



Preparation of ^{244}Pu -targets by electrodeposition

*J. Runke¹, Ch. E. Düllmann², K. Eberhardt¹, J.V. Kratz¹,
B. Lommel², M. Schädel², P. Thörle-Pospiech¹*

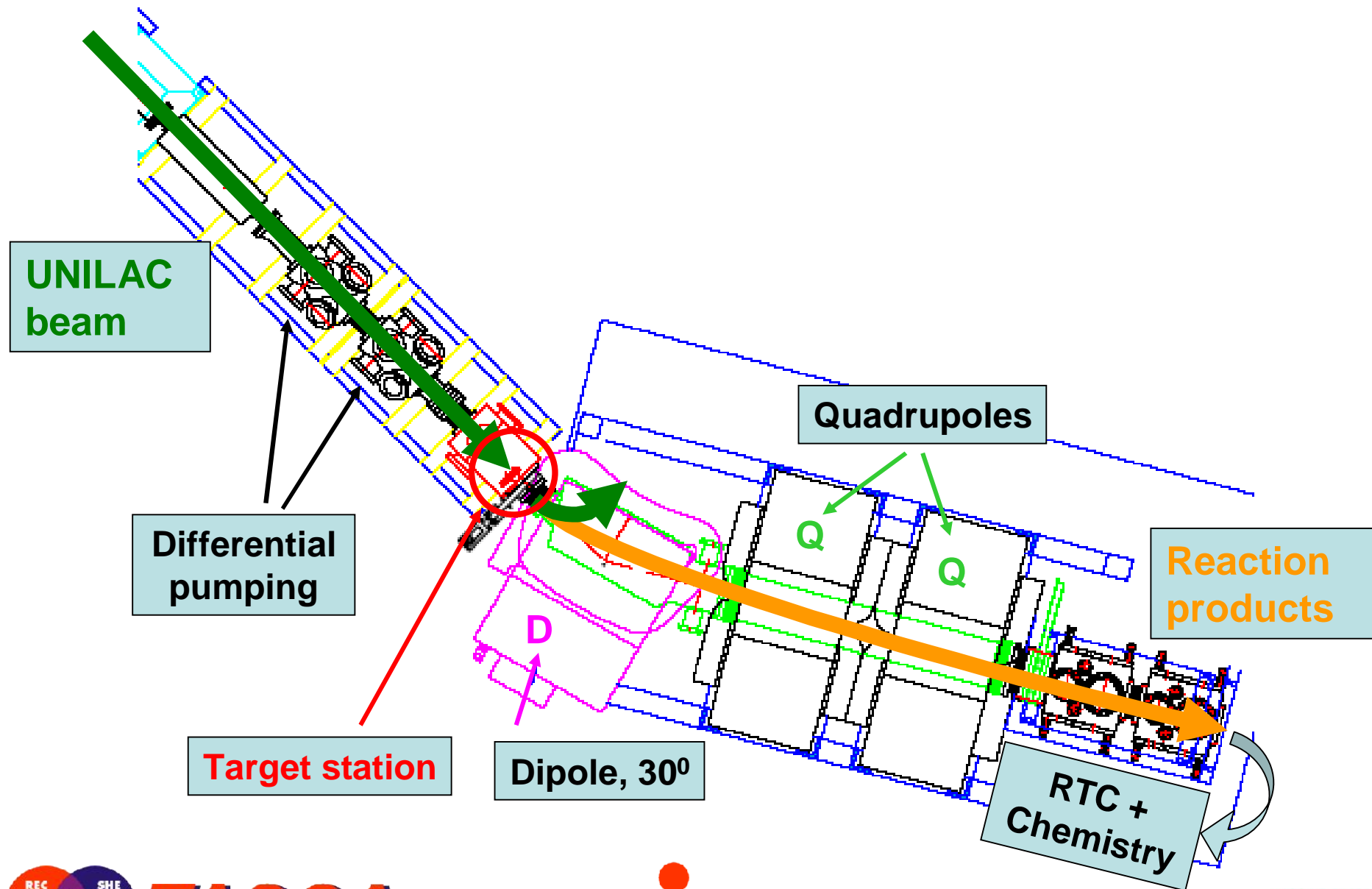
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- TASCAs separator at GSI
- Deposition cell design
- Deposition of ^{244}Pu
- Determination of target thickness



