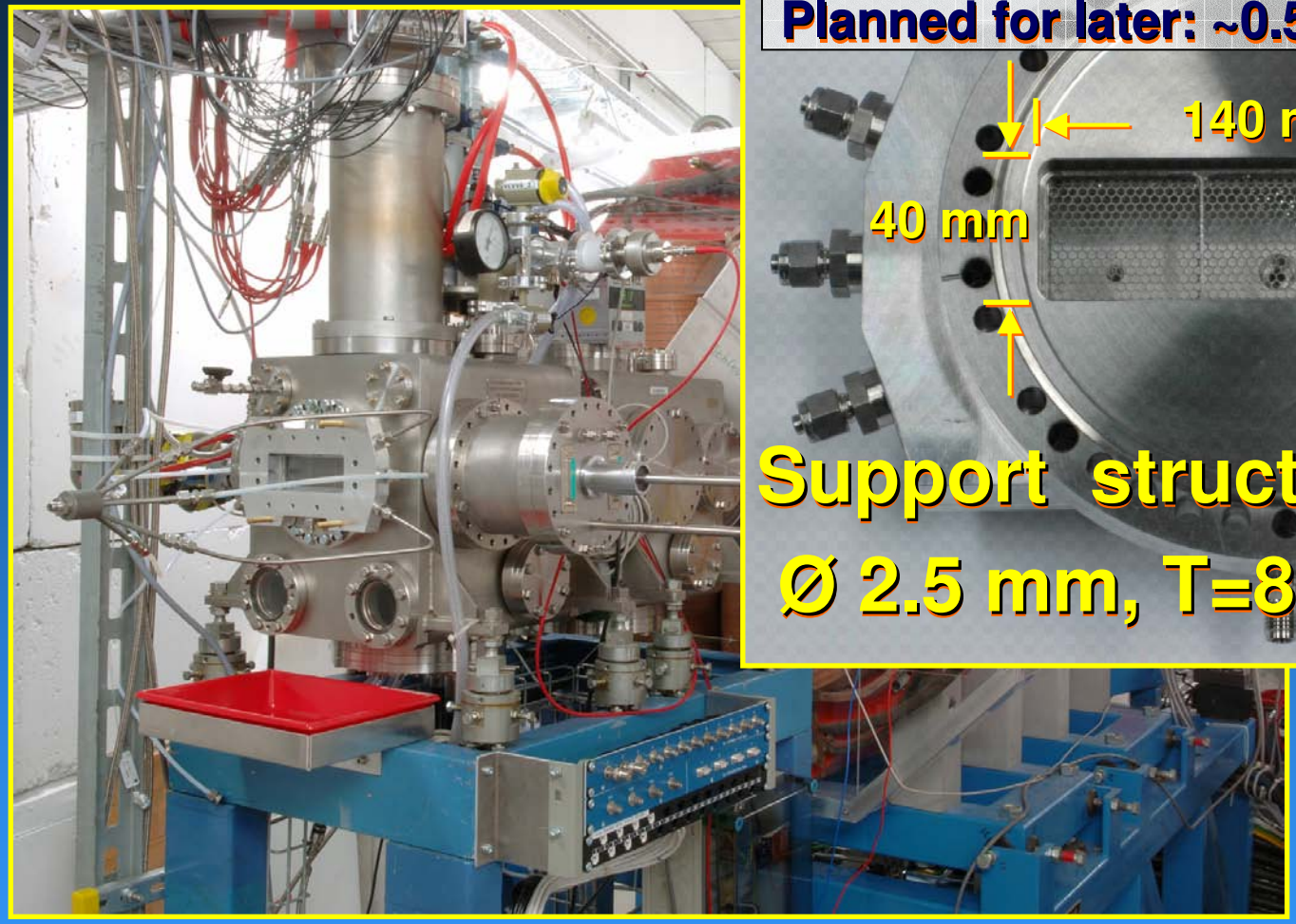
TASCA – Two Modes:
Large tran ode



HTM RTC



HTM RTC



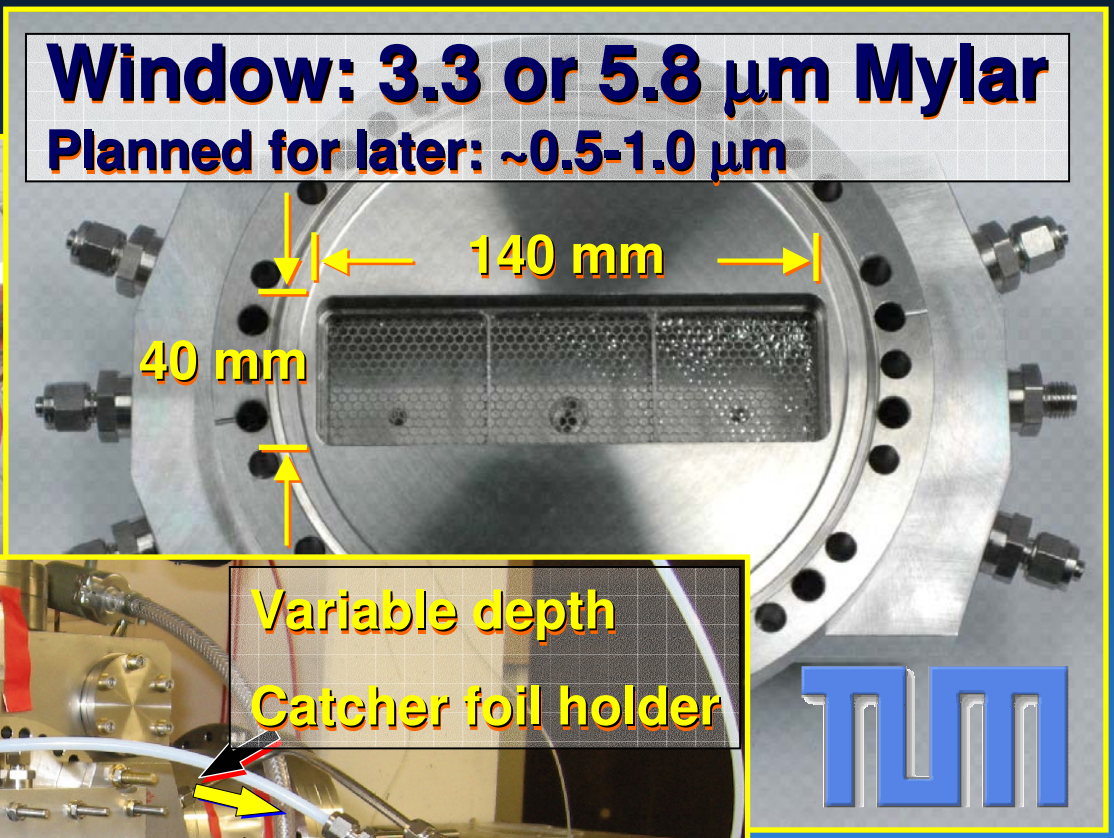
Window: 3.3 or 5.8 μm Mylar

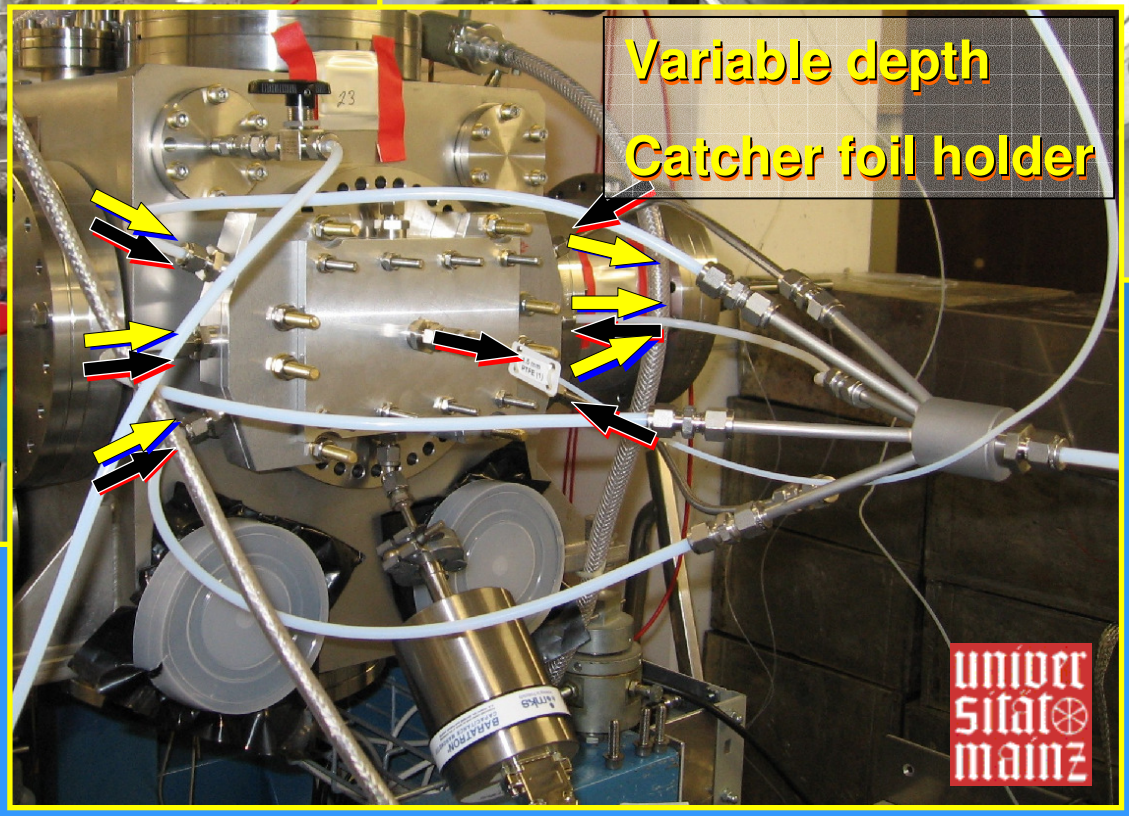
Planned for later: ~0.5-1.0 μm

Support structure:

