

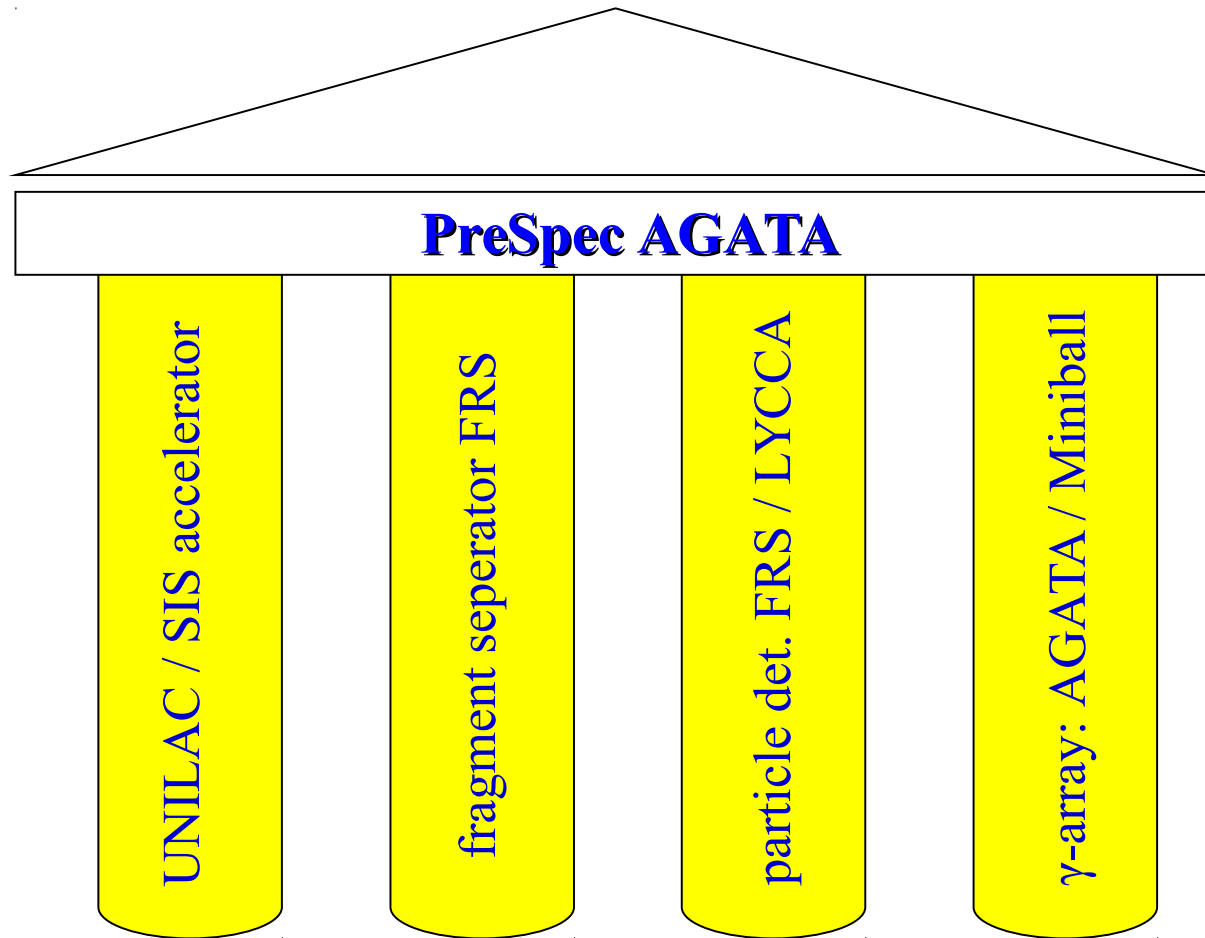
PRESPEC-AGATA Commissioning

P. Boutachkov

Technische Universität Darmstadt
for the PreSPEC-AGATA collaboration

- Exp. at relativistic energies
- Experimental Setup
- Detector performance





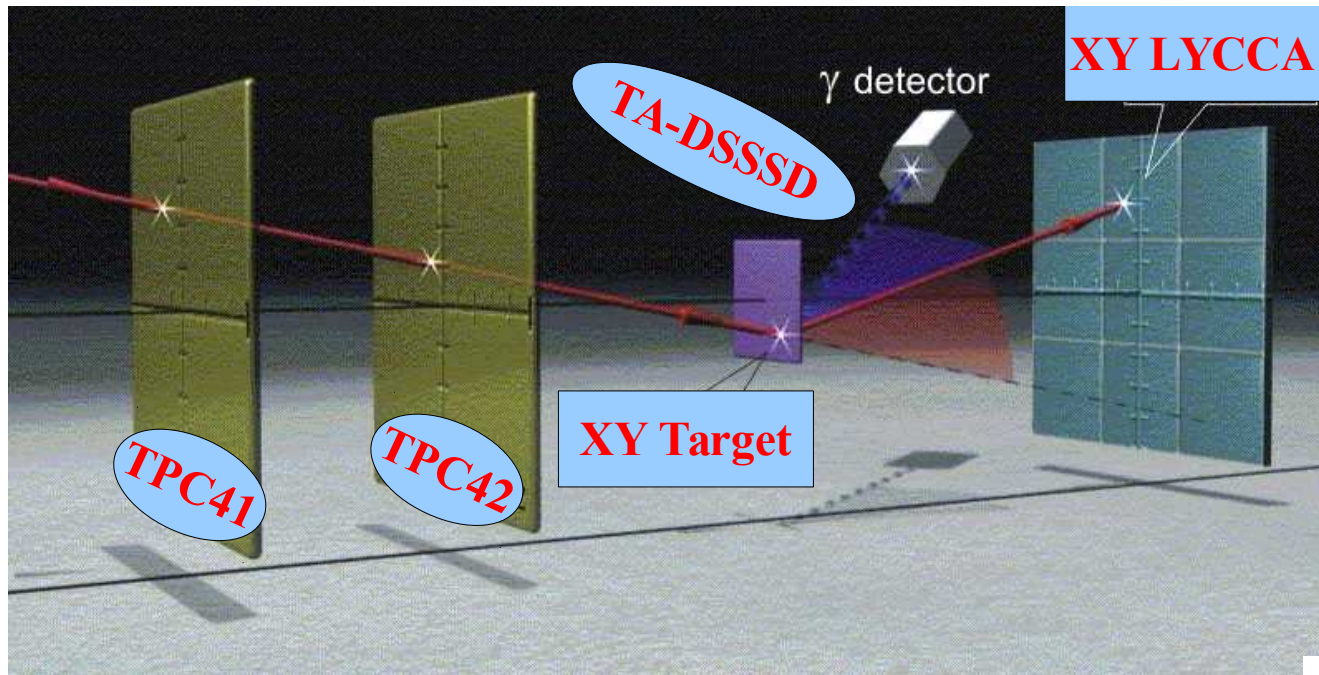
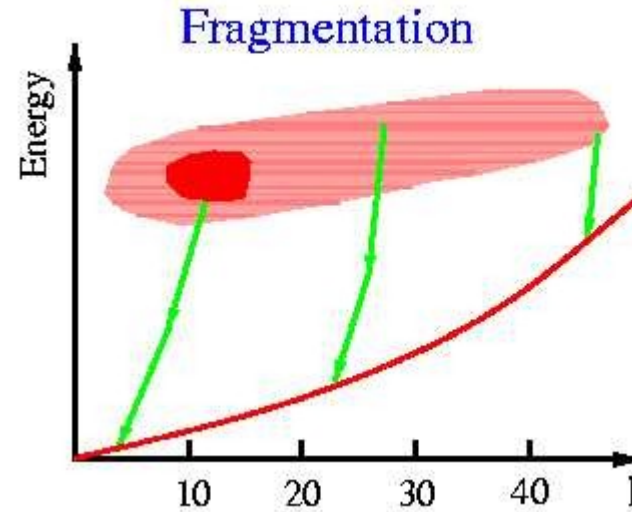
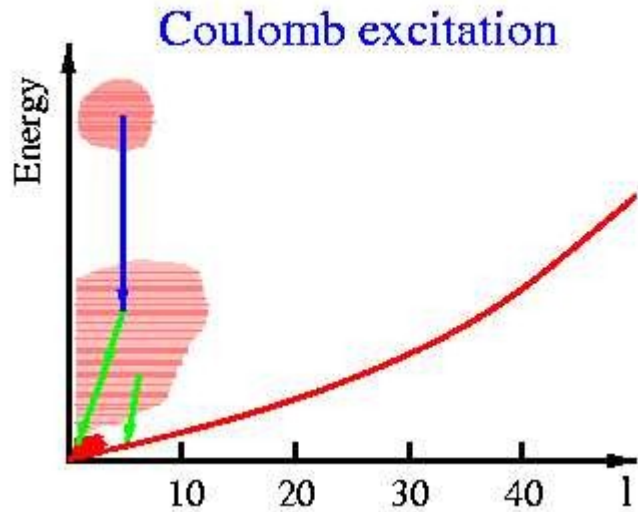
^{58}Ni : 10^{10} /spill
 ^{86}Kr : 10^{10} /spill
 ^{136}Xe : 5×10^9 /spill
 ^{208}Pb , ^{238}U : 10^9 /spill

ToF: 300 ns
 ϵ_{trans} (frag.): $\leq 50\%$
 ϵ_{trans} (fiss.): 1%

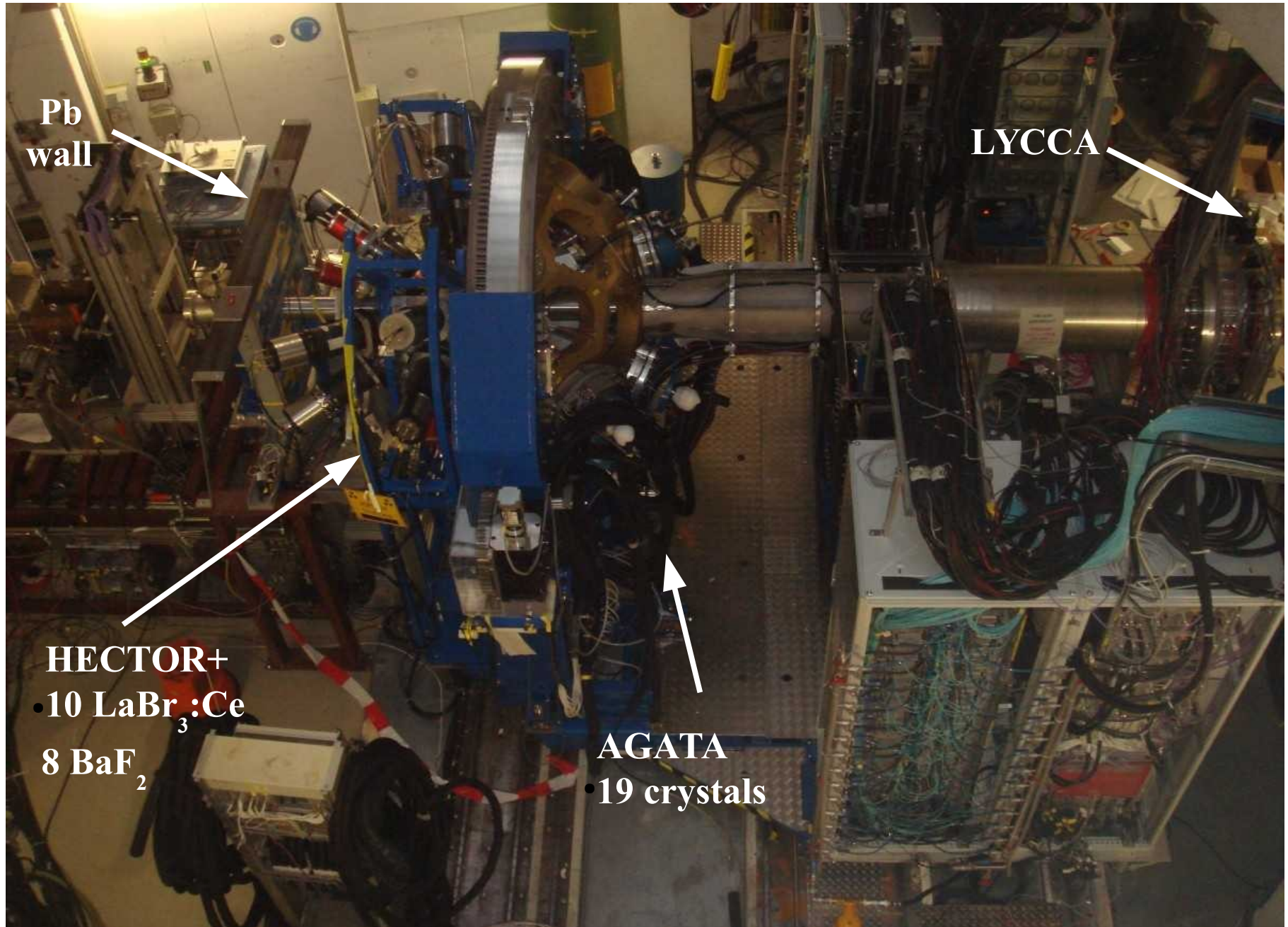
A and Z
 ΔE : ~ 1 GeV

ϵ_{γ} : $\sim 11\%$
 ΔE : ~ 6 keV

Scattering experiment at relativistic energies



S4 Detectors



AGATA at GSI

In total 25 crystals

RISING

AGATA

Target detector distance:

70 cm Variable: 10 - 24 cm

Efficiency:

2.8% γ -efficiency : 7-11 %

Energy resolution (FWHM):

21 keV 6 - 11 keV

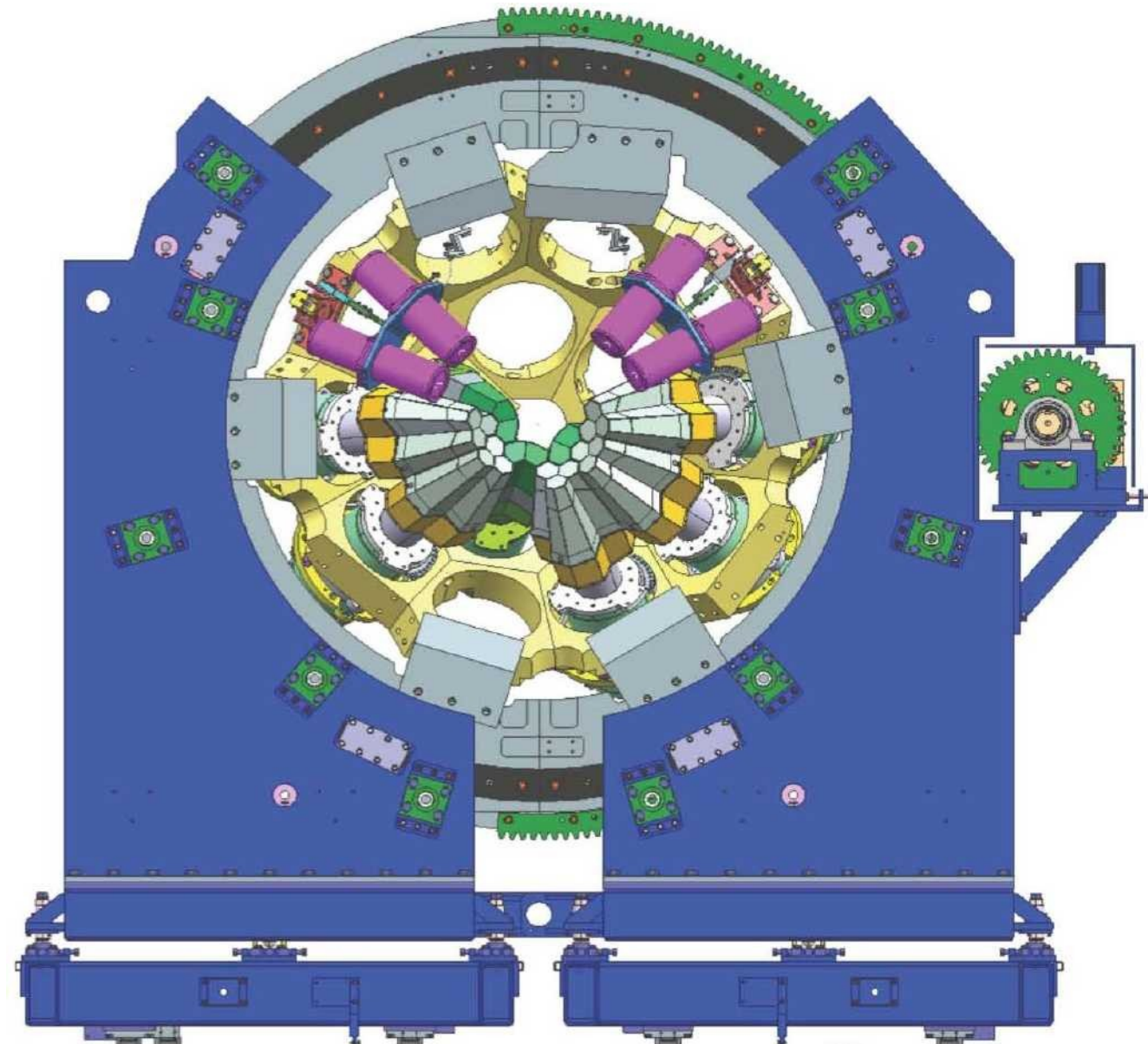
Cross section limit :

>100mb >5 mb (for 150 pps)

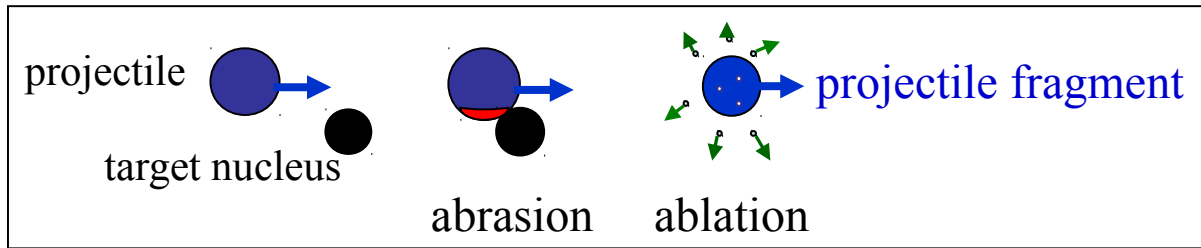
AGATA at GSI

configuration for 2012
19 crystals
3 double Cluster
5 triple Cluster
+ HECTOR+ BaF₂/LaBr₃

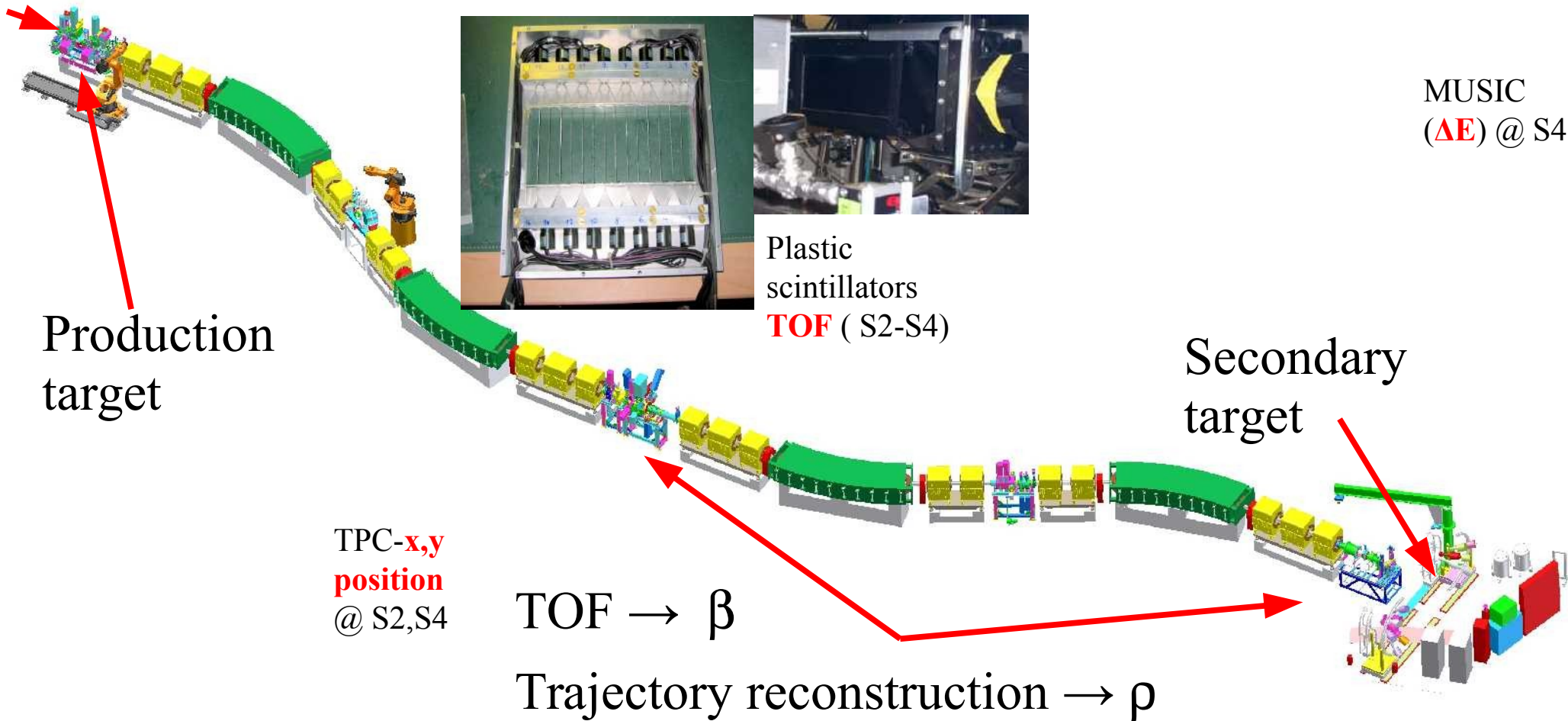
AGATA - efficiency ~5%



Production, Separation, Identification



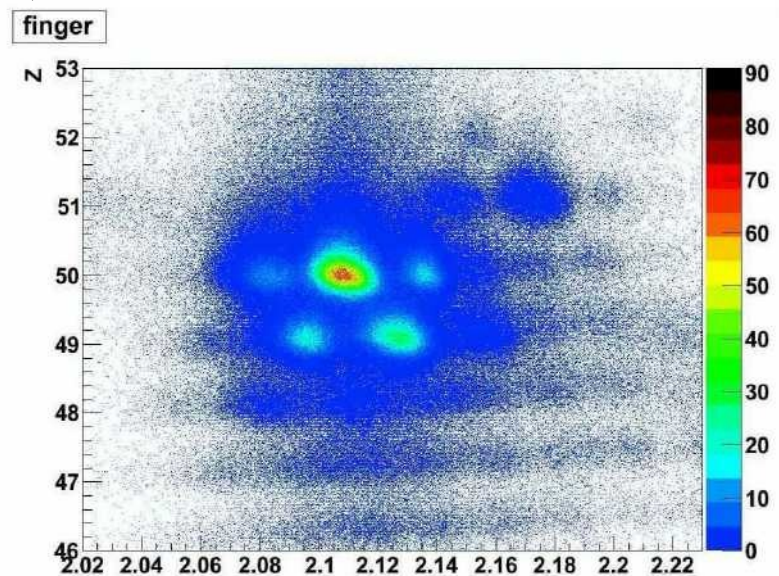
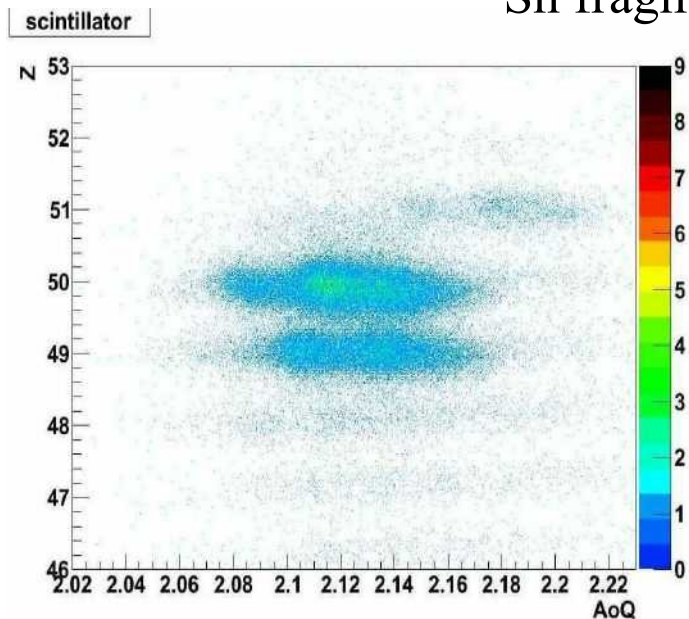
Beam