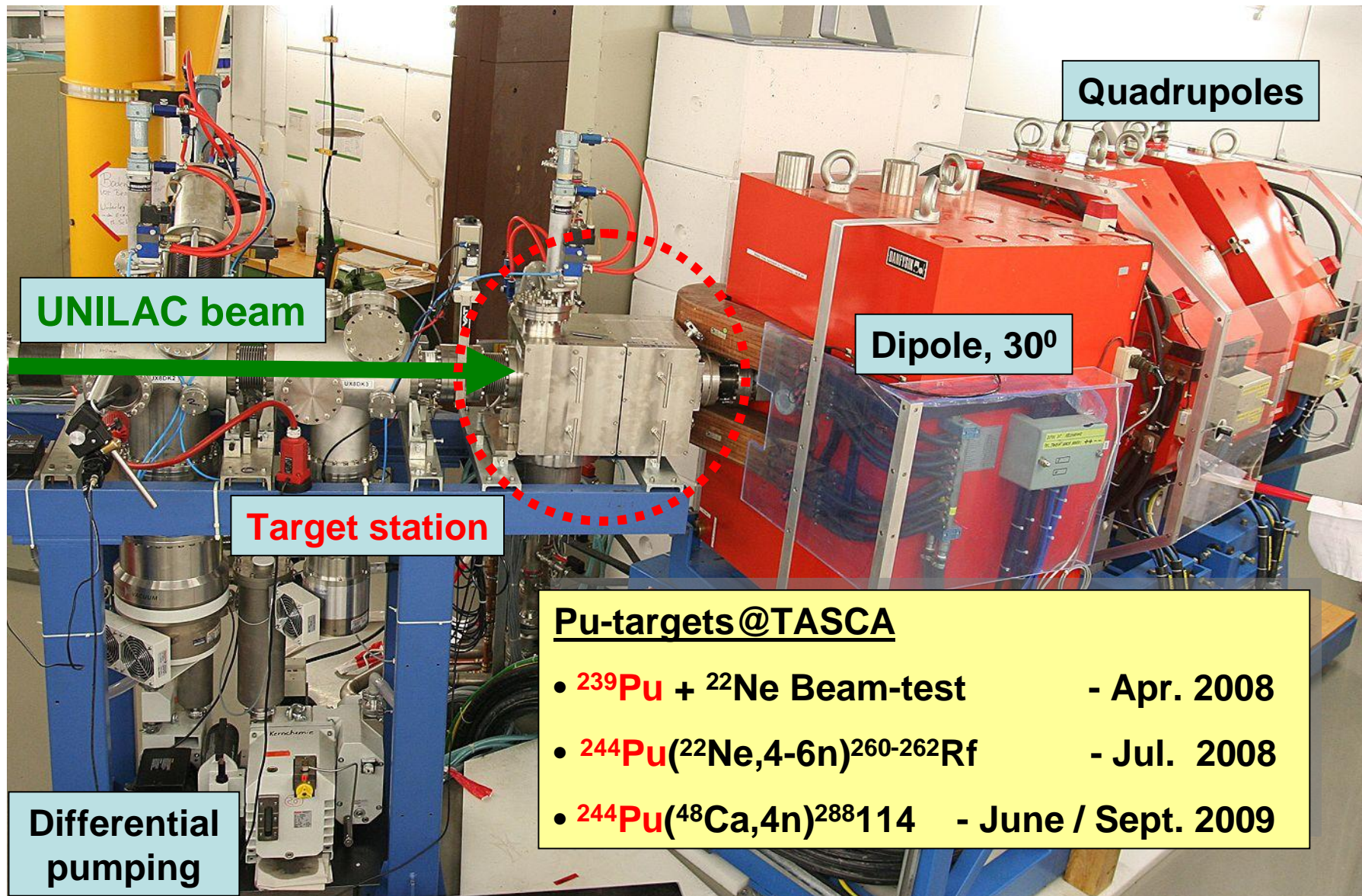
TASCA: Trans-Actinide-Separator and Chemistry Apparatus



TASCA @ **GS I** DARMSTADT

JOHANNES
GUTENBERG
UNIVERSITÄT
MAINZ

TASCA target station

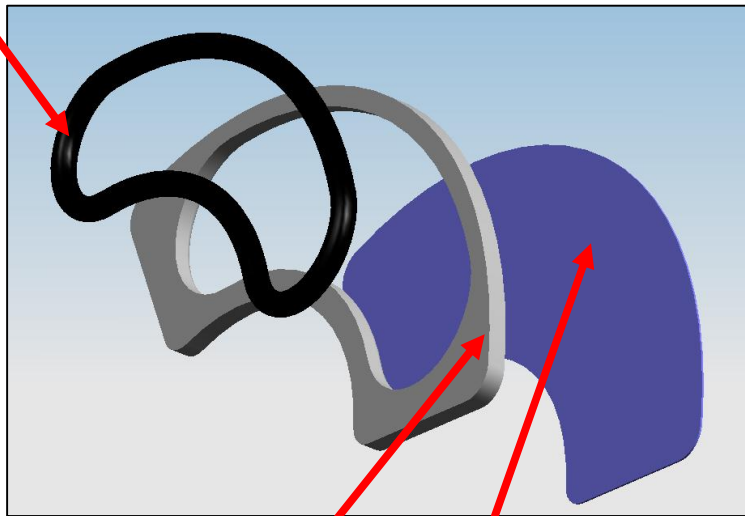


TASCA Rotating Target Wheel Unit

GSI target laboratory:

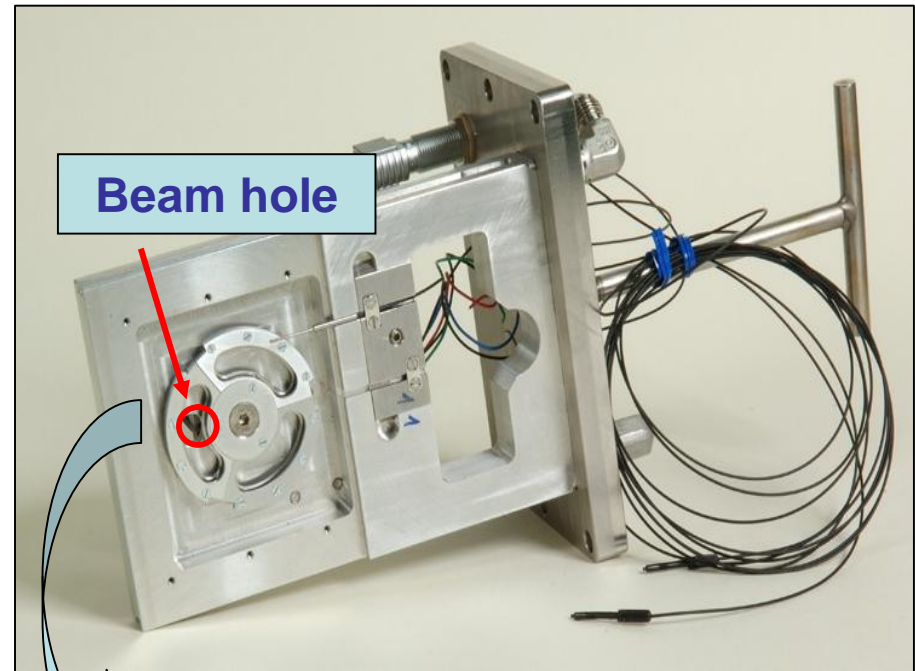
- 2 μm Ti-foils produced by cold rolling
- Foils are pre-mounted onto Al-frame

