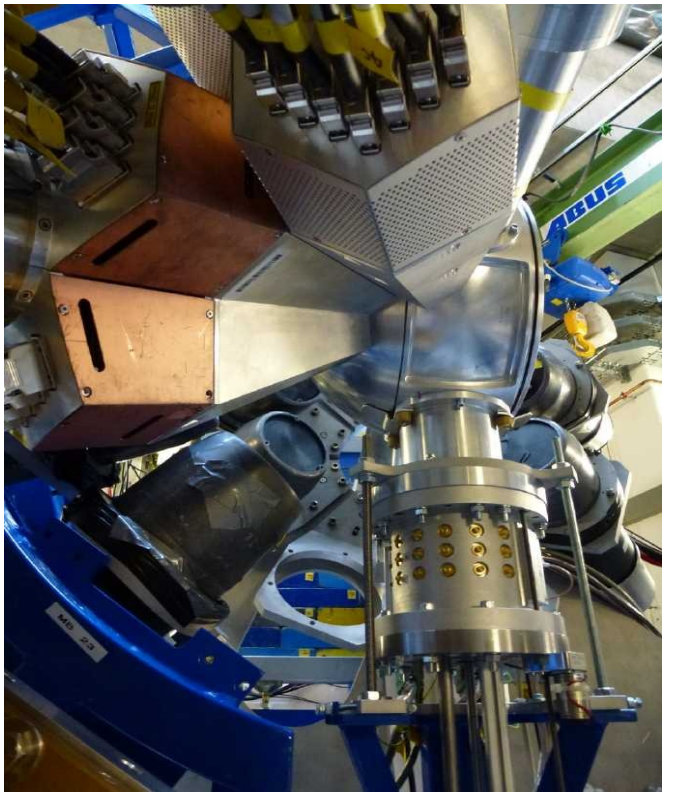
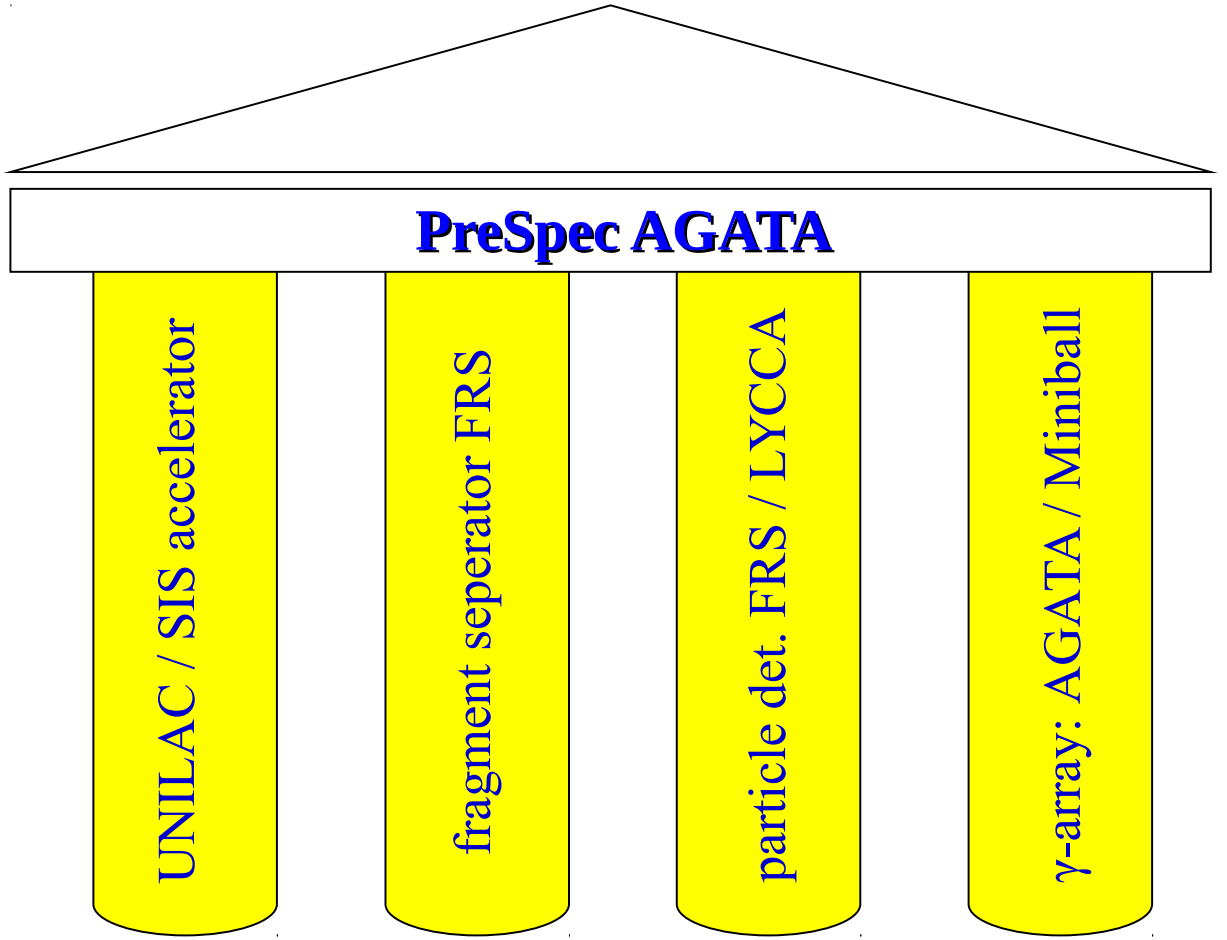
PRESPEC-AGATA Commissioning