Operation rates of tracking detectors

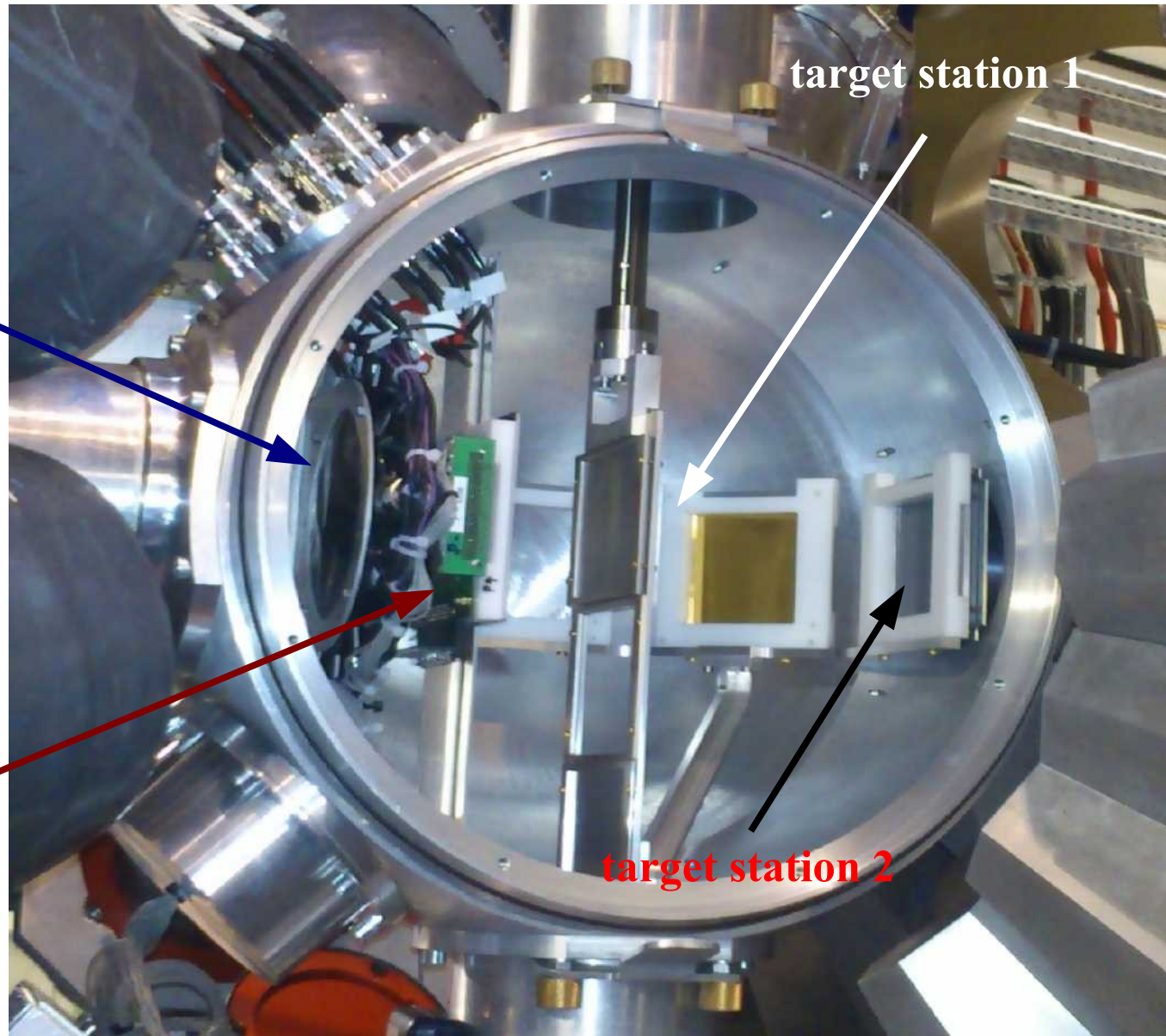
Detector	Max. Inst. Rate [pps]
X,Y: TPC dE: MUSIC detectors (S4) TOF: Scintillators (S2) Finger Scintillator	a few 10^5 $< 2 \times 10^5$ $< 10^6$ a few 10^5 pps/cm
DSSSD	$< 10^5$

^{104}Sn fragments, S2 $\sim 10^6 \text{ s}^{-1}$



F. Ameil (GSI)

Scattering chamber

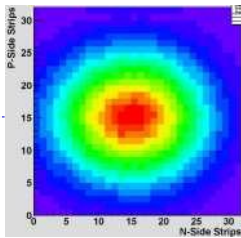
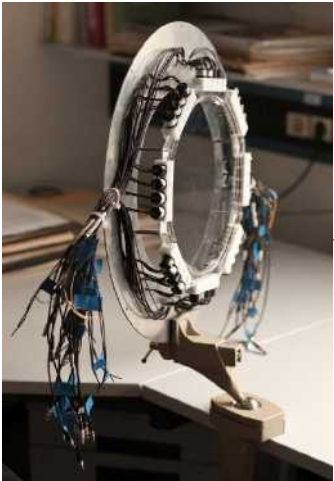


target-TOF-START
0.5 mm BC 420
12 PMT

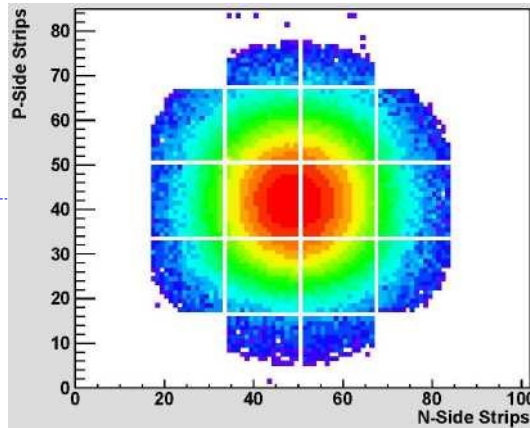
target station 1

target-XY
DSSSD
58 x 58 mm²
32 x 32 strips

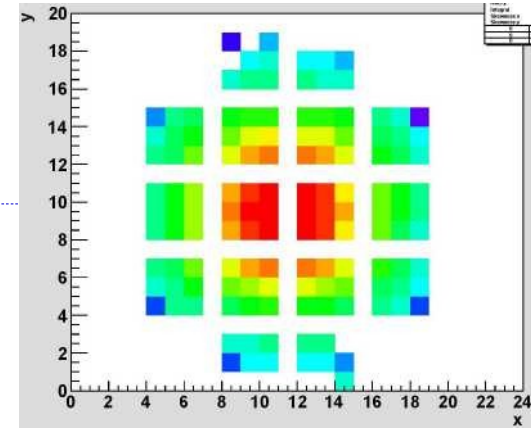
target station 2



target DSSSD

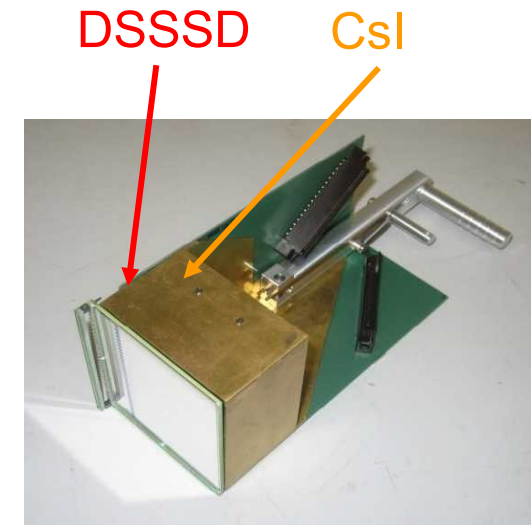
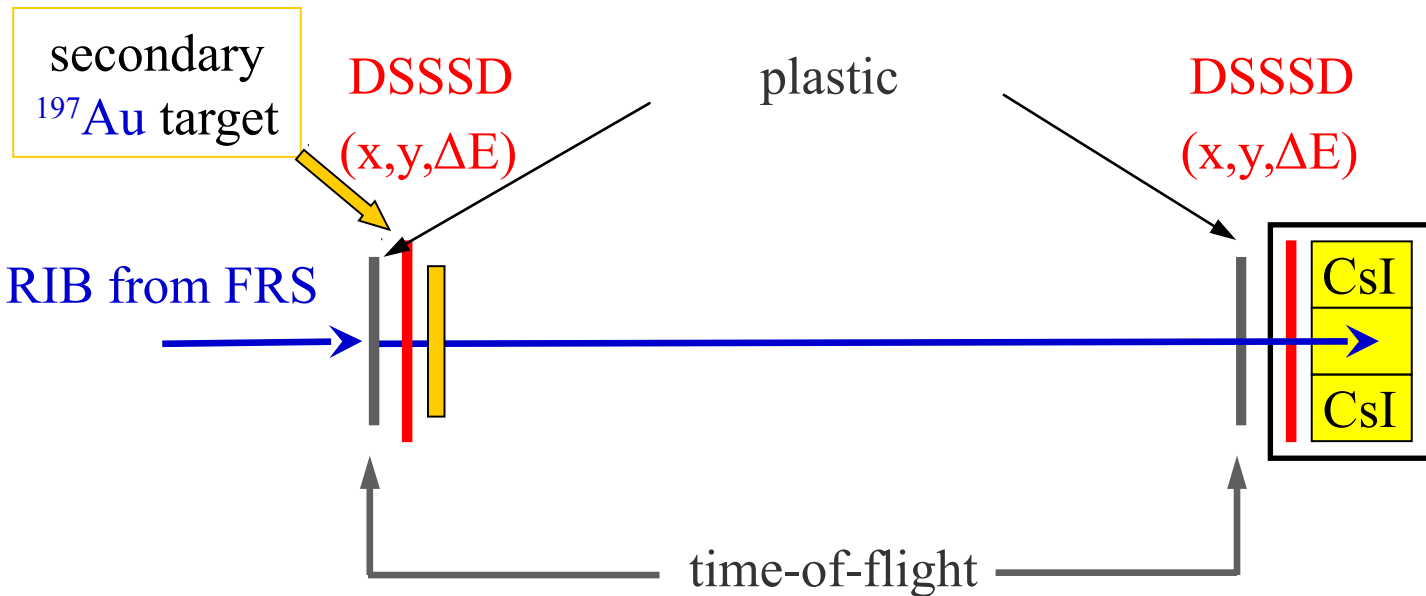


DSSSD wall



CsI wall

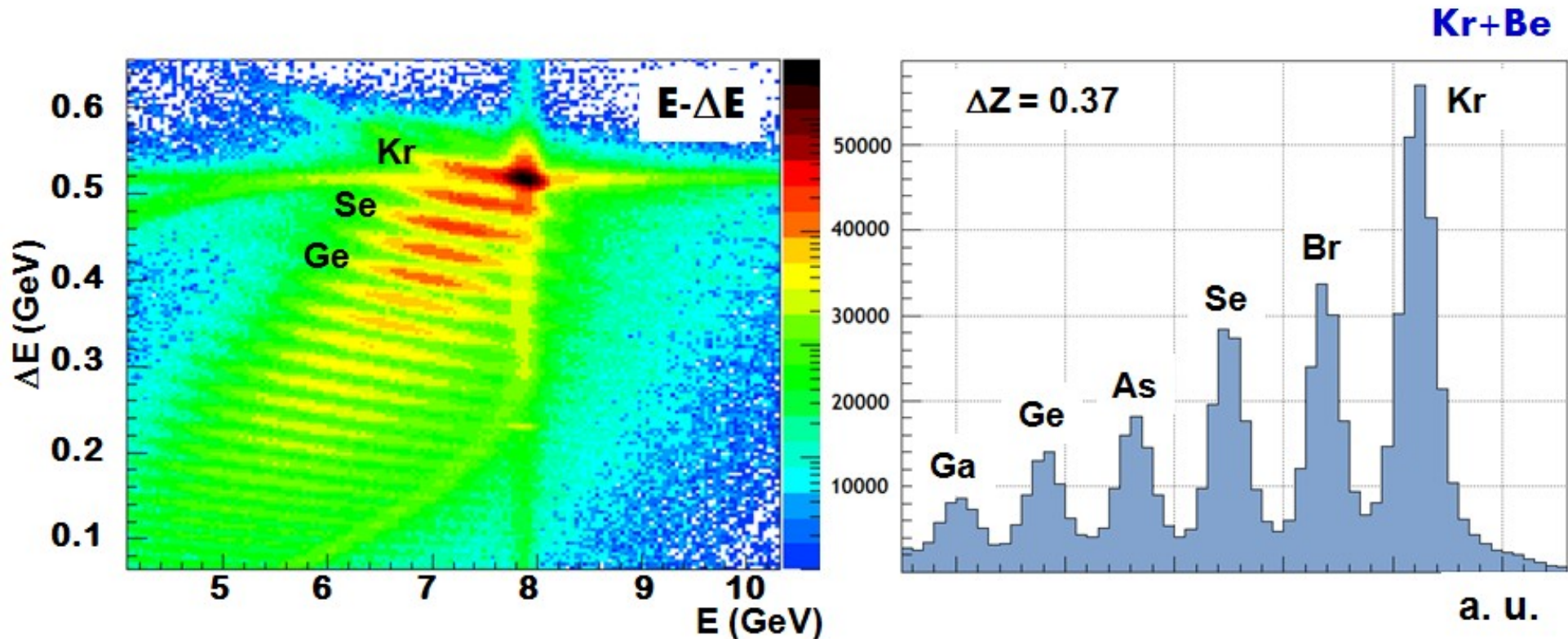
2 mm BC 420
 read with 32 PMT
 R.Hoischen(LUND), M.Reese(TUD)