Ø 2.5 mm, T=80%

HTM RTC

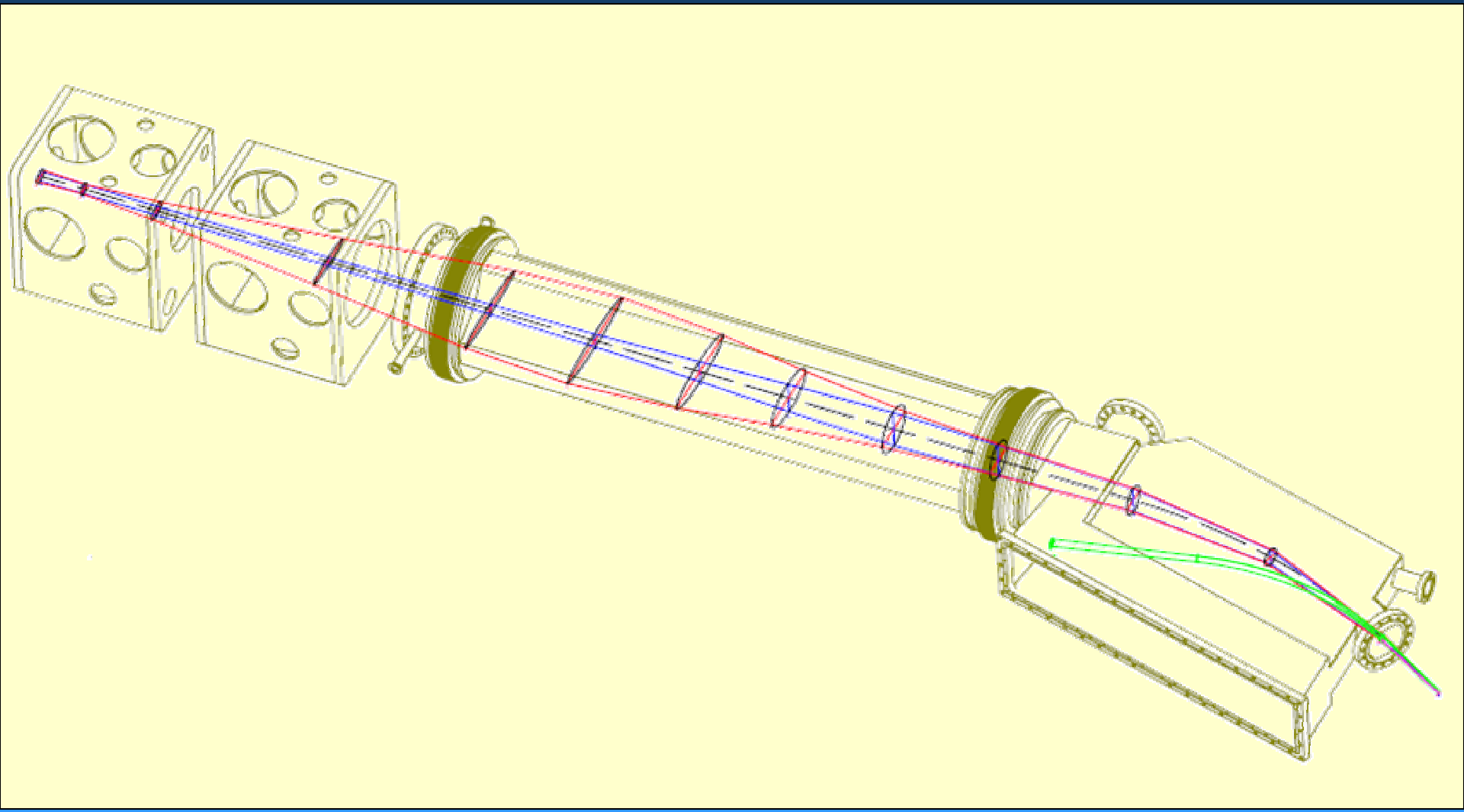

Window: 3.3 or 5.8 µm Mylar
Planned for later: ~0.5-1.0 µm
140 mm
40 mm


Variable depth
Catcher foil holder
universität mainz

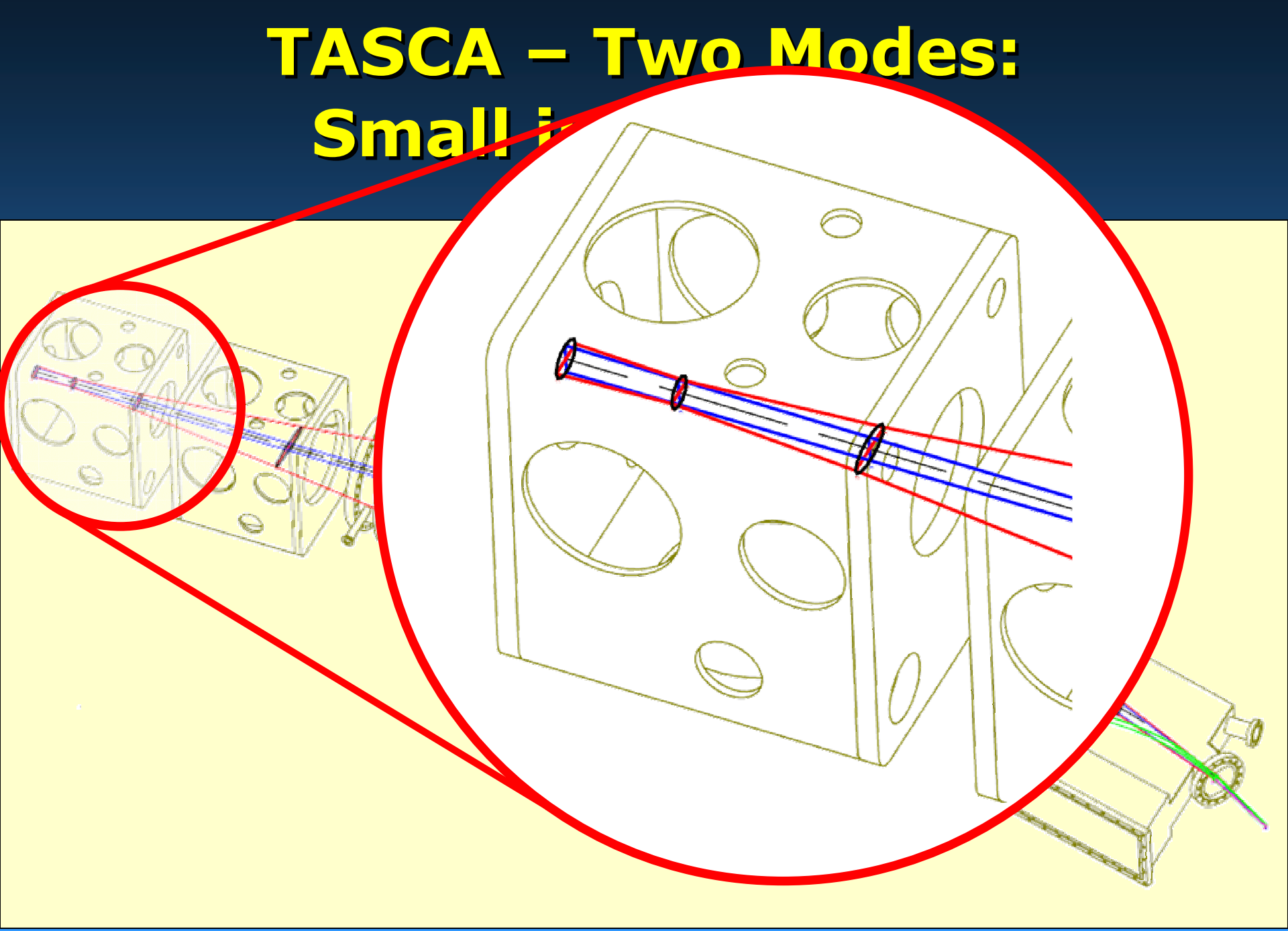
Small image mode (DQ_VQ_H)

For reactions leading to short-lived isotopes (~4s-^{257}Rf, 4s-^{258}Db)