P. Boutachkov
GSI
for the PreSPEC-AGATA collaboration

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





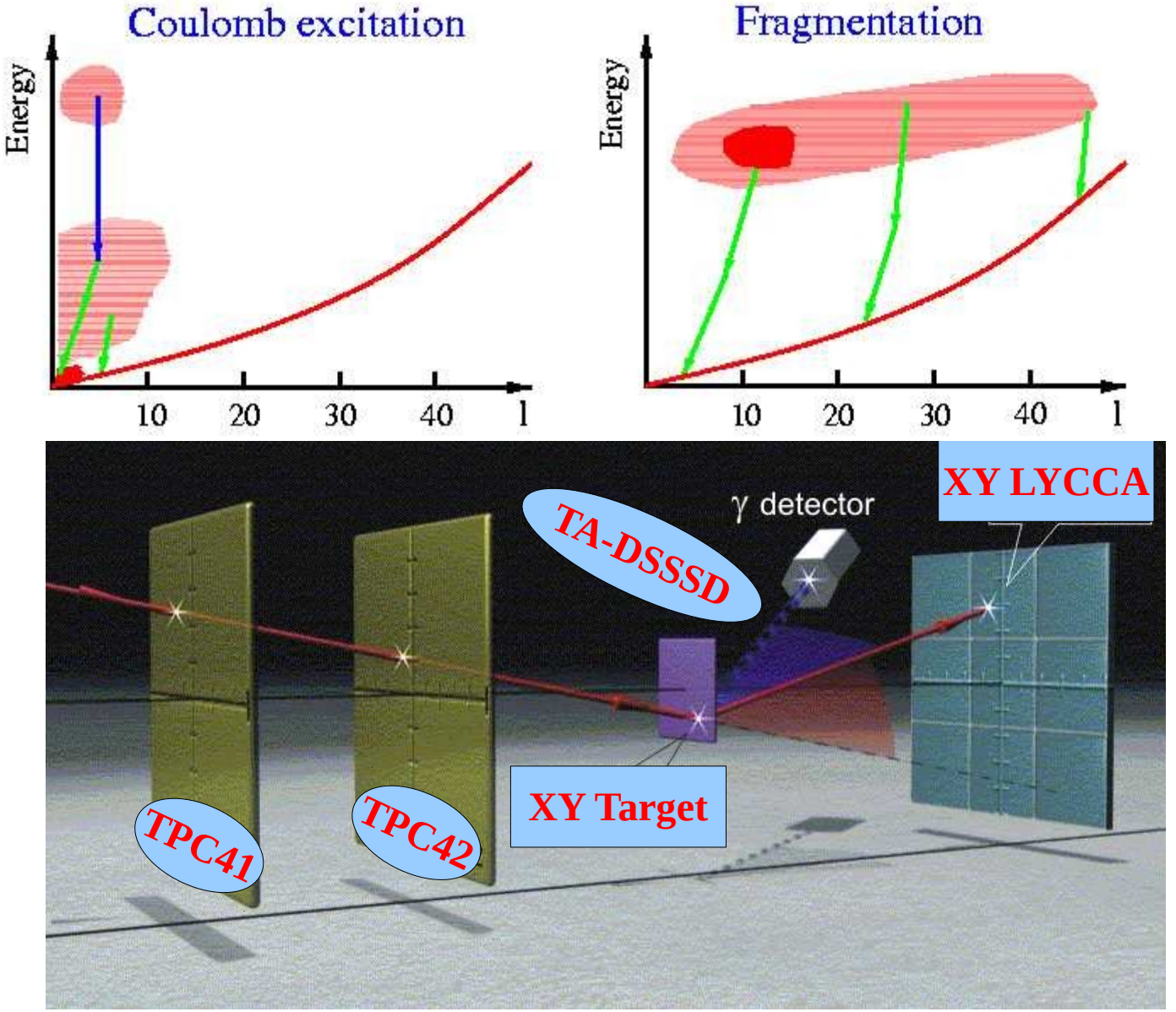
^{58}Ni: 10^{10} /spill
^{86}Kr:10^{10} /spill
^{136}Xe: 5x10^{9} /spill
^{208}Pb,^{238}U: 10^{9} /spill