P.Golubev(LUND), A.Went(IKP)

LYCCA performance

^{80}Kr at 150 MeV/u on ^9Be target (0.7g/cm^2), projectile fragmentation



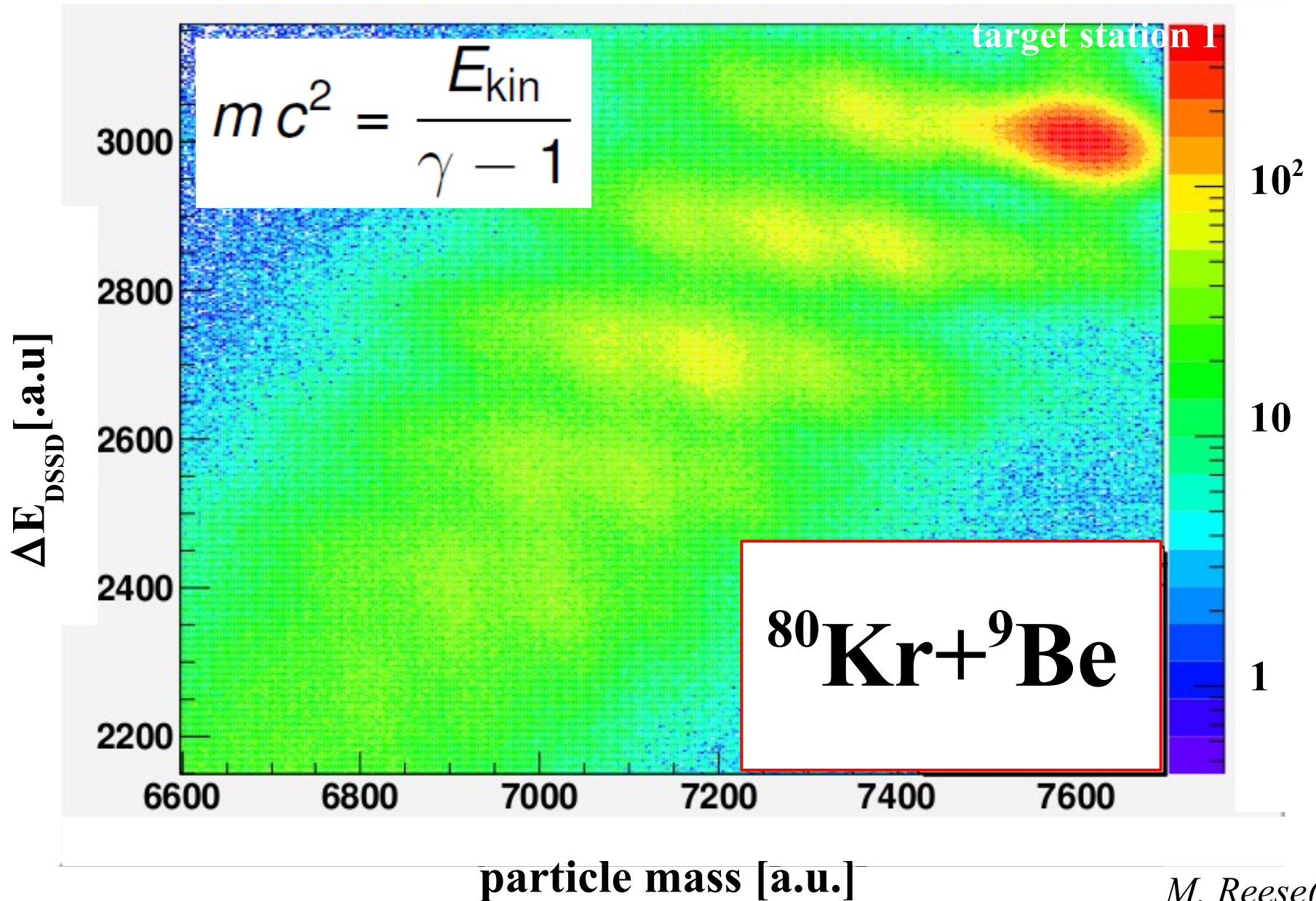
LYCCA Performance During the PreSPEC-AGATA Campaign

Pushpendra P. Singh^{1,*}, P. Golubev², D. Rudolph², for the PreSPEC-AGATA Collaboration

¹Technische Universität Darmstadt, Germany; ²Lund University, Sweden

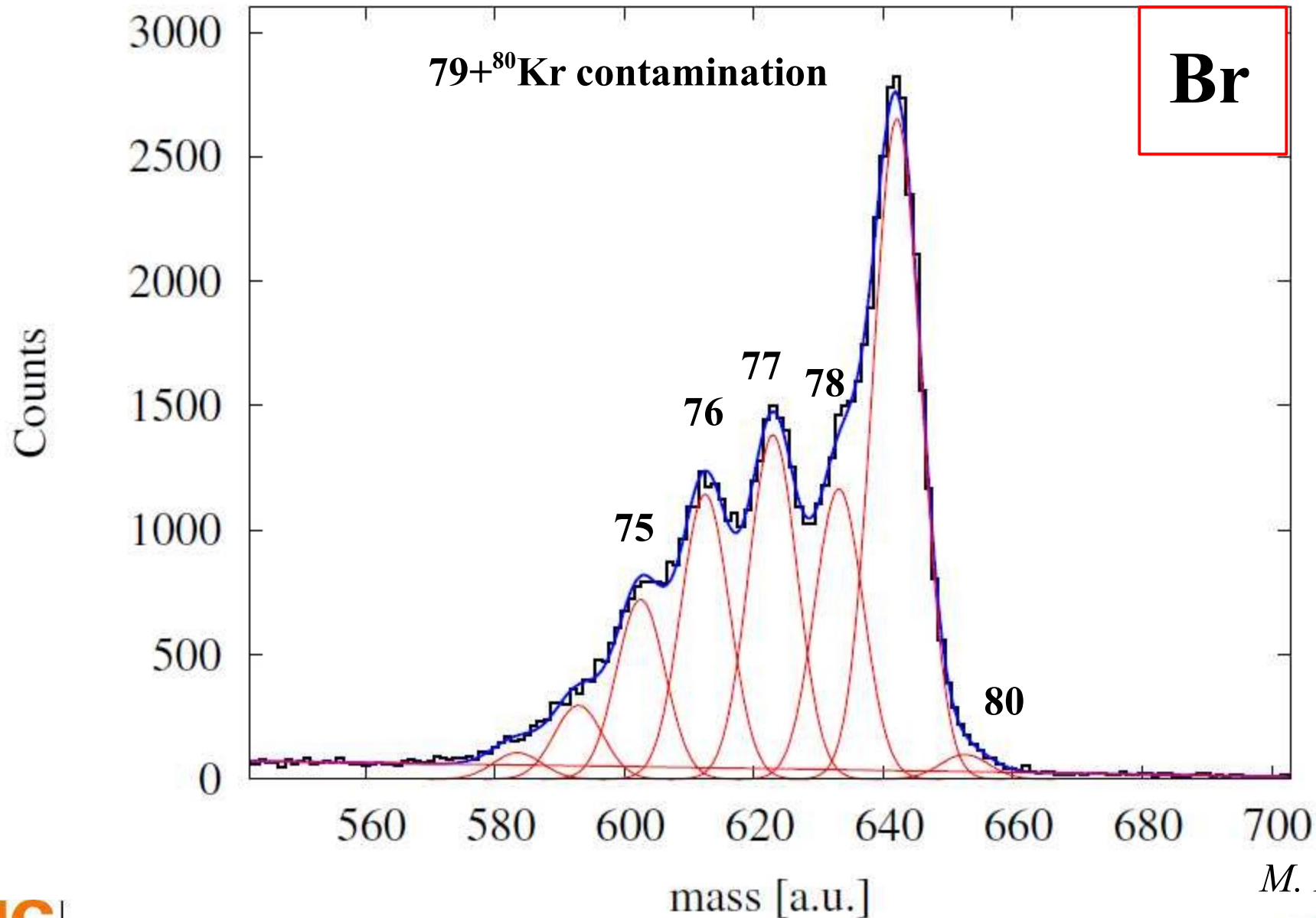
GSI Report, 2012

LYCCA Mass resolution



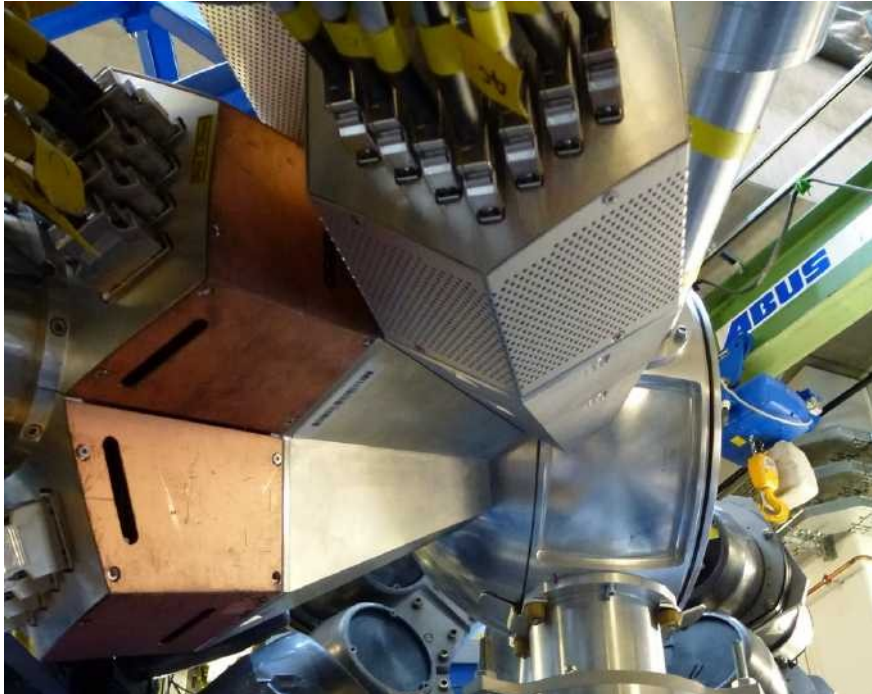
M. Reese(TUD)

LYCCA Mass resolution

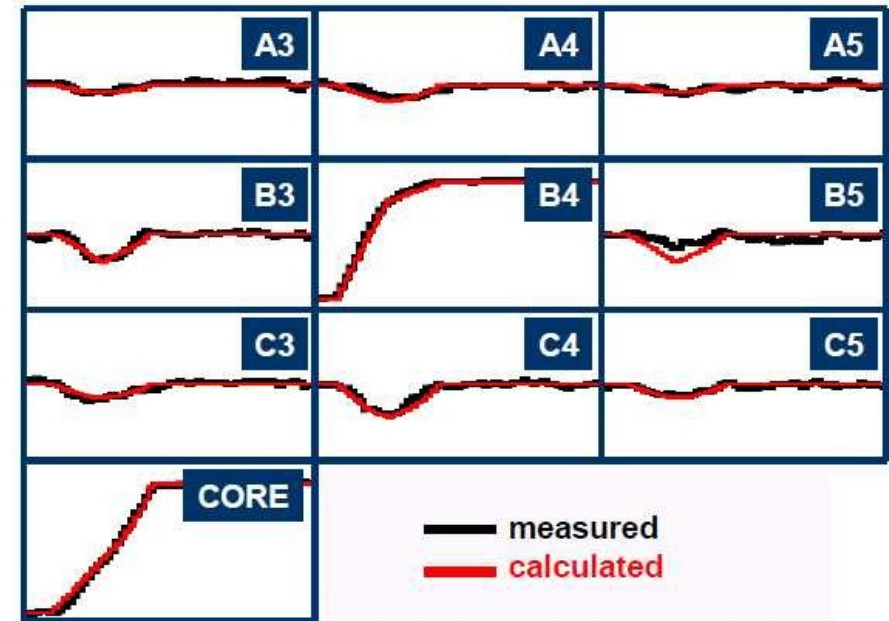
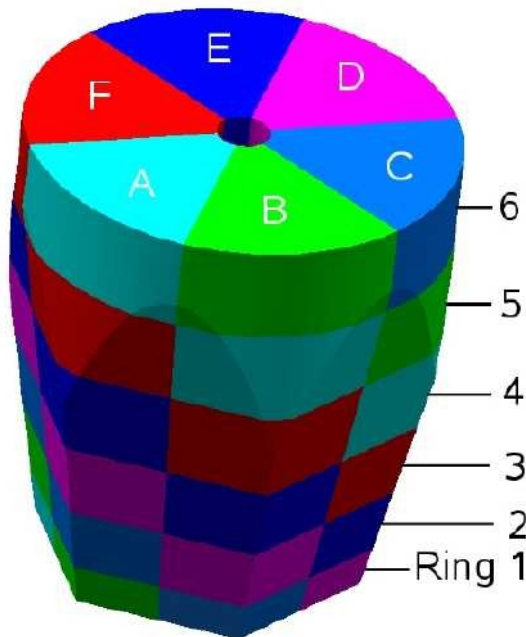