O-Ring, Viton
(20 x 1.3 mm)



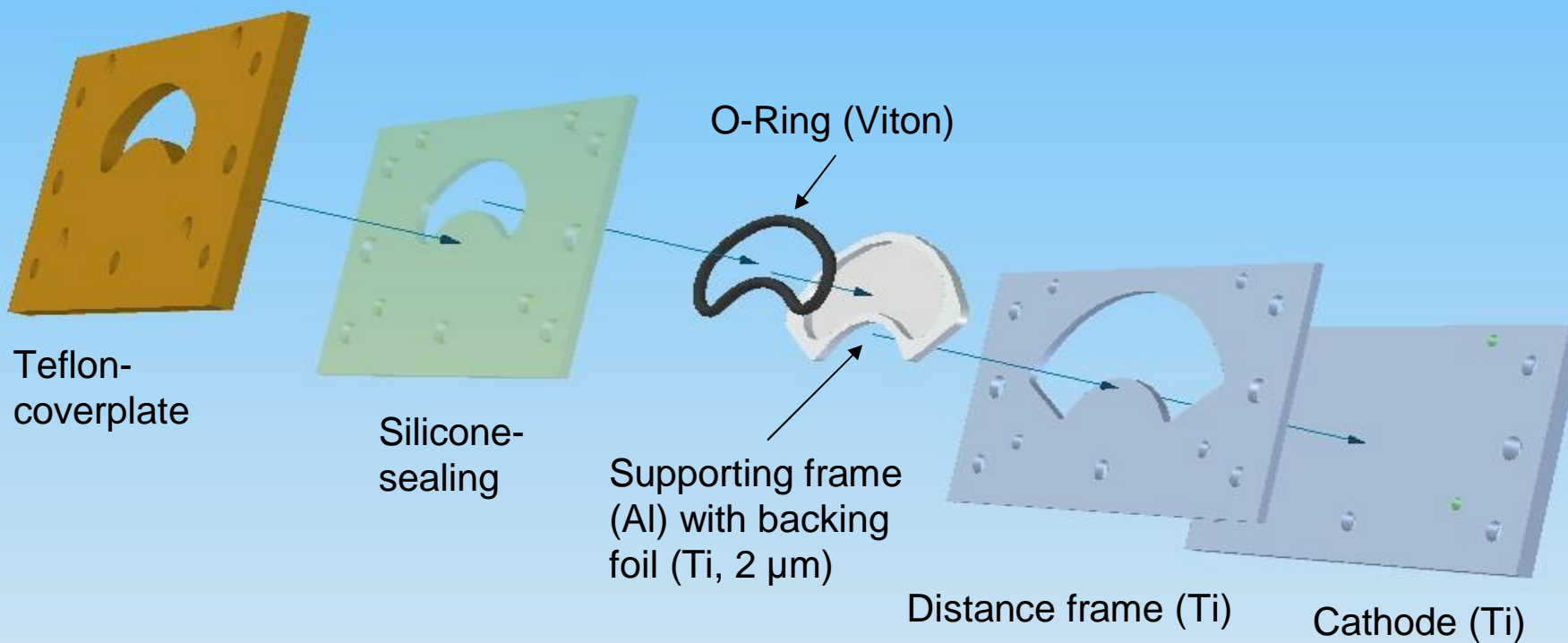
Supporting frame
(Al 1.0 mm)