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

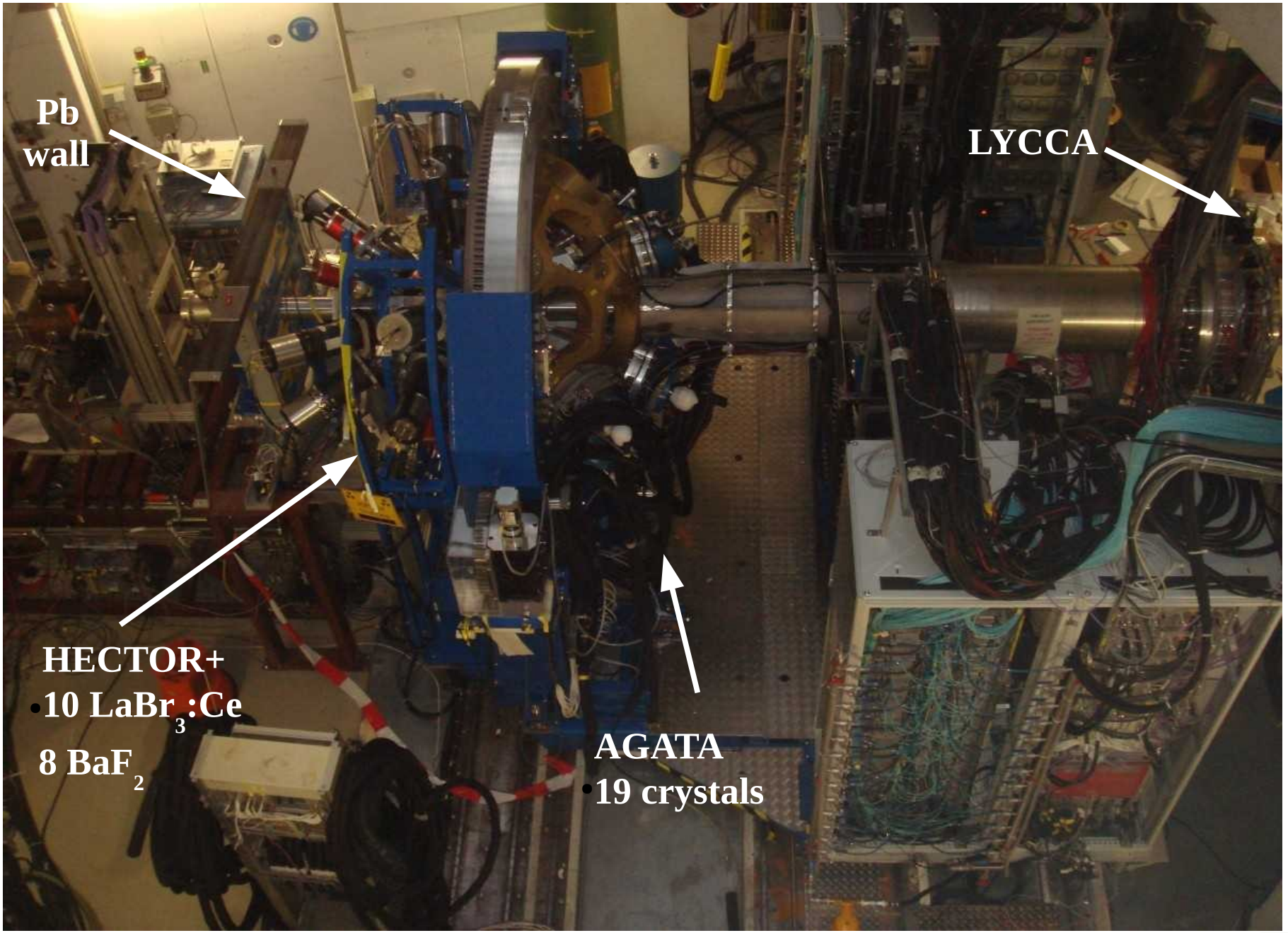
A and Z
ΔE: ~1 GeV
^{131}Sn ^{132}Sn

ε_{γ} : ~11%
ΔE: ~6 keV

Scattering experiment at relativistic energies