M. Reese(TUD)

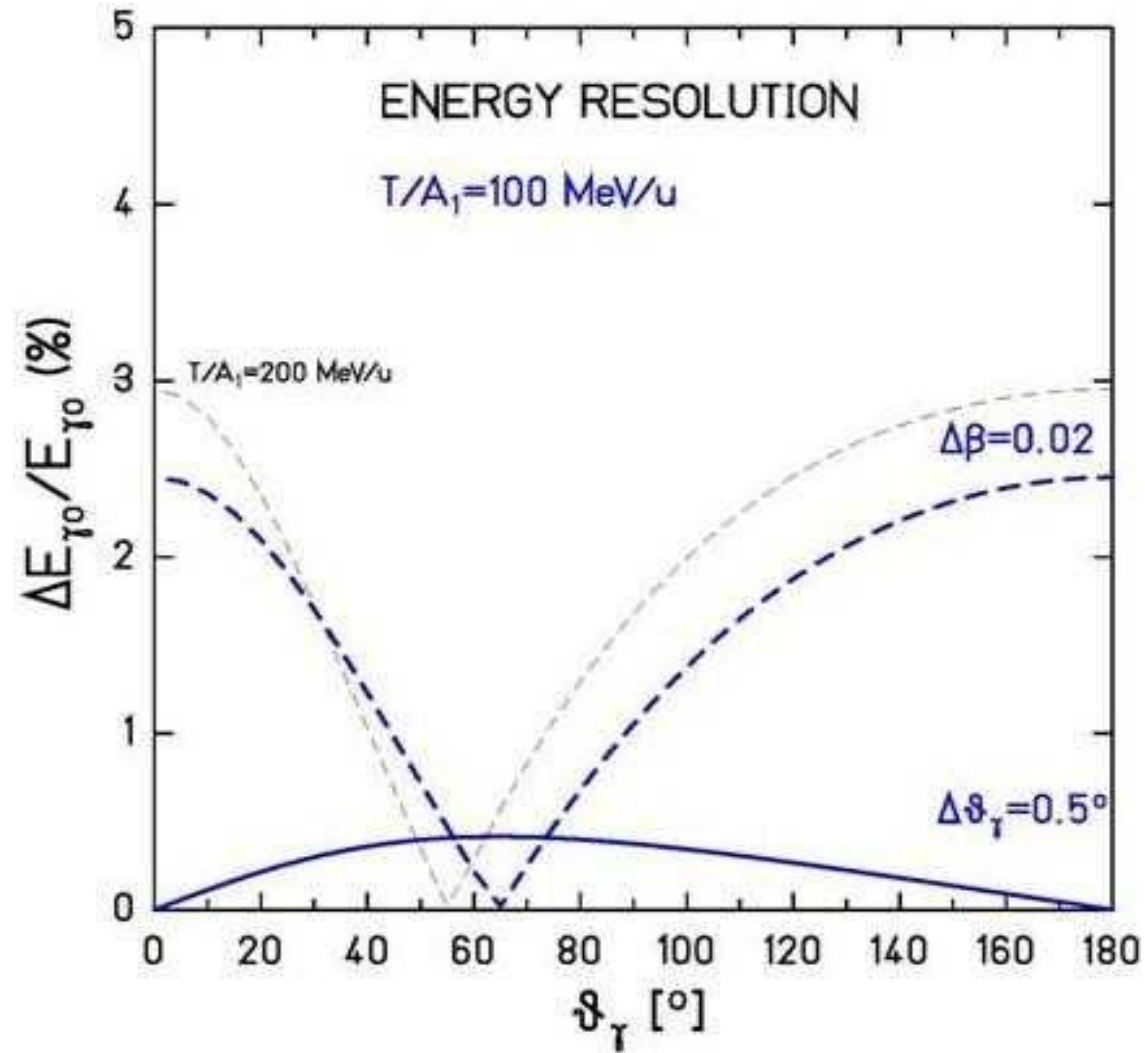
Single AGATA detector



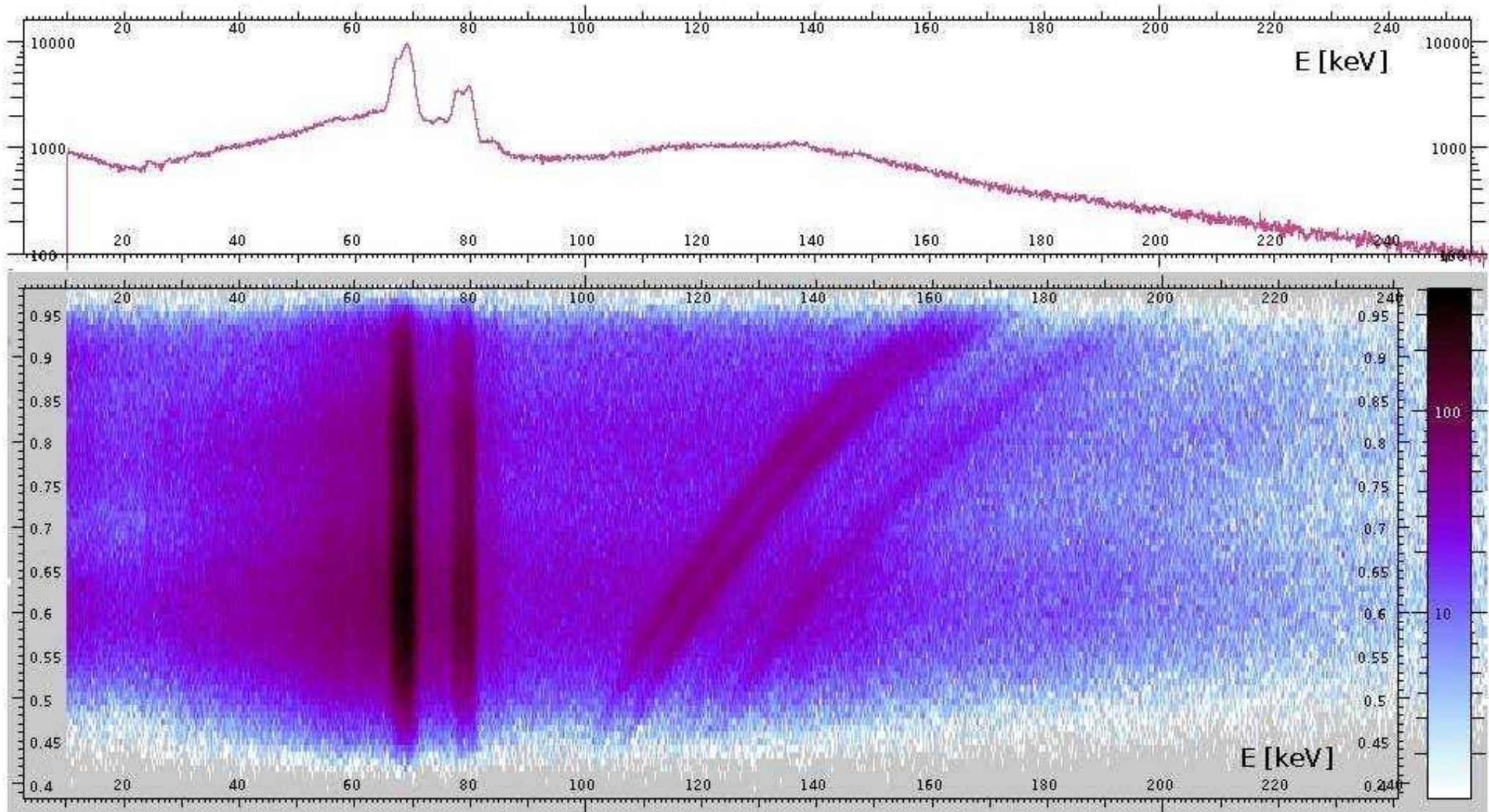
Signals from 36 segments + core are measured as a function of time (γ -ray interaction point)