Backing foil (Ti/2 μm)
Active area: 1.44 cm²



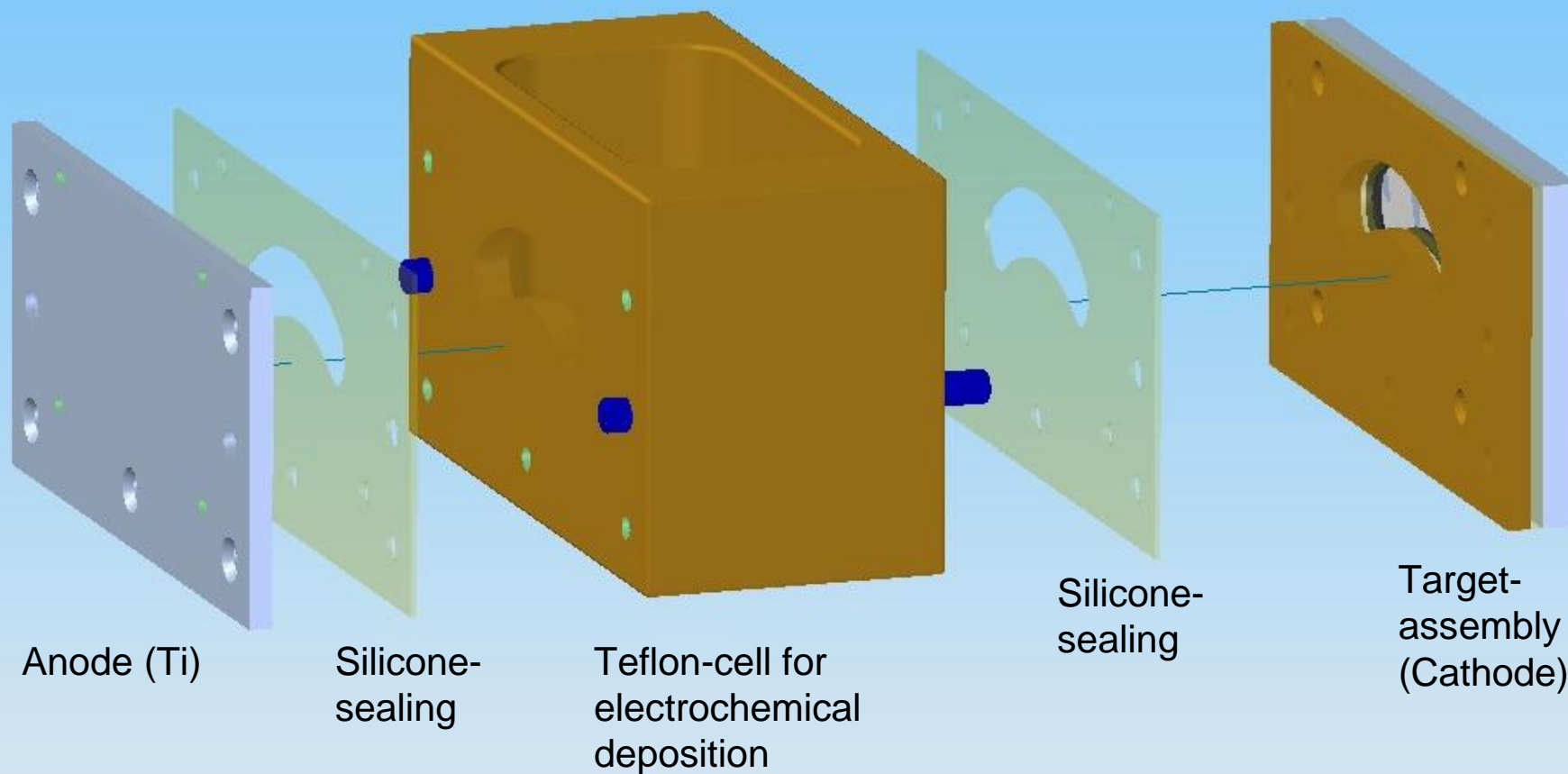
Deposition cell I

Target-assembly



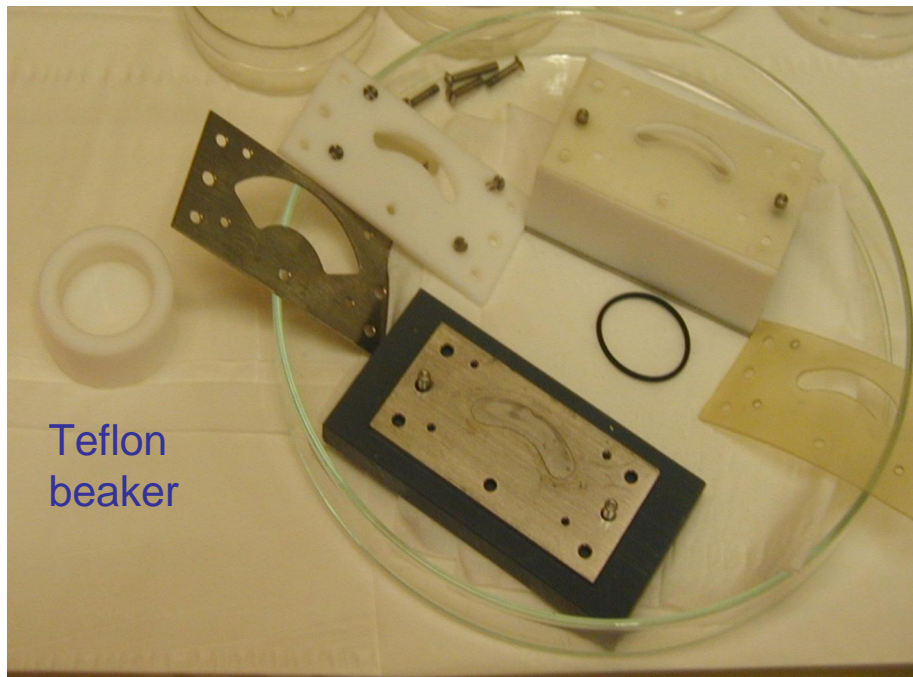
Deposition cell II