S4 Detectors



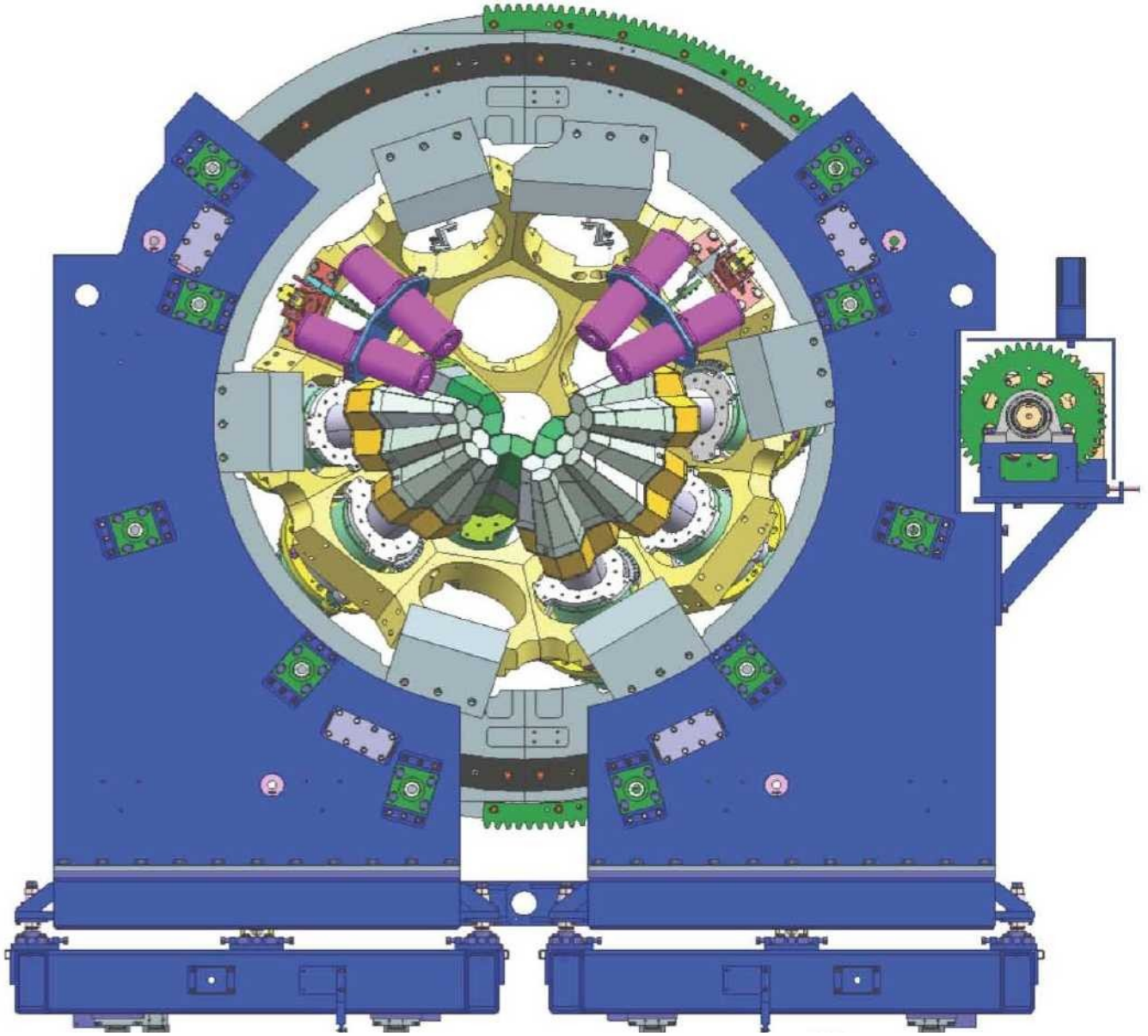
SPEC for NUSTAR

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+ BaF_2/$LaBr_3$

AGATA - efficiency ~5%

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