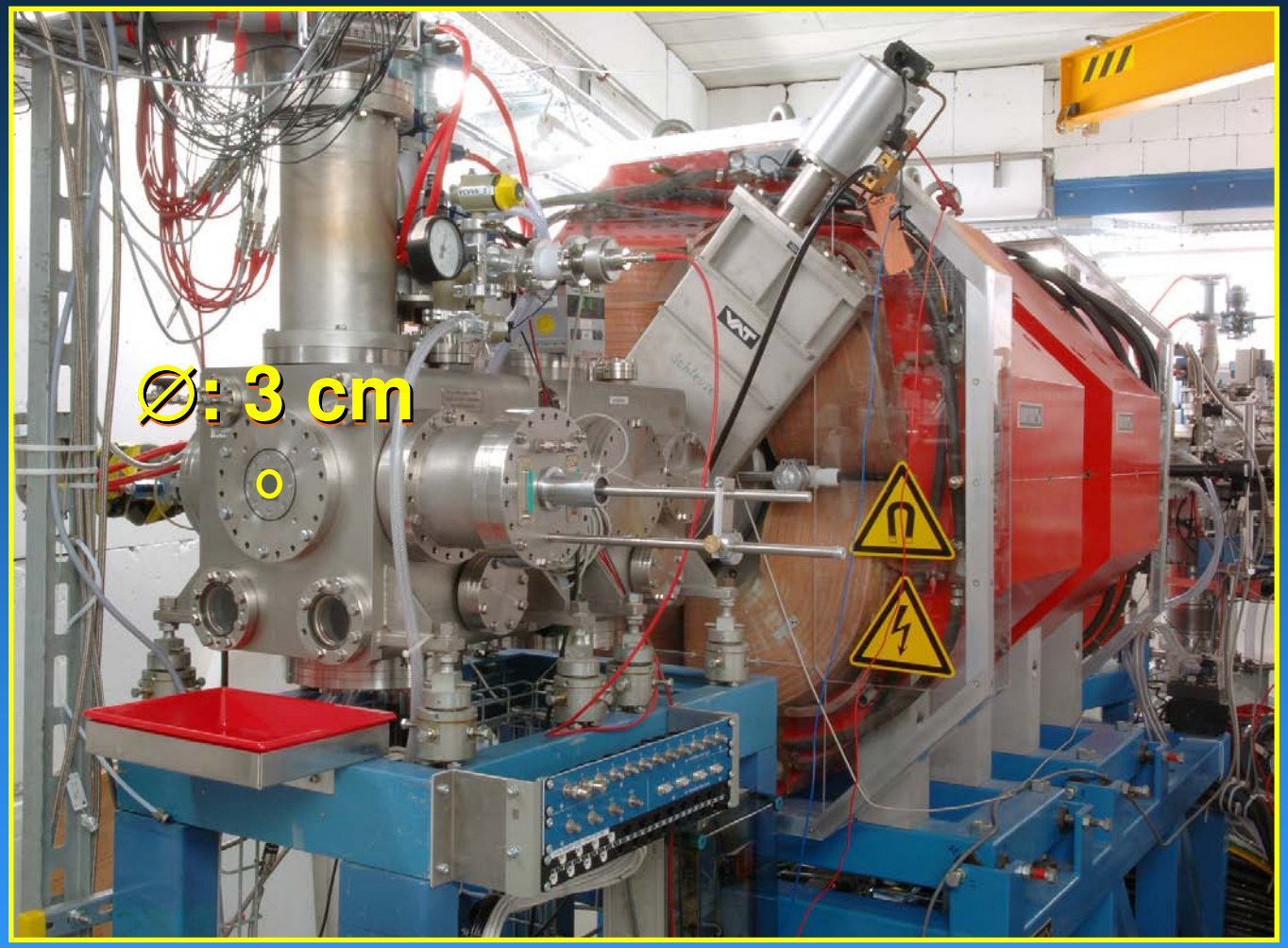
TASCA – Two Modes: Small image mode



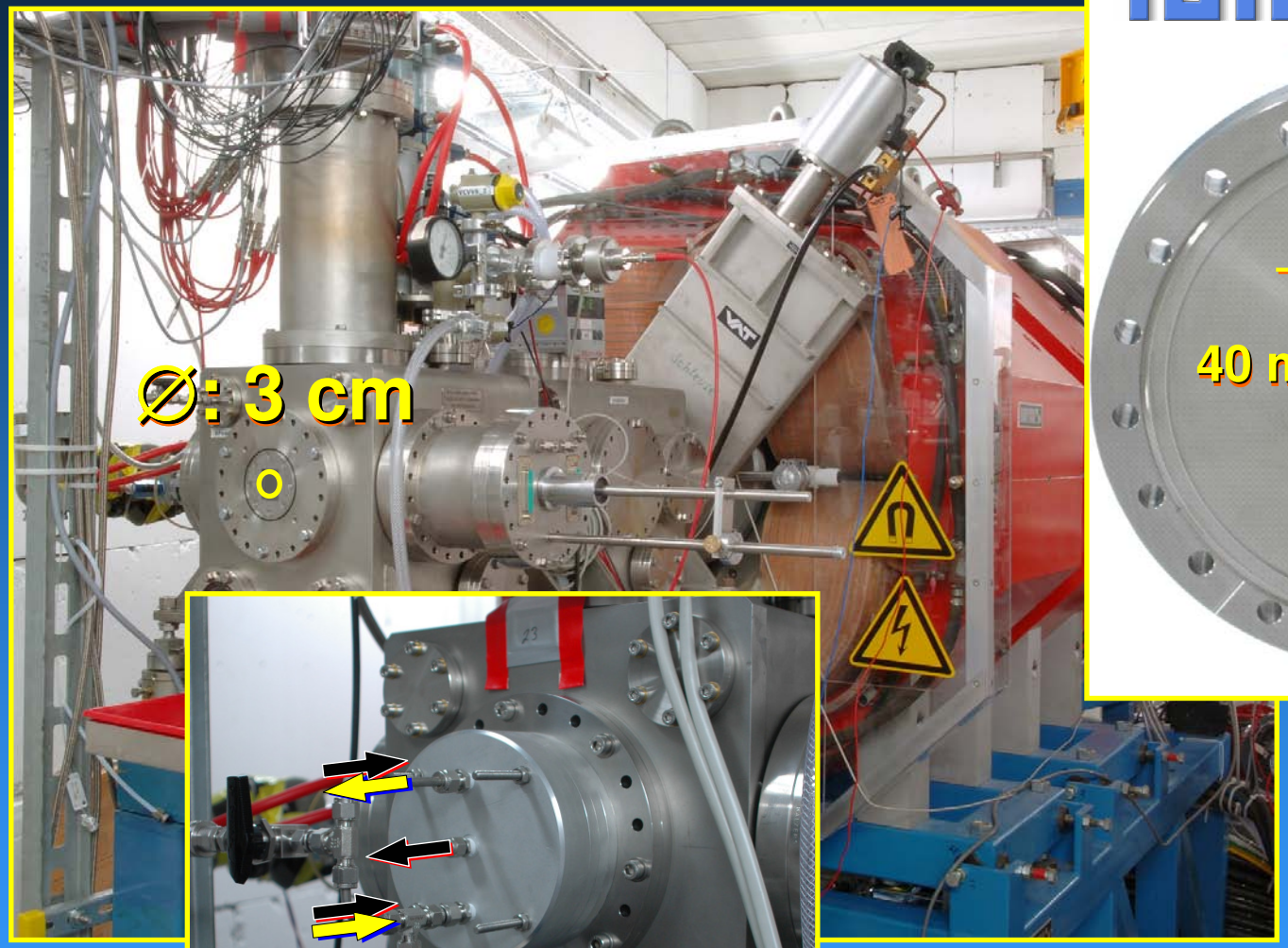
TASCA – Two Modes: Small i