Cell design according to H. Haba [RIKEN], TASCA 05, Oslo, Oct. 2005

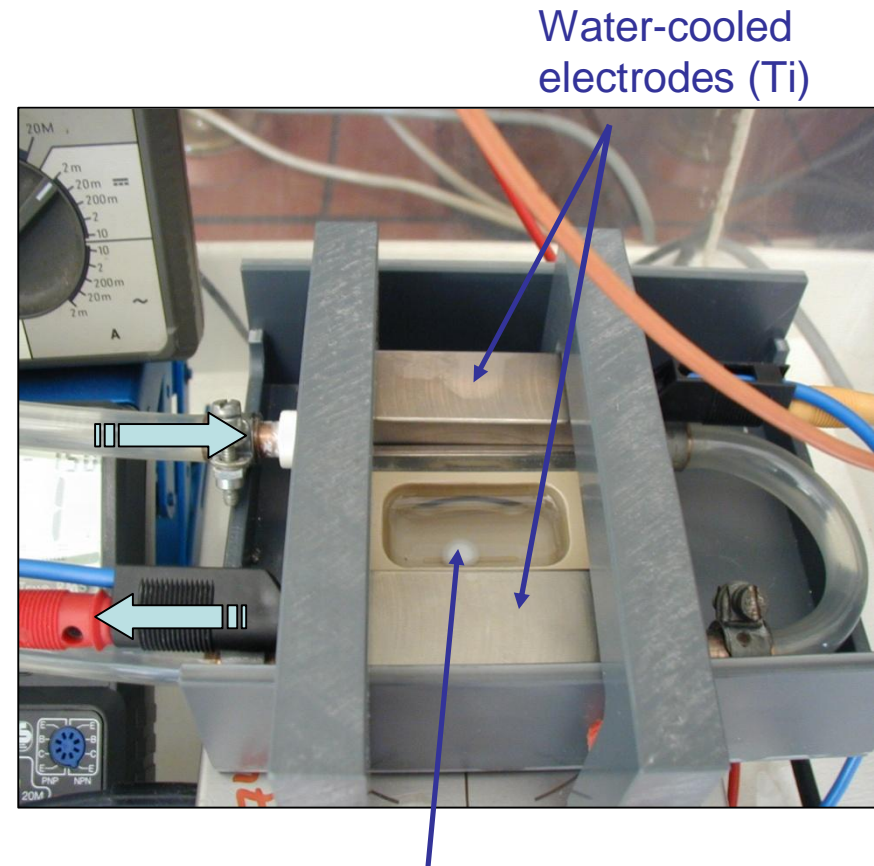


Deposition cell III

Pu-targets: cell made of Teflon



Teflon beaker



Water-cooled electrodes (Ti)