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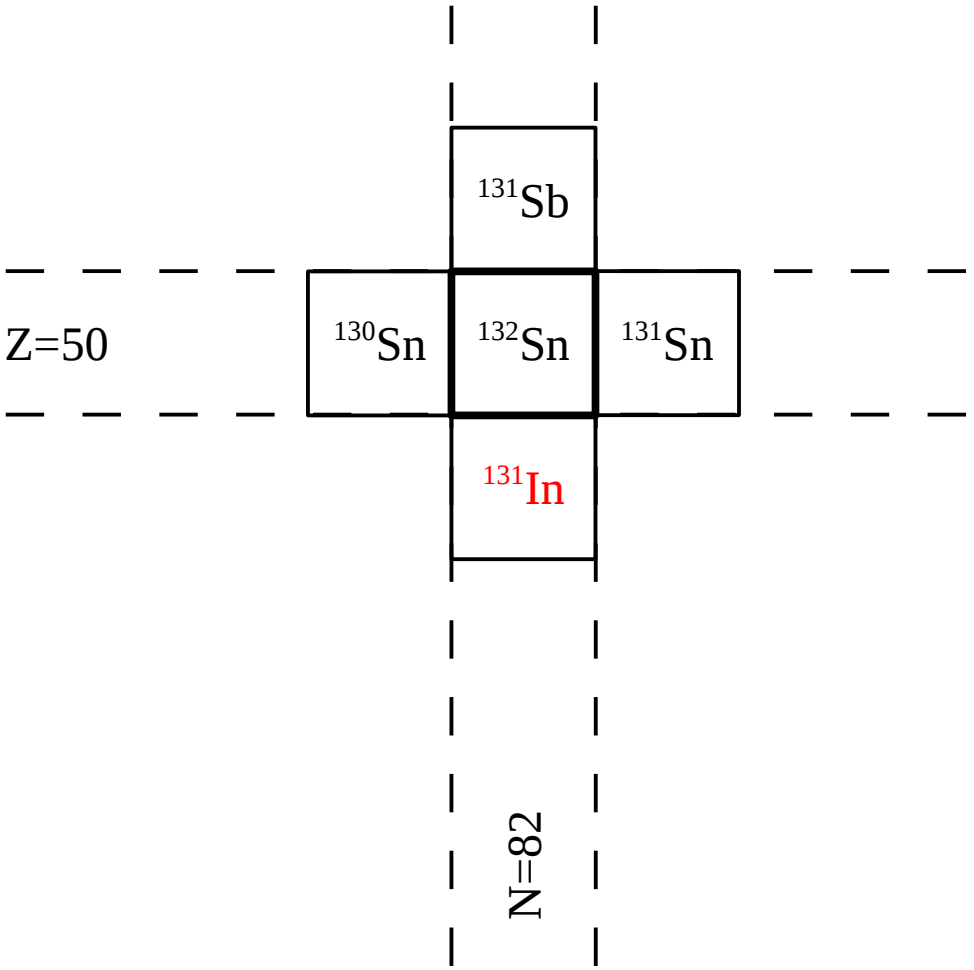
S431: Boutachkov / Korten
Proton hole states in ^{132}Sn and *N*=82 shell structure