AGATA energy resolution

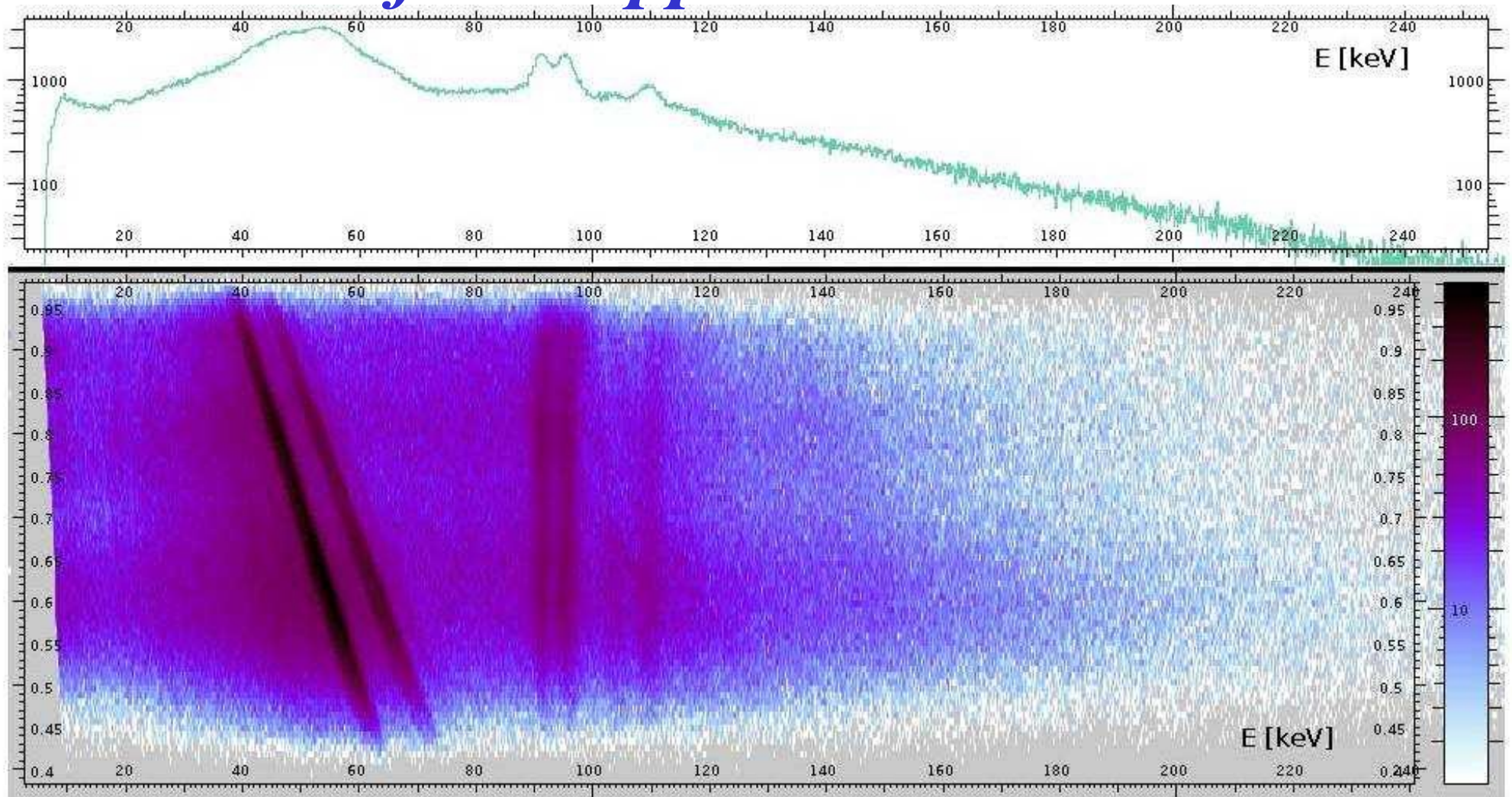


^{238}U on ^{197}Au at 180 MeV/u

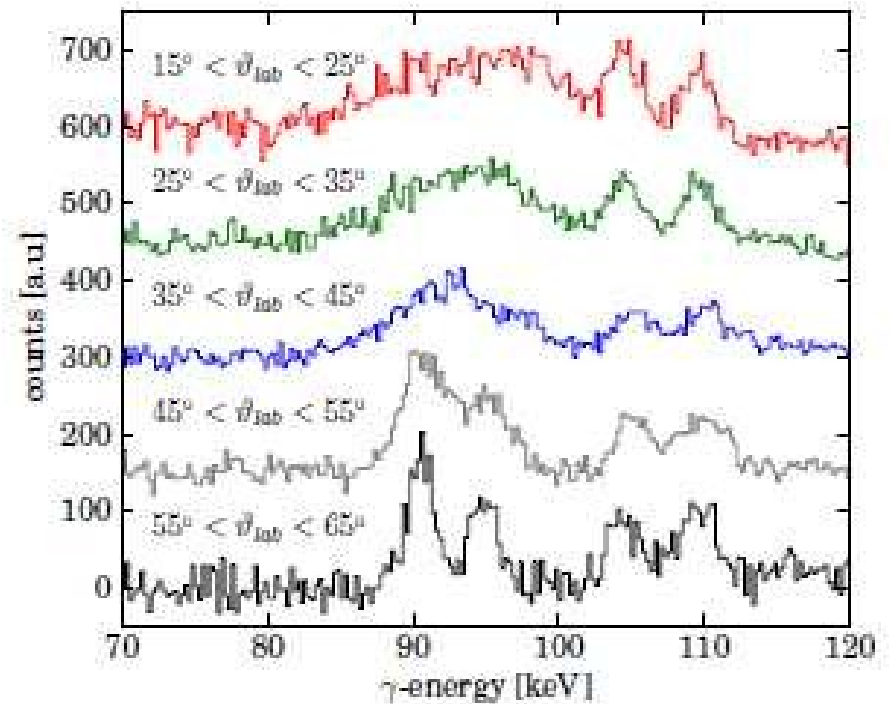
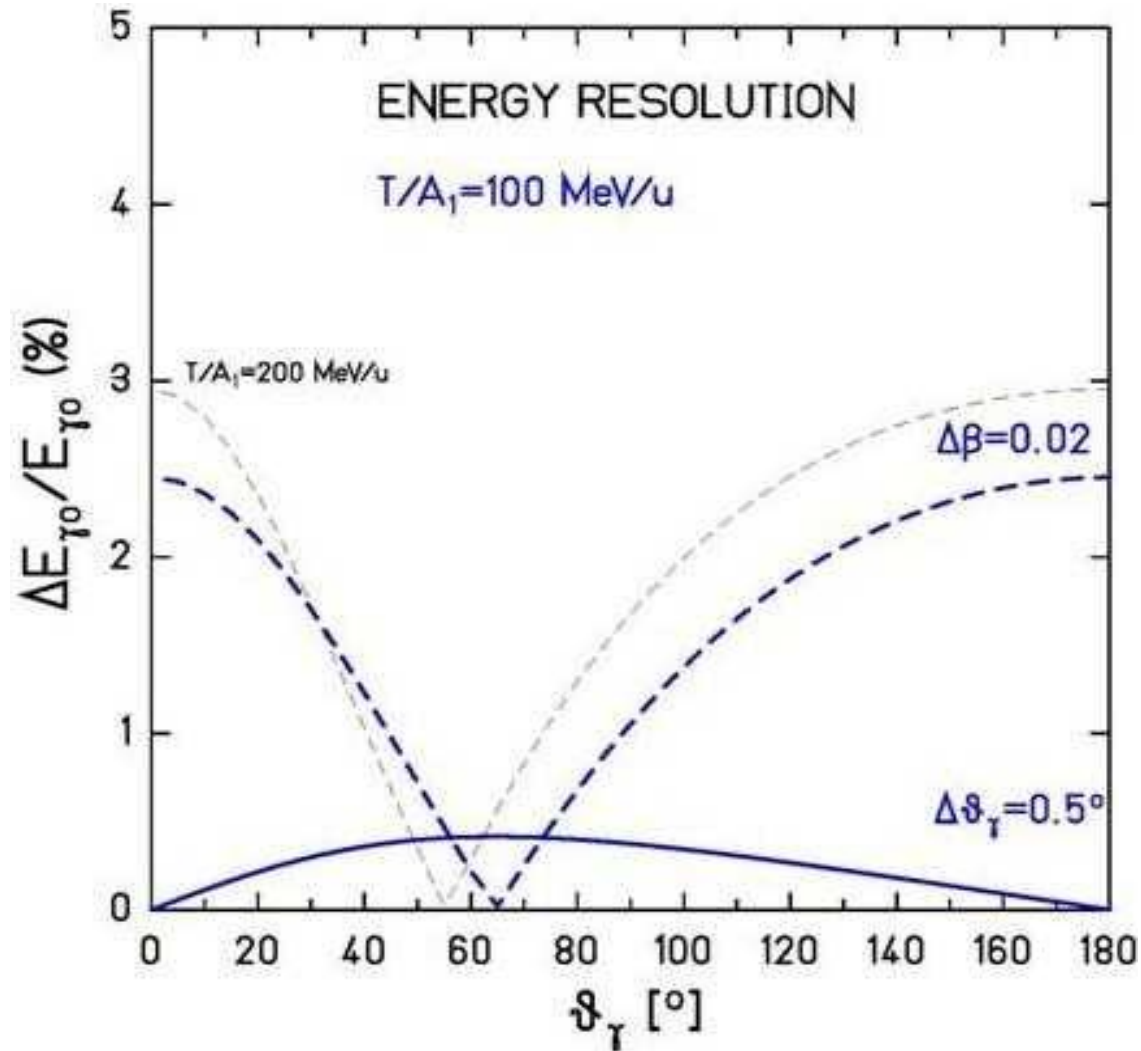


M. Reese (TUD)

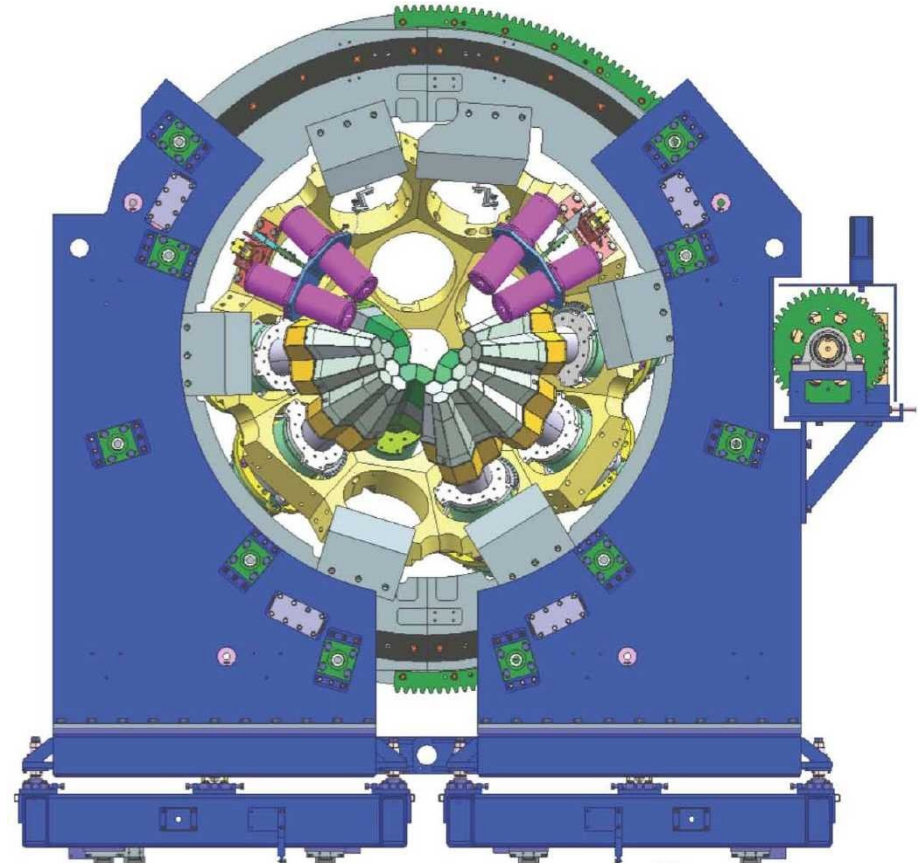
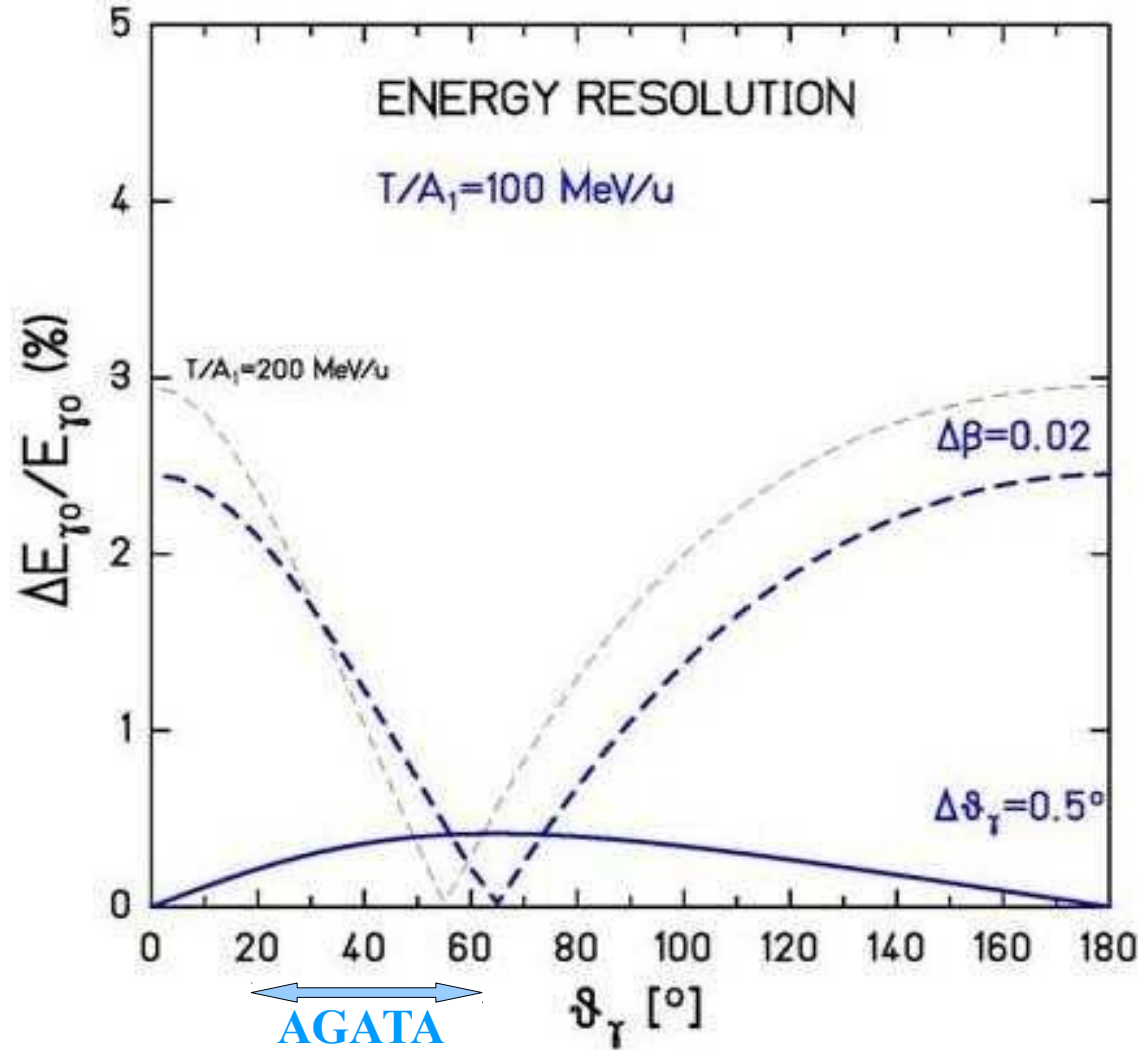
^{238}U on ^{197}Au at 180 MeV/u after Doppler correction