Magnetic stirrer

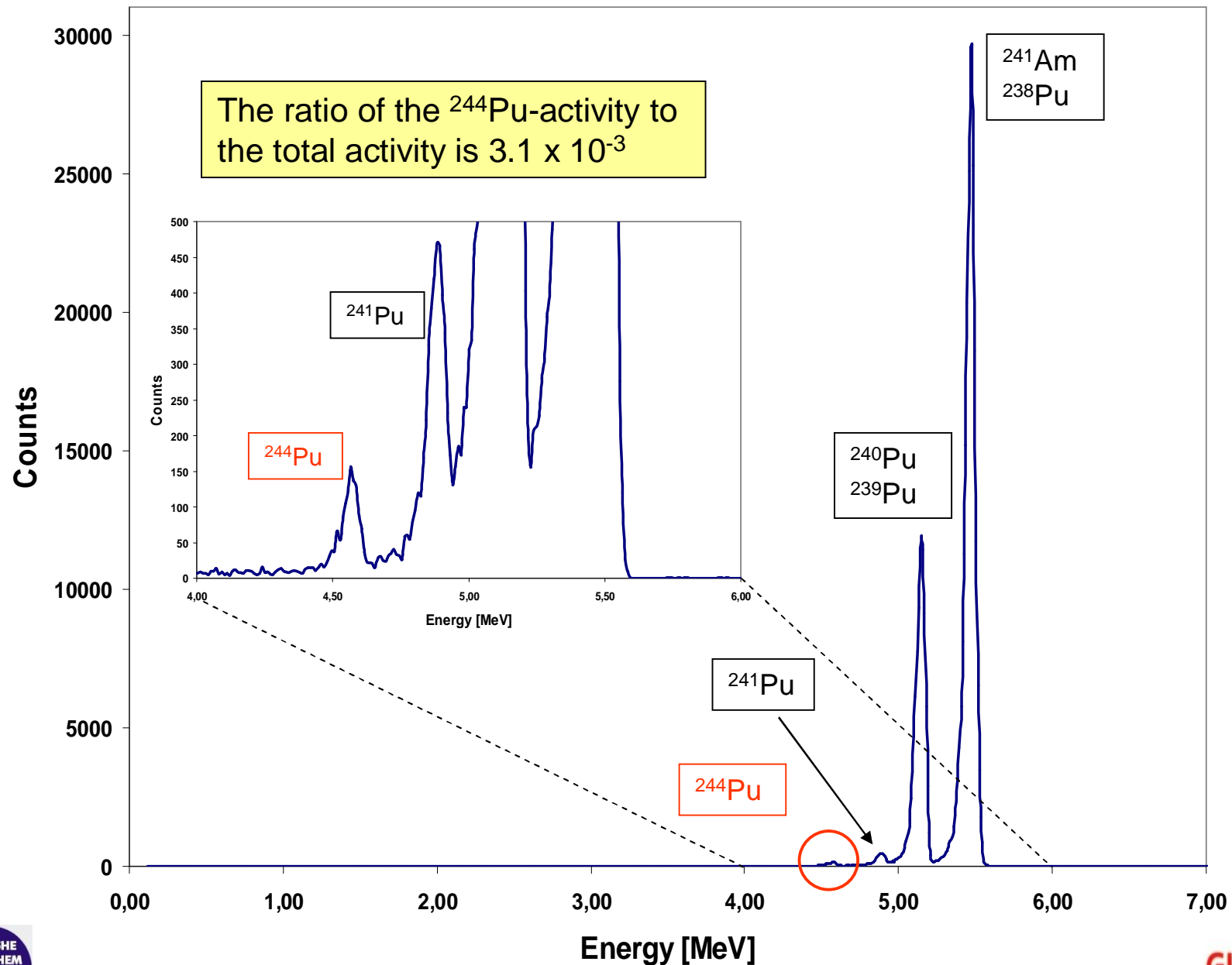
Deposition-parameters



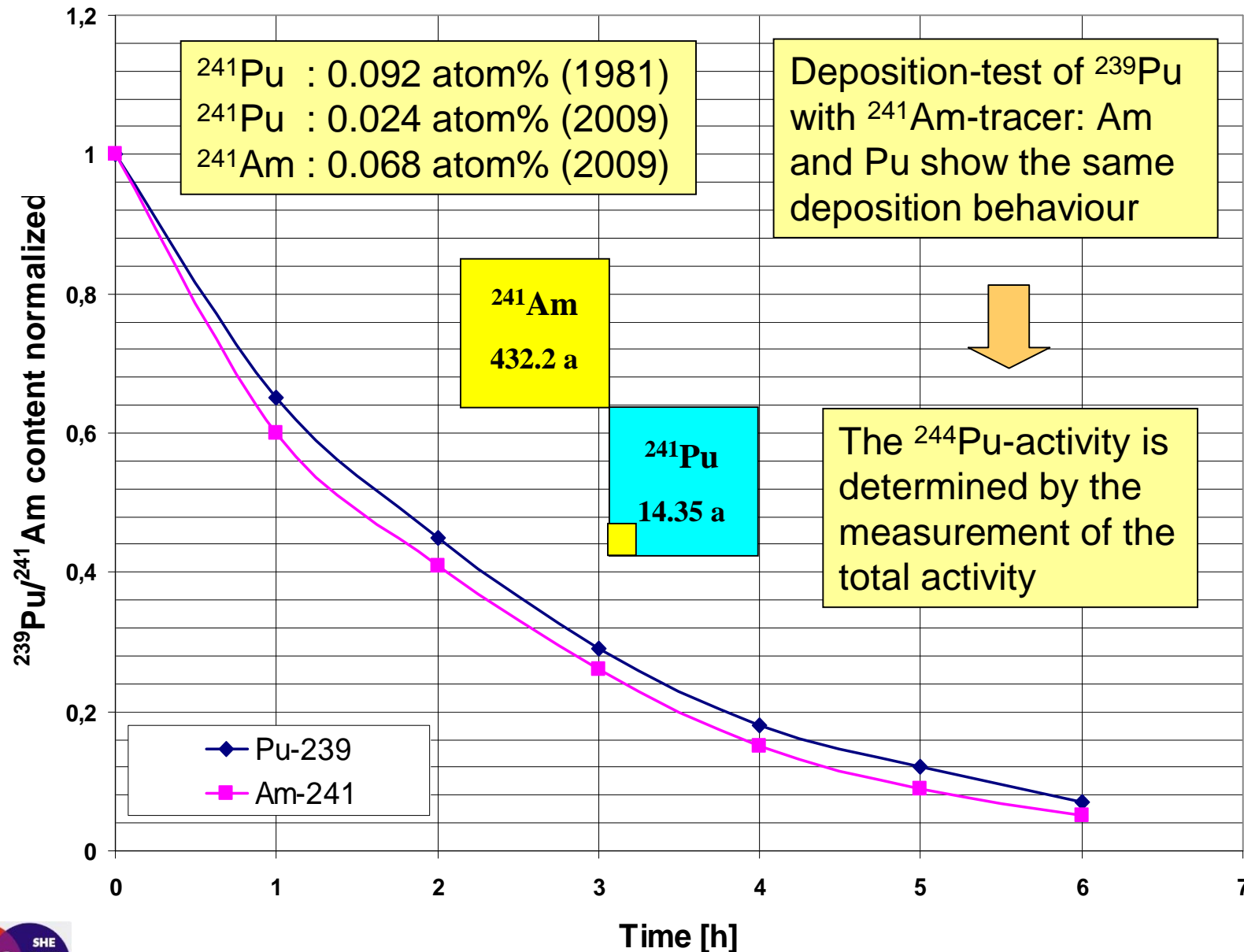
Deposition-parameters:

- Solvent: Isobutanol / Isopropanol
- Current density: $\leq 1.15 \text{ mA/cm}^2$
- Voltage: 160 to 200 V
- Deposition-time: 5 to 6 hours
- Target-thickness: 670 to 790 $\mu\text{g/cm}^2$
- Deposition yields up to 90 %