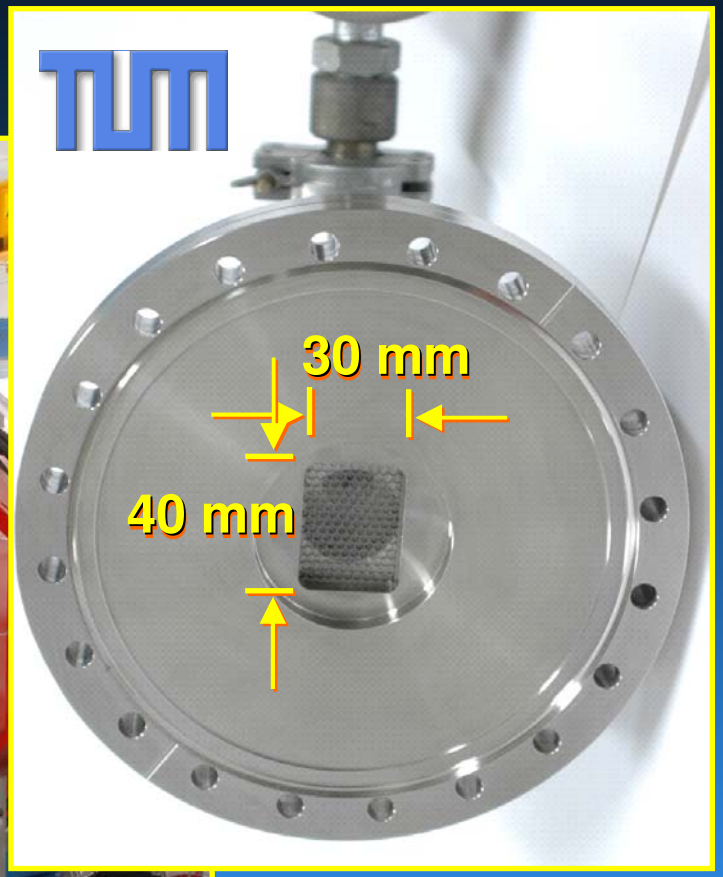


SIM RTC

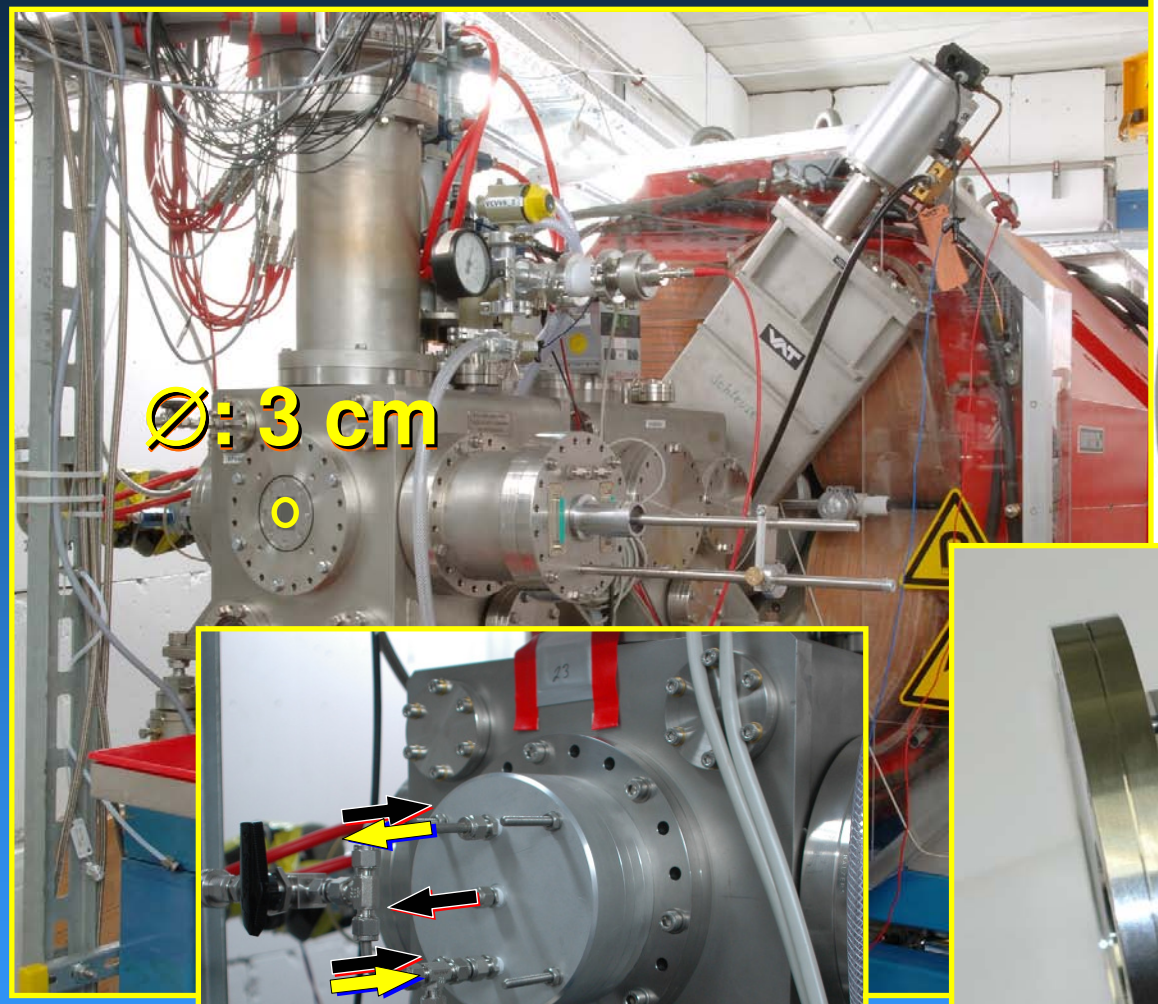


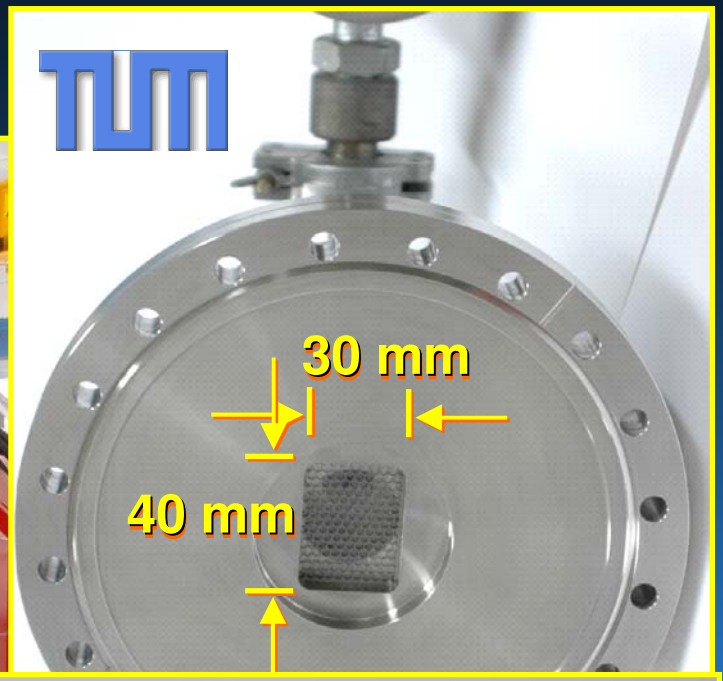
SIM RTC





SIM RTC