AGATA energy resolution

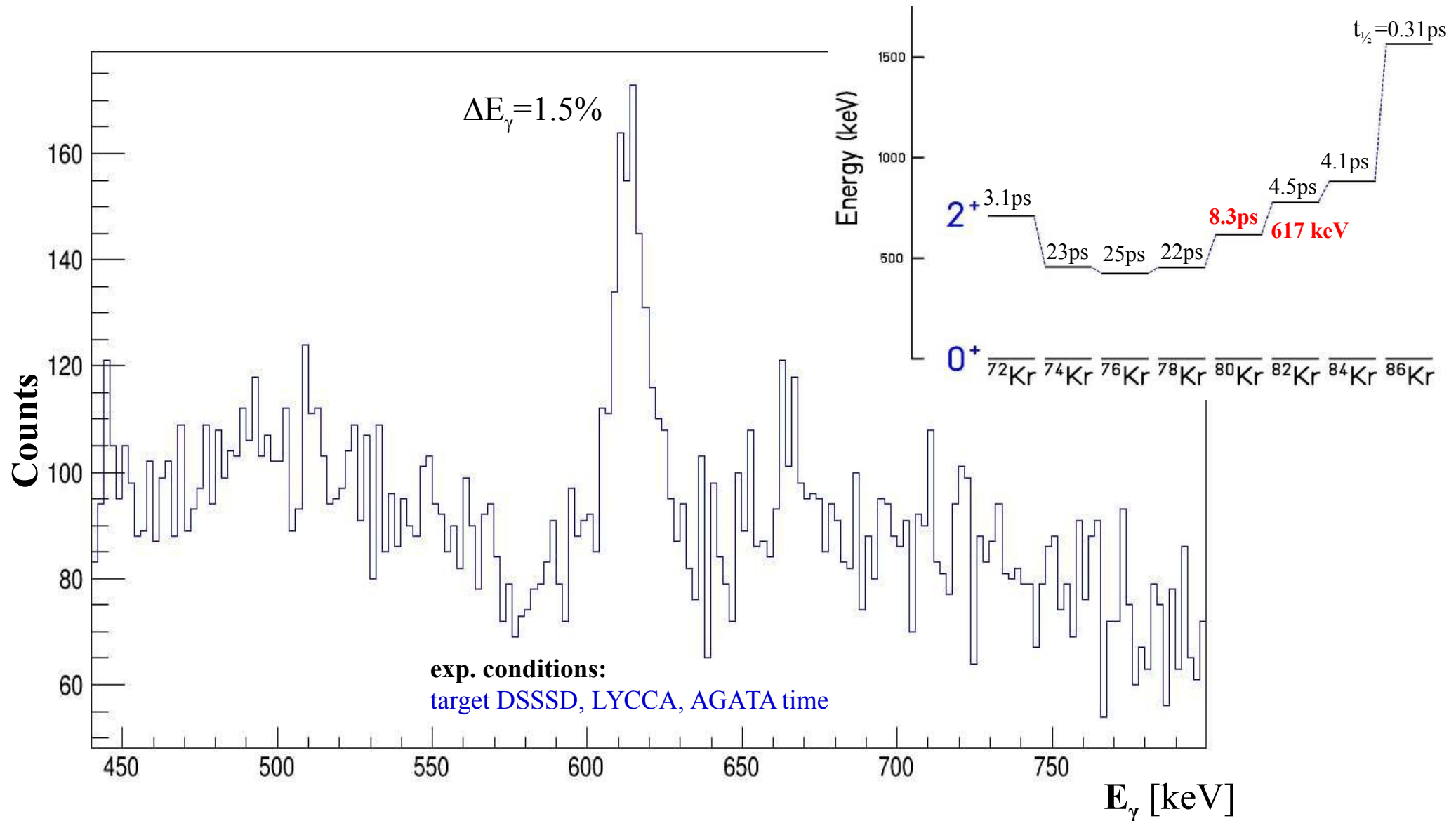


AGATA energy resolution



Coulomb excitation: $^{80}\text{Kr} + \text{Au}$

Au: $400 \text{ mg/cm}^2 (0.2 \text{ mm})$

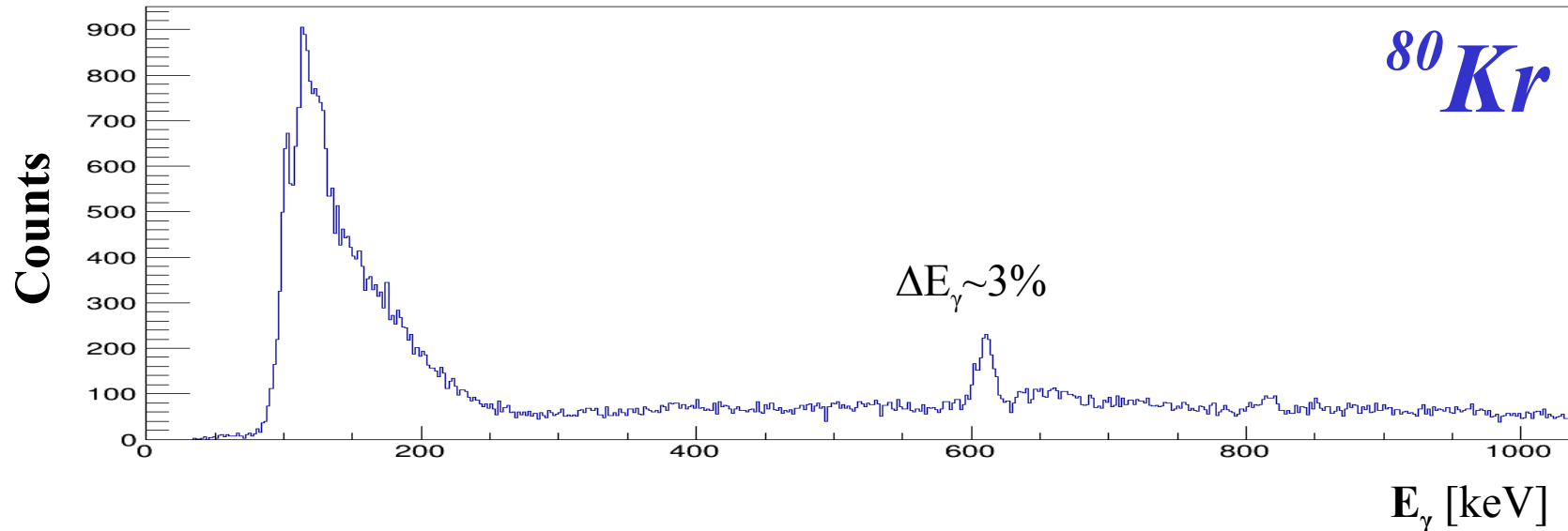
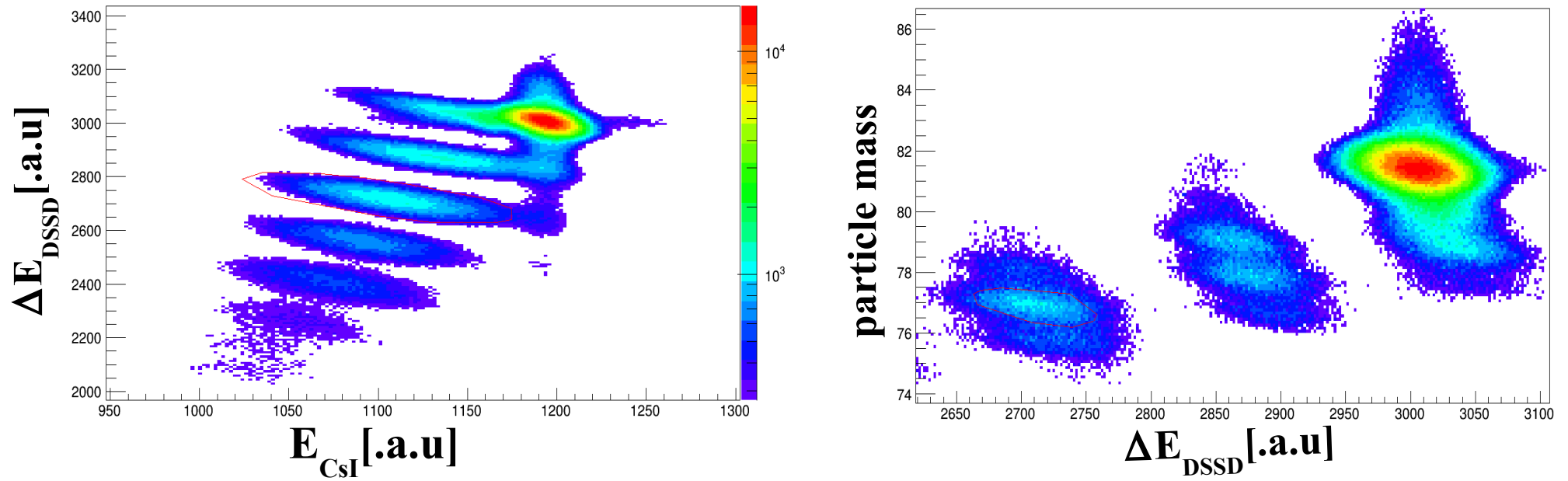


N. Goel (GSI) et. al.

Oct 2013

$^{80}\text{Kr} + \text{Be}$

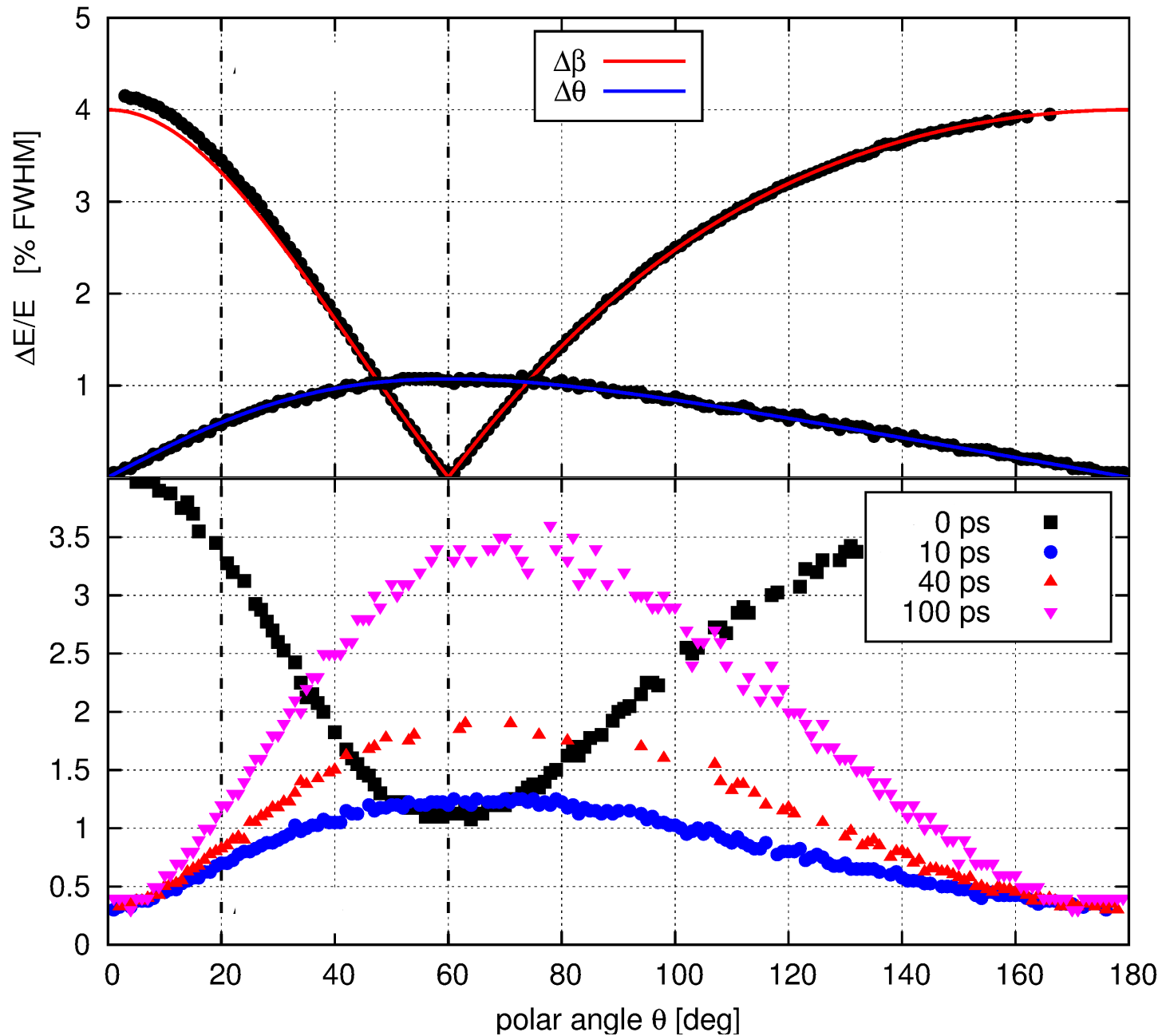
Be: $700 \text{ mg/cm}^2 (3.8 \text{ mm})$