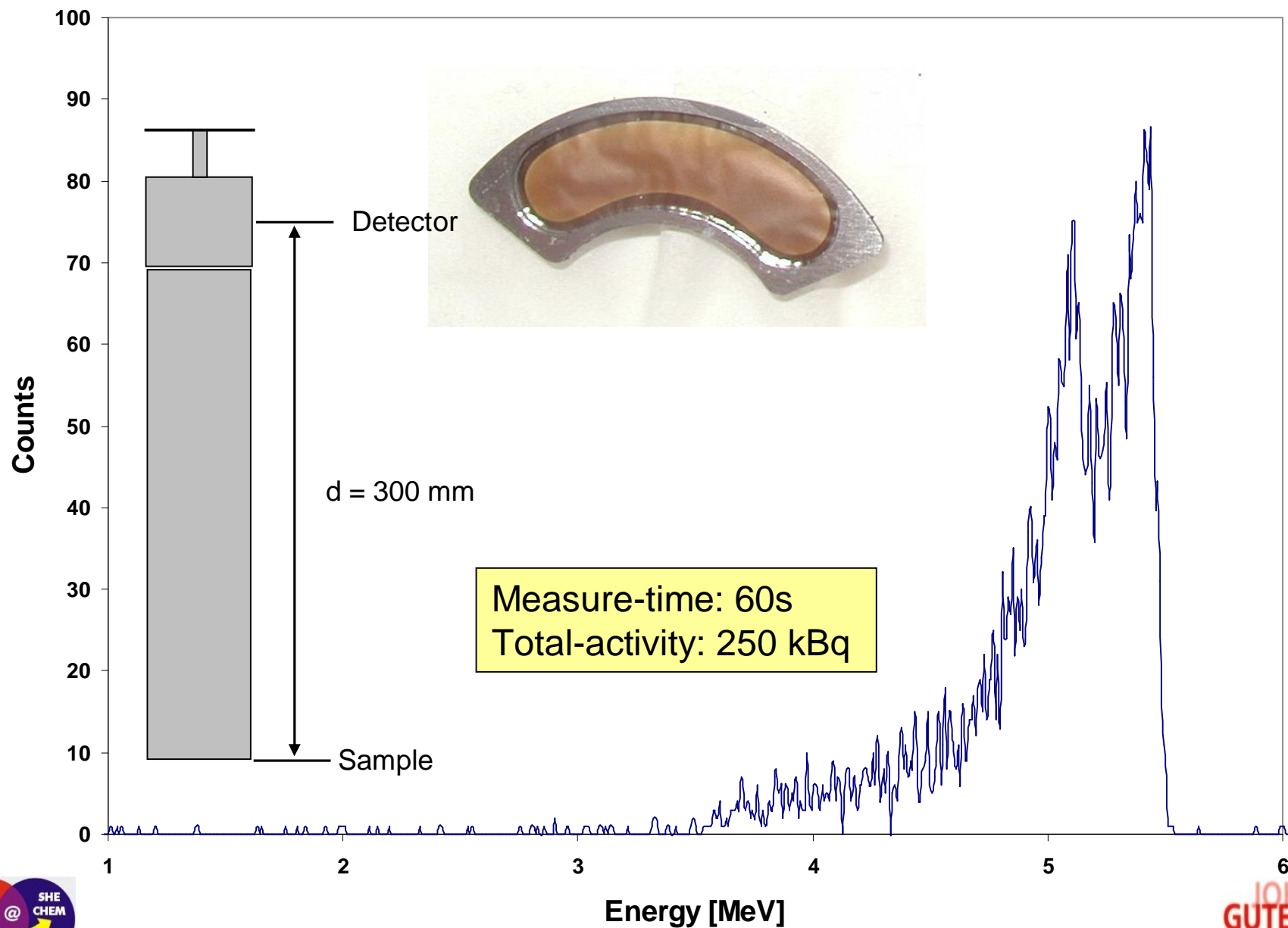
Alphaspectrum of the ^{244}Pu -stocksolution