∅: 3 cm


30 mm
40 mm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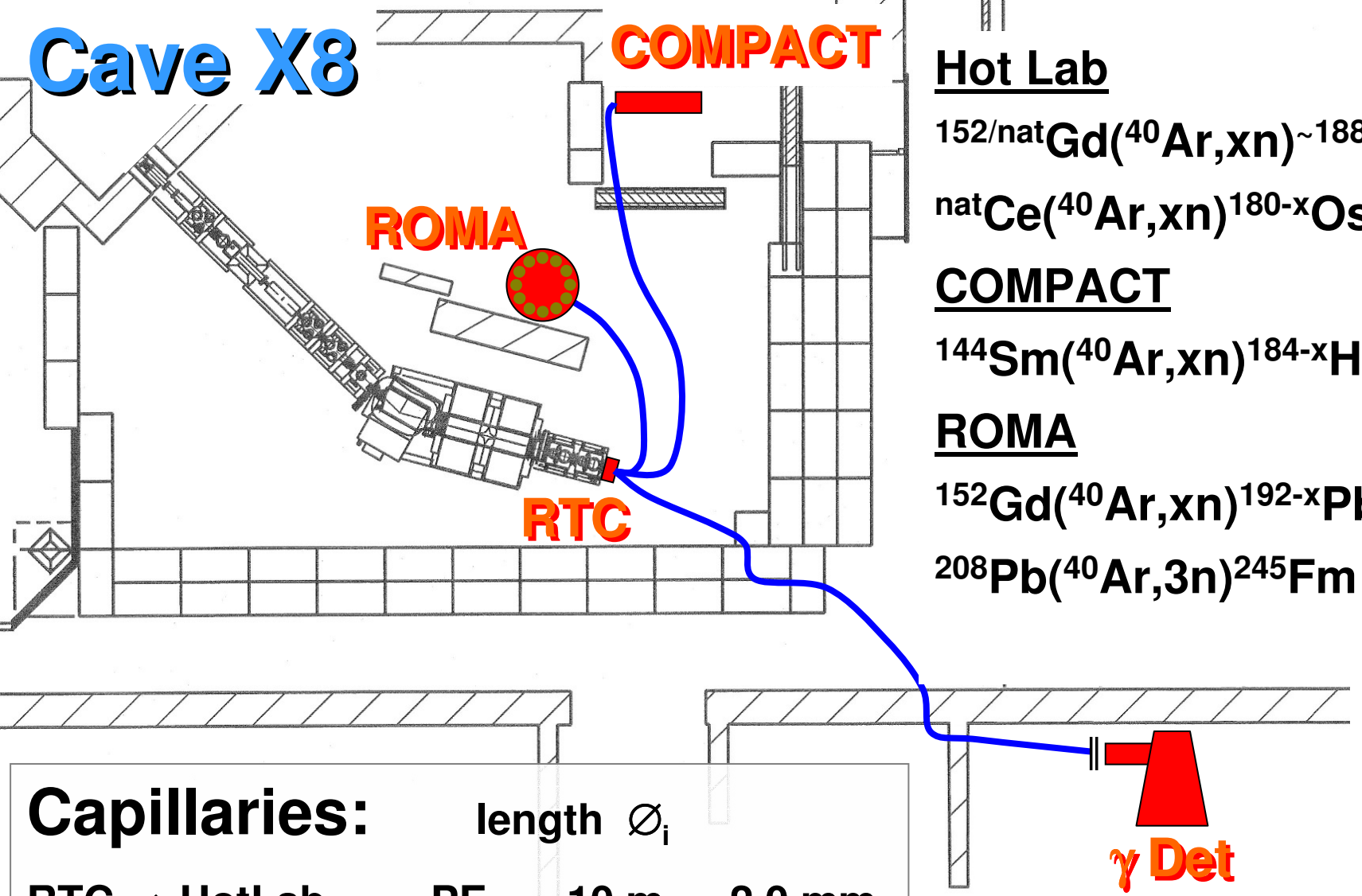
Modular design
Catcher foil holder