N. Goel (GSI), M. Reese (TUD)

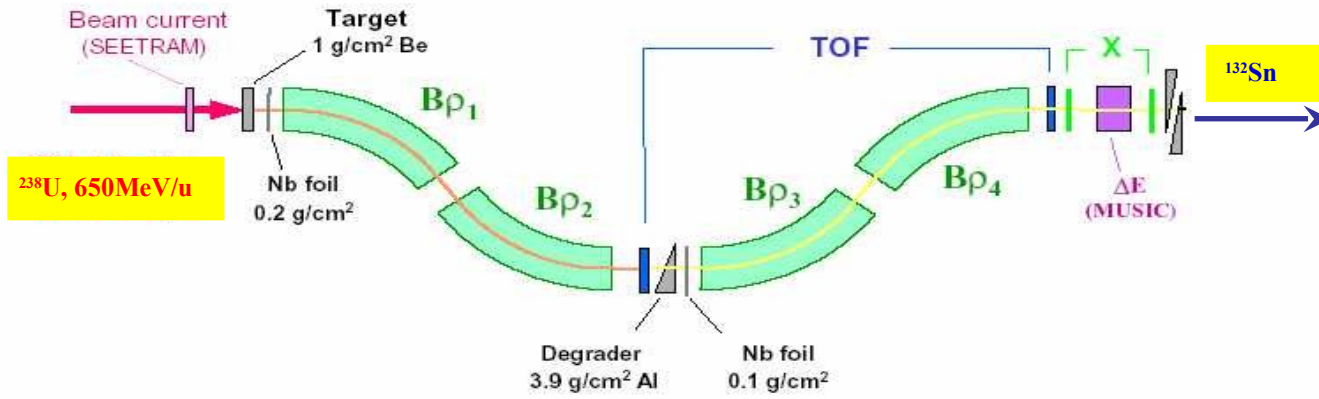
Oct 2013

AGATA energy resolution

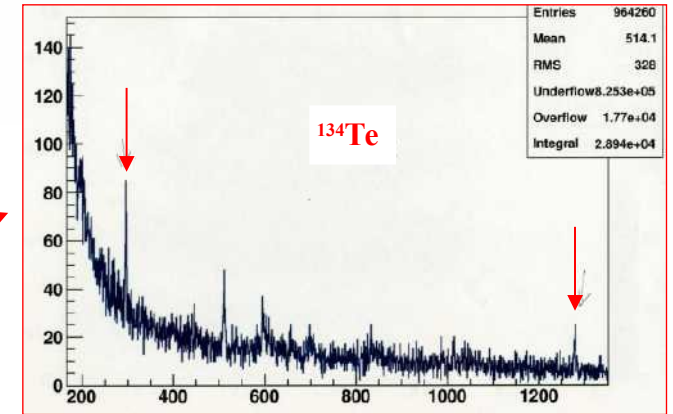


M. Reese (TUD)

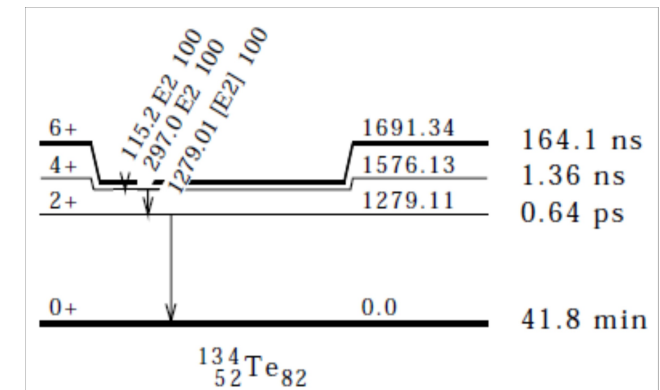
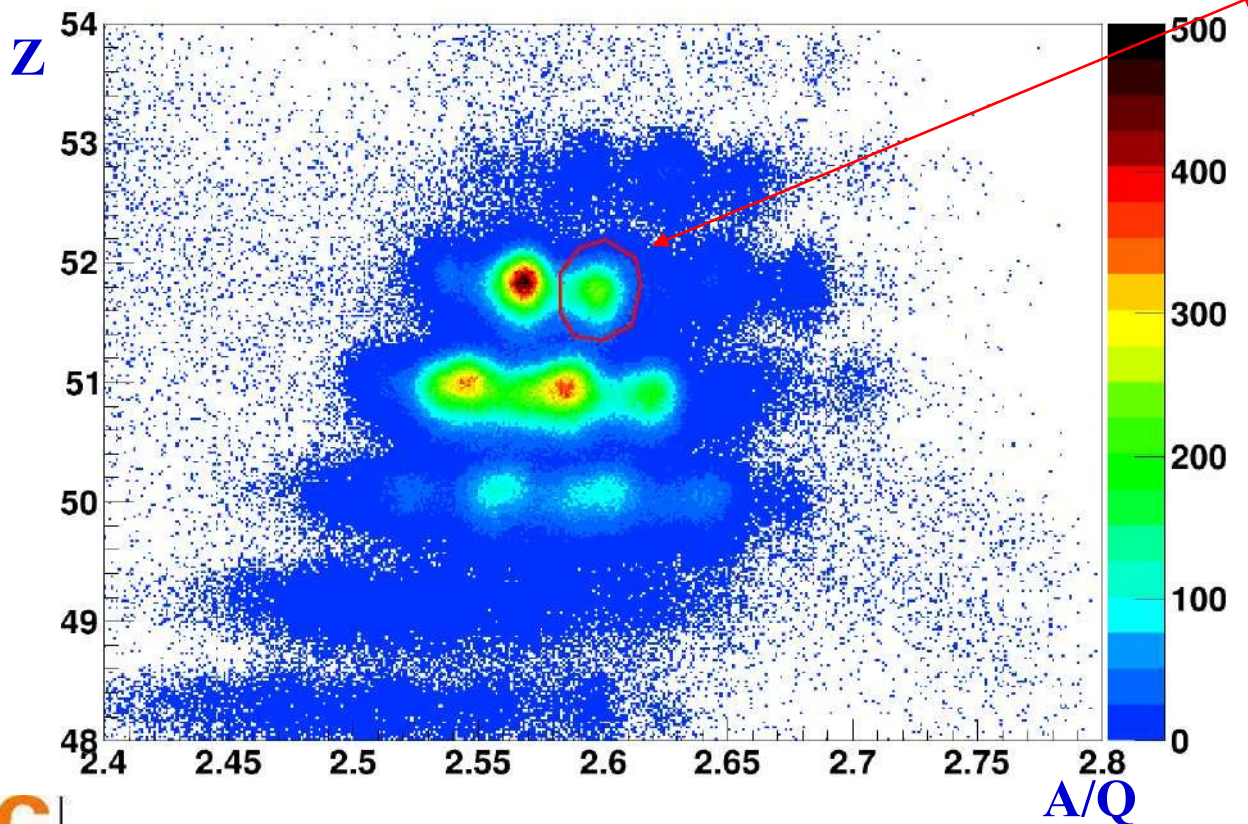
Scattering experiment at 100 MeV/u



AGATA spectrum



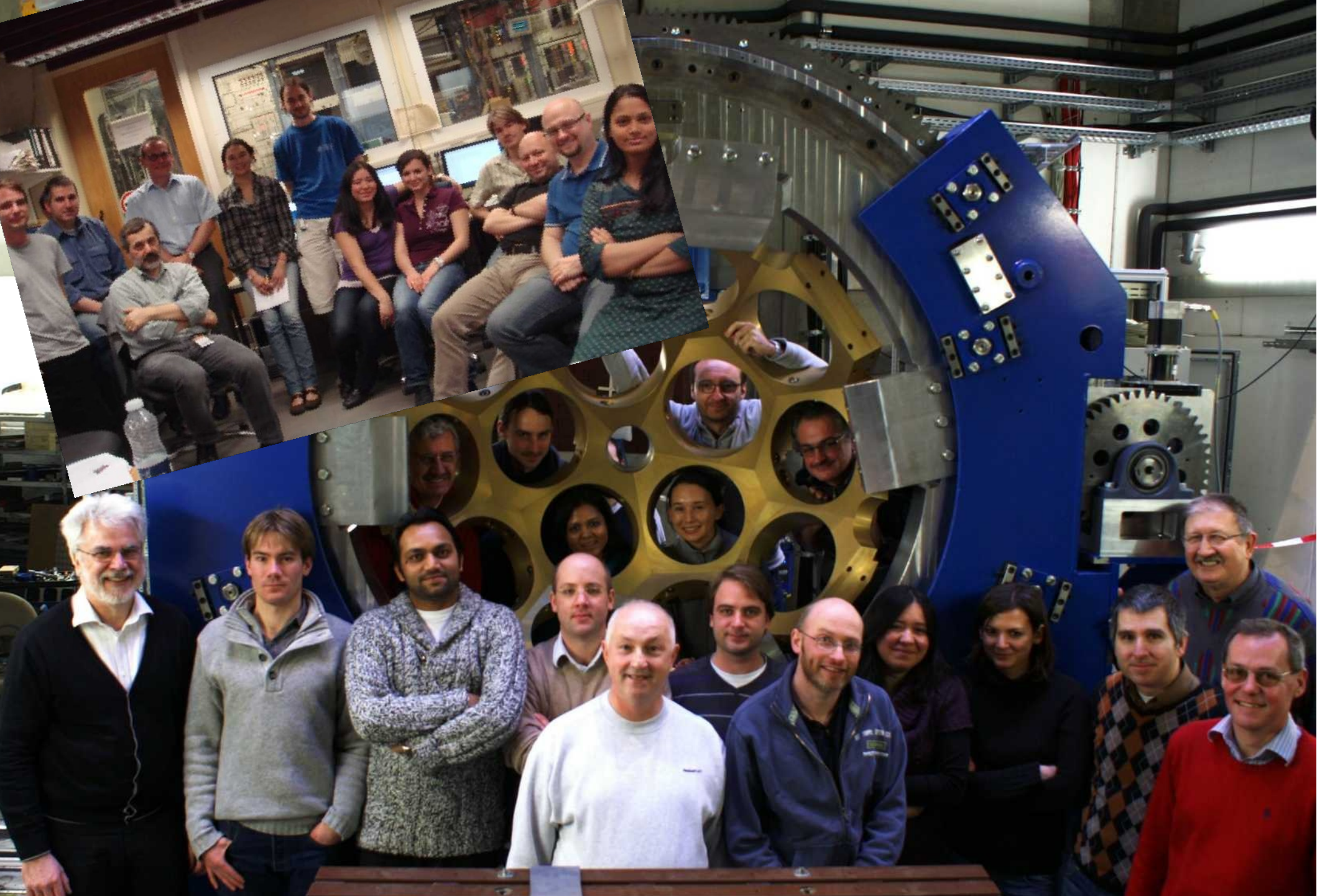
isotope identification



Science Campaign



- S424: Korten/Gerl**
Performance commissioning (PreSPEC-AGATA- LYCCA)
- S429: Rudolph / Podolyák / Gerl**
Quadrantic evolution of collectivity around ^{208}Pb
- S430: Wieland / Gorská**
Pygmy Dipole Resonance in ^{64}Fe and the properties of neutron skin
- S426: Pietralla / Rainovski / Gerl**
Relativistic *M1*-Coulomb excitation of ^{85}Br
- S433: Gadea / Gorská**
Coulomb excitation of the band-terminating 12^+ yrast trap in ^{52}Fe
- S431: Boutachkov / Korten**
Proton hole states in ^{132}Sn and $N=82$ shell structure
- S428: Pietri**
Shape evolution in neutron-rich Zr
- S427: Sahin / de Angelis**
Study of the $T_z=-1$ nucleus ^{70}Kr (isospin symmetry $A=70$)
- S434: Recchia / Bentley**
Transition rates and mirror energy differences in isobaric multiplets



Ivan Kojouharov, Michael Reese, Namita Goel, Liliana Cortes, Frederic Ameil, Bogdan Szczepanczyk
H.-J. W., Damian Ralet, Pushpendra Singh, Stephane Pietri, Tobias Habermann, Edana Merchan, Giulia Guastalla, Plamen Boutachkov, Adolf Brünle,
Ian Burrows, Jonathan Strachan, (Paul Morral), Jürgen Gerl, (Henning Schaffner, Magda Gorska)