Simultaneous deposition of ^{239}Pu and ^{241}Am



Alphaspectrum of a ^{244}Pu -Target



Determination of target thickness by NAA

Electrochemical
deposition

Irradiation of
supernatant
solution + standard

^{245}Am

2.05 h

β^- 0.9
 γ 253
(241; 296...)
 e^- ; g

^{244}Pu

$8.00 \cdot 10^7$ a

α 4.589; 4.546
sf; γ
 e^- 1.7

^{245}Pu

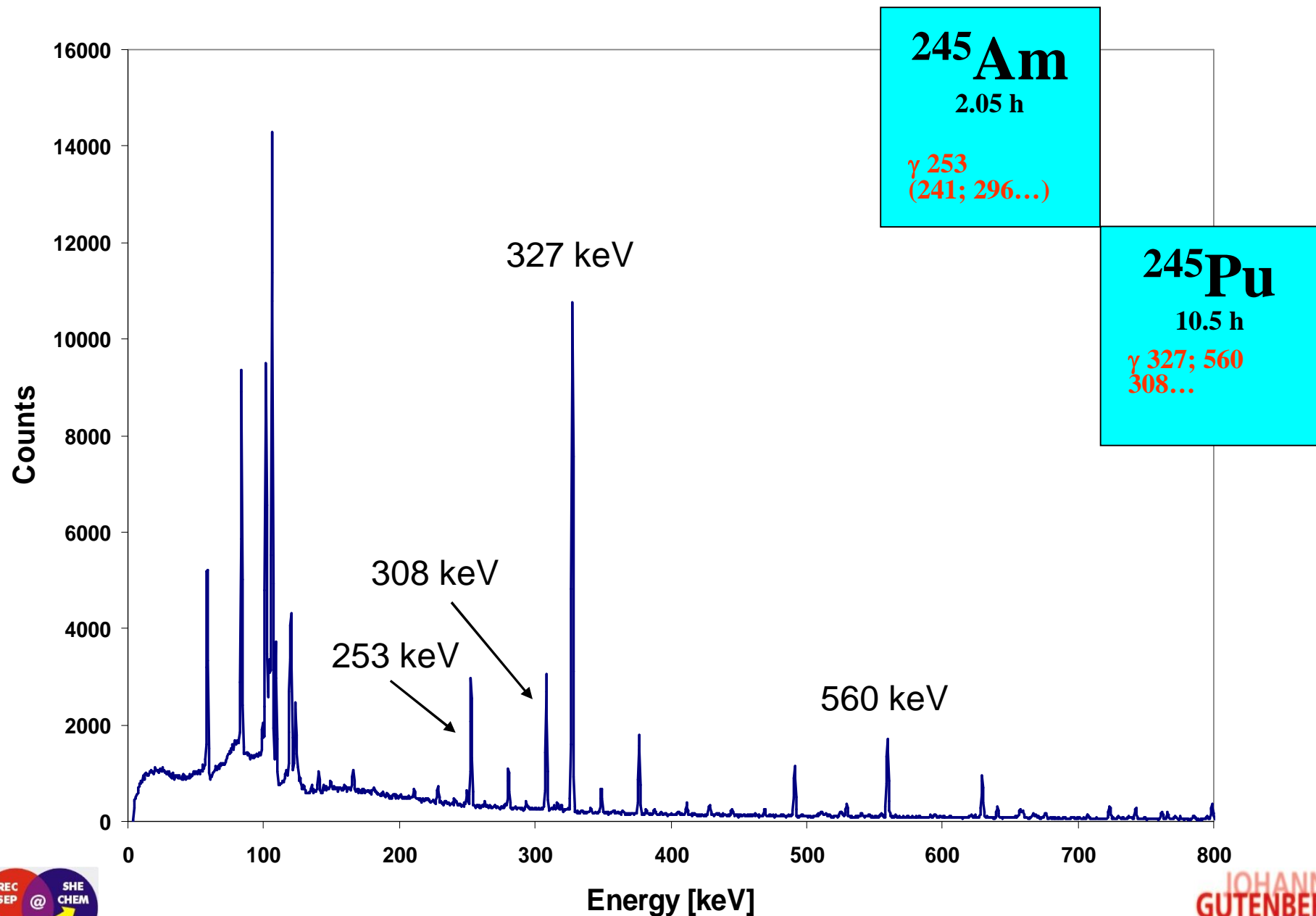
10.5 h

β^- 0.9; 1.2
 γ 327; 560
308...;g
 σ 150

γ -measurement +
yield calculation

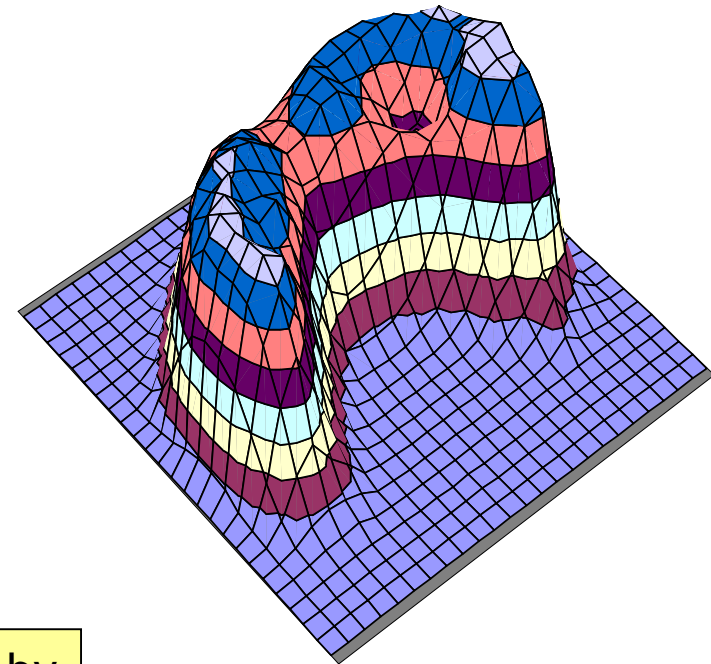
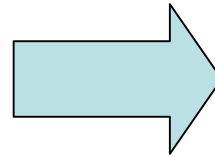
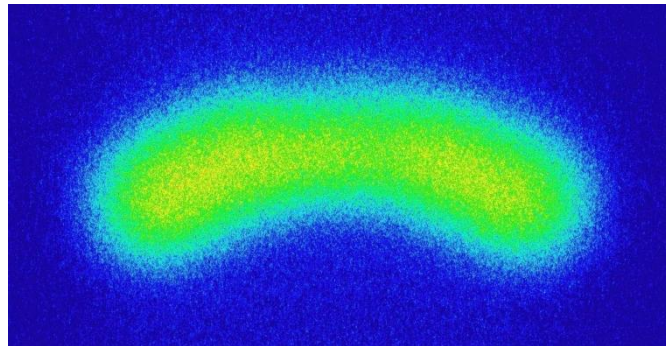


γ -spectrum of supernatant solution (1 ml / 10 μg ^{245}Pu)



Radiographic Imaging

Radiographic imaging with FLA 7000 by FUJIFILM
Investigation of the target homogeneity



Radiographic image of a ^{244}Pu -target produced by electrochemical deposition

Thanks to



- GSI target laboratory for providing the backing foils
- The mechanical workshop of the Institut für Kernchemie
- GSI for financial support (F+E Projekt MZJVKR)
- Staff of TRIGA Mainz

[YOU for your attention](#)