Hot Lab

$^{152/nat}Gd(^{40}Ar,xn)^{\sim 188\text{-}198}Pb$

$^{nat}Ce(^{40}Ar,xn)^{180\text{-}x}Os$

COMPACT

$^{144}Sm(^{40}Ar,xn)^{184\text{-}x}Hg$

ROMA

$^{152}Gd(^{40}Ar,xn)^{192\text{-}x}Pb$

$^{208}Pb(^{40}Ar,3n)^{245}Fm$

Capillaries:

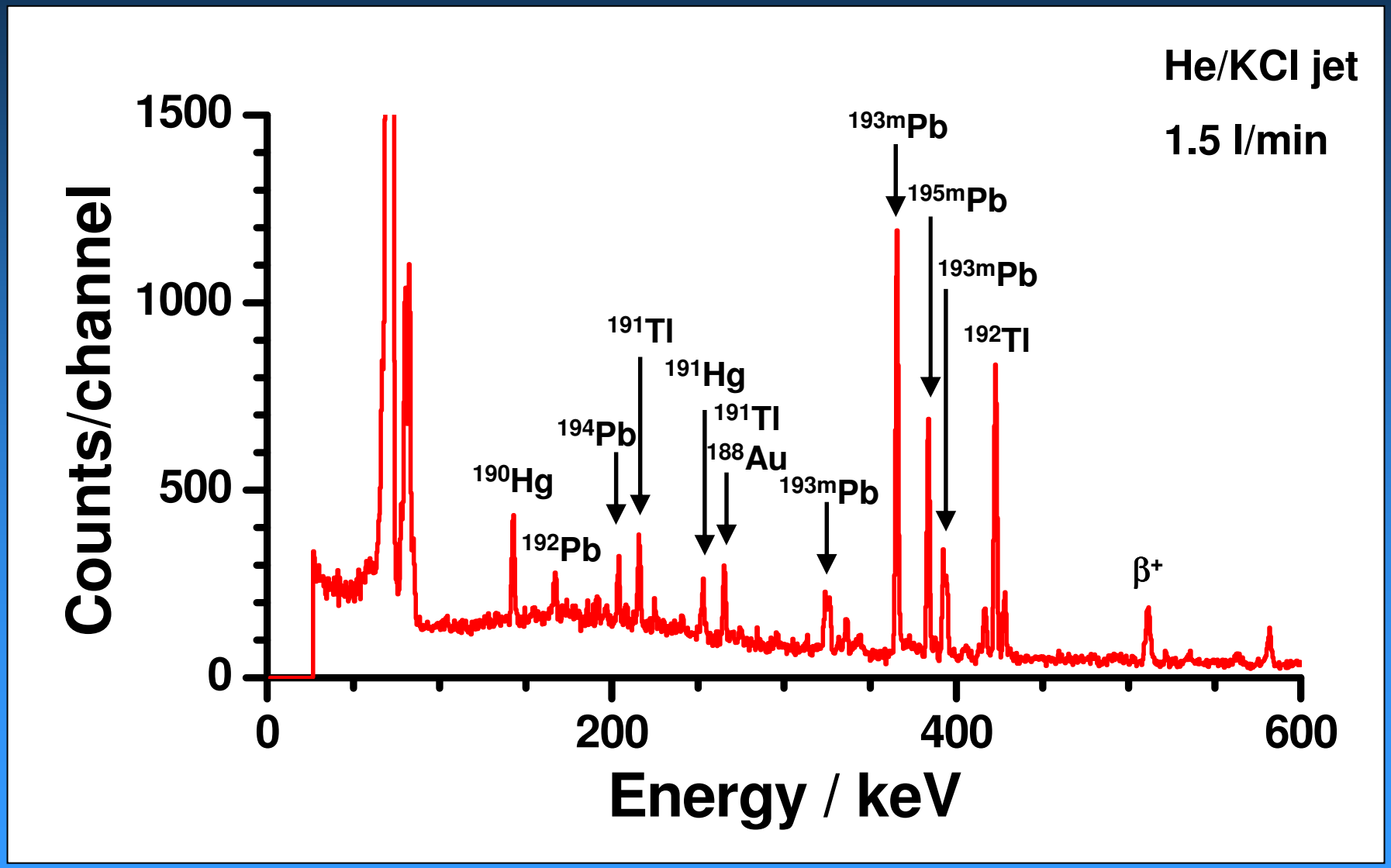
		length	$\varnothing_i$
RTC → HotLab	PE	10 m	2.0 mm
RTC → COMPACT	PTFE	~13 m	2.0 mm
RTC → ROMA	PE	5.5 m	1.5 mm

Hot Lab (S3)

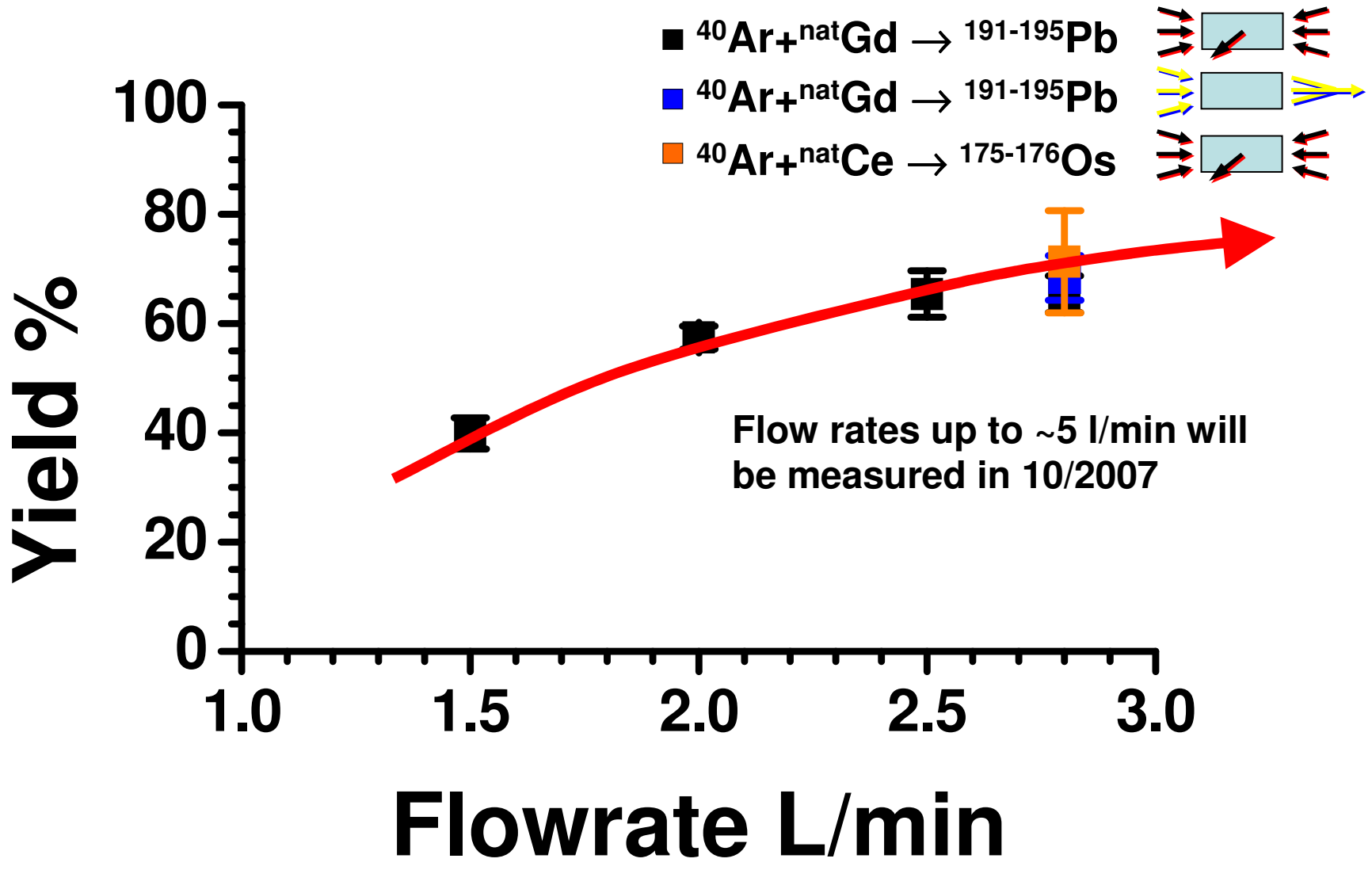
Large transmission mode (DQ_HQ_V)

- $^{40}Ar(^{152}Gd,xn)^{191-194}Pb$ in Hot Lab
- Jet yield for long-lived γ emitters
- ^{245}Fm in FPD and in ROMA

$^{40}Ar(^{152}Gd,xn)^{\sim 190\text{-}194}Pb$ Direct catch in HTM

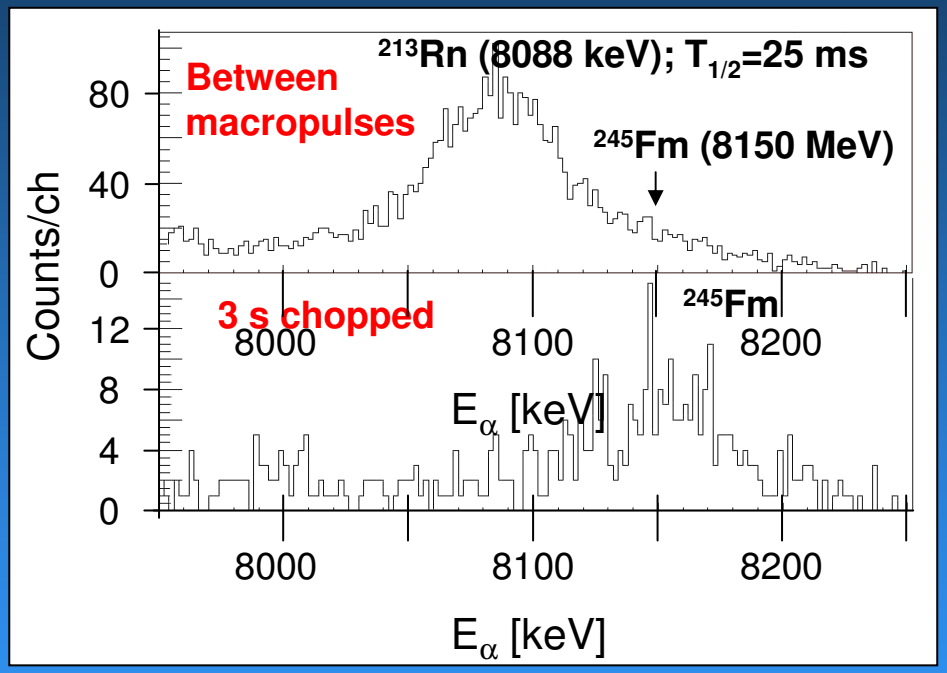


HTM RTC: Yield optimization

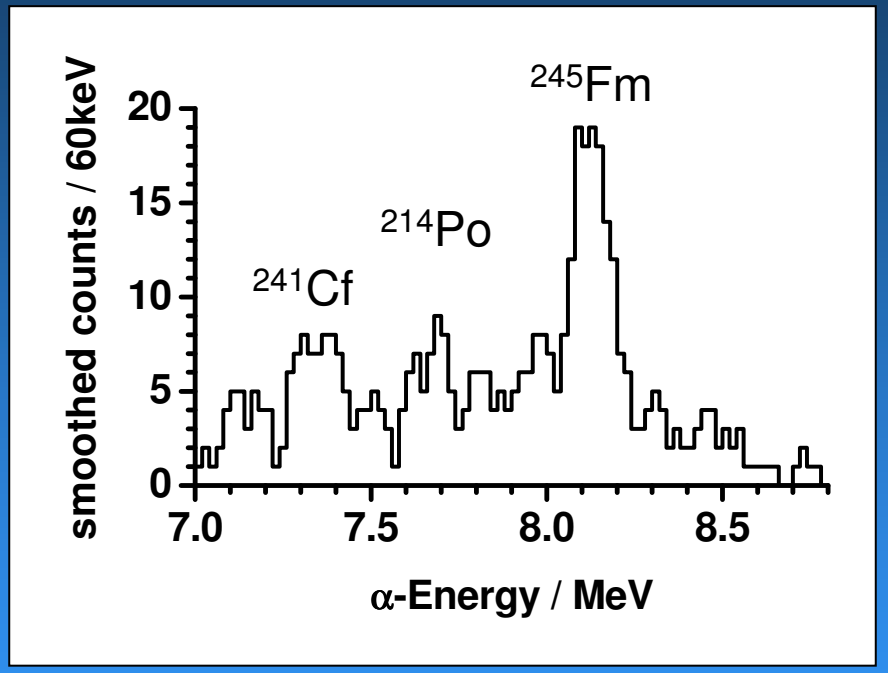


HTM RTC: 4-s ^{245}Fm

In Focal Plane



In ROMA



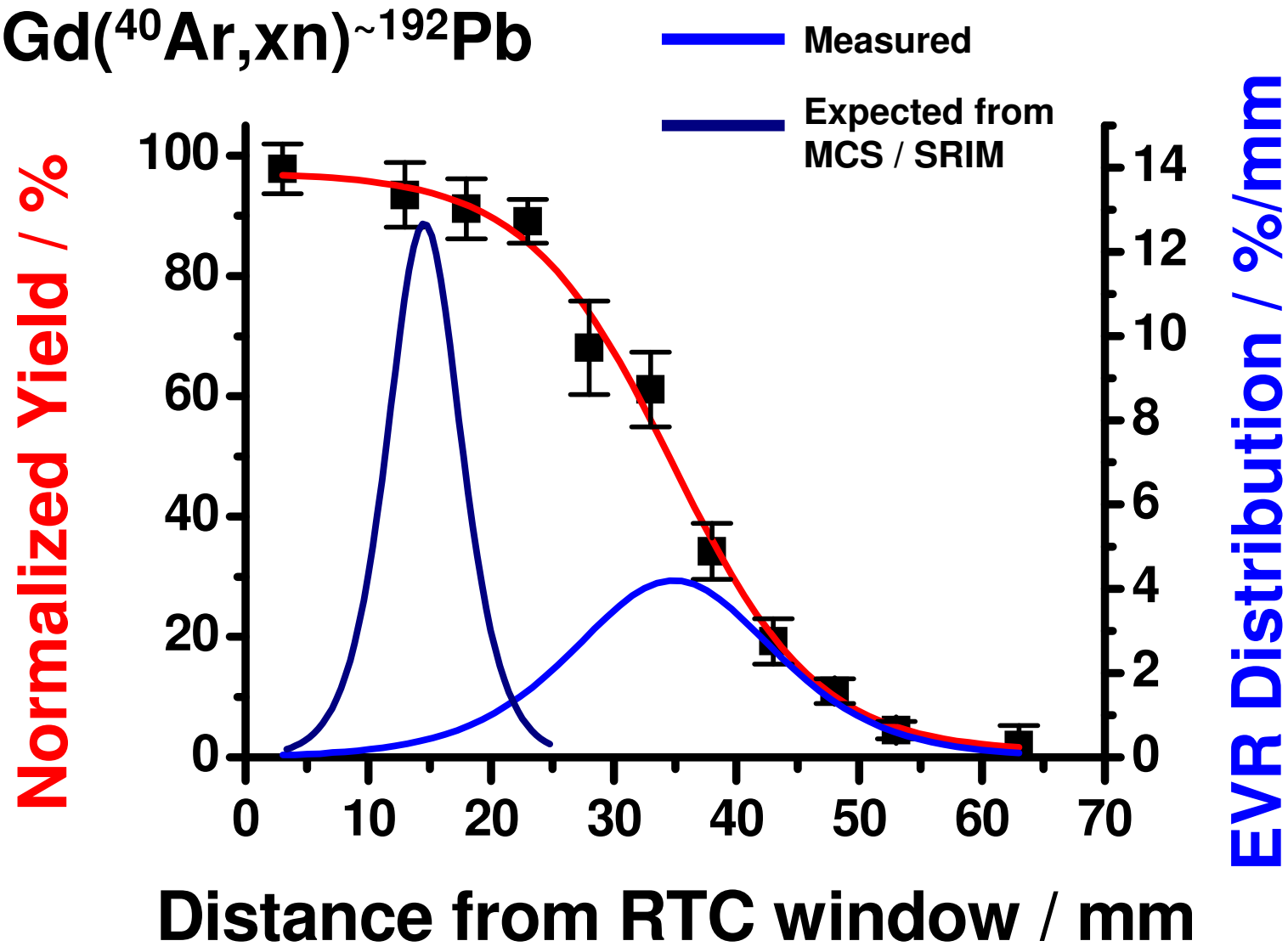
Gas flow rate: 2.2 l/min; T_{step}=3 s

Beam dose: ~1.3·10^{17}; Sum of 8 Dets. (t+b)

Small image mode (DQ_VQ_H)

- Where are $^{nat}Gd(^{40}Ar,xn)Pb$ isotopes stopped in the RTC?
- ^{188}Pb in ROMA

SIM RTC: Pb EVR Range



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GSI

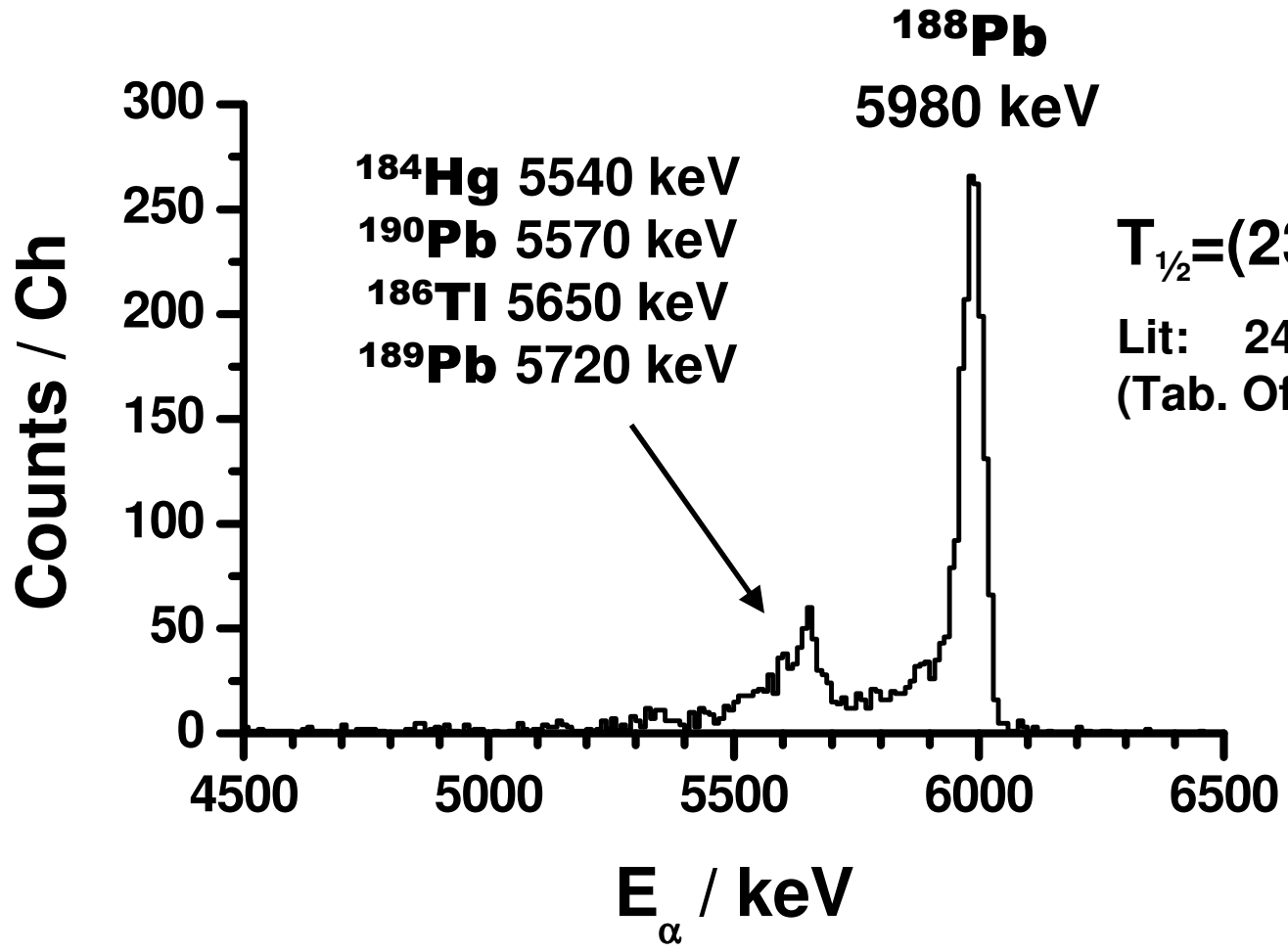
SIM RTC
Jet-Parameter Studies

Gas-jet efficiency was measured for:
-different gas flow rate
-different gas flow pattern
-different degrader foil thickness
-different pressure in the RTC

Jet-yield: ~30-65 %.

SIM RTC: $^{40}Ar+^{152}Gd$

^{188}Pb in ROMA; T_{step}=30 s; 2.7 l/min



Conclusion / What's next?

All major components built and tested

Efficiencies: some room for improvement...

The *TASCA* / RTC facility is generally ready for preseparation experiments!

YOUR IDEAS ARE WELCOME!

We're looking forward to many exciting "chemistry @ *TASCA*" experiments