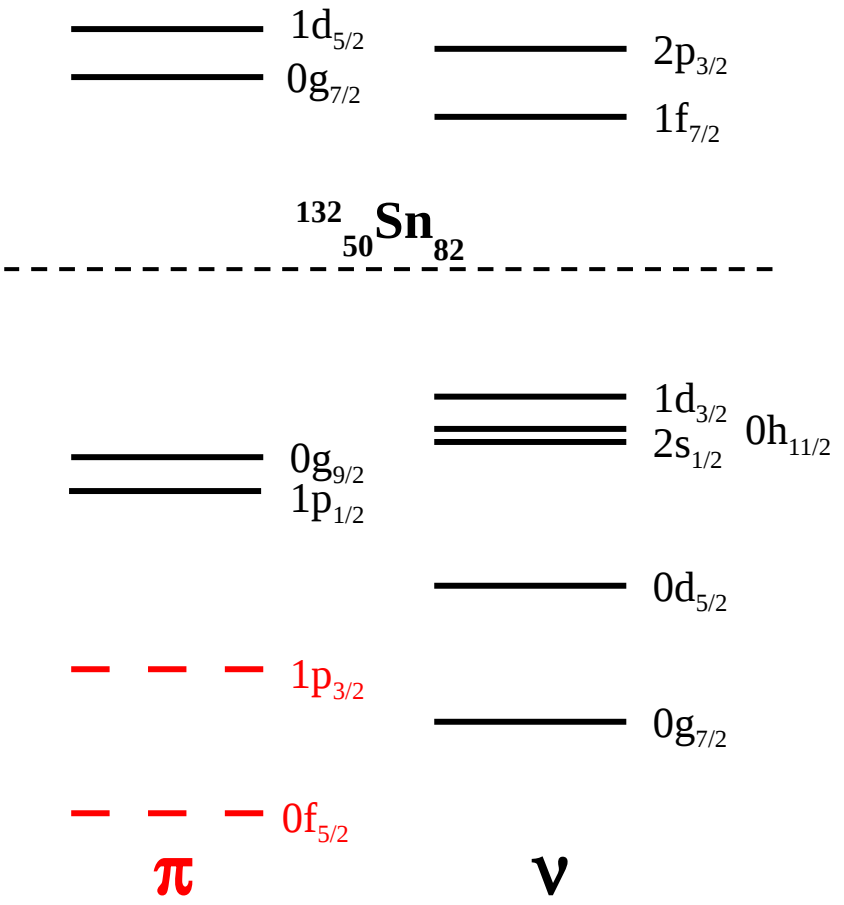
S428: Pietri
Shape evolution in neutron-rich Zr

S427: Sahin / de Angelis
Study of the Tz=-1 nucleus ^{70}Kr (isospin symmetry A=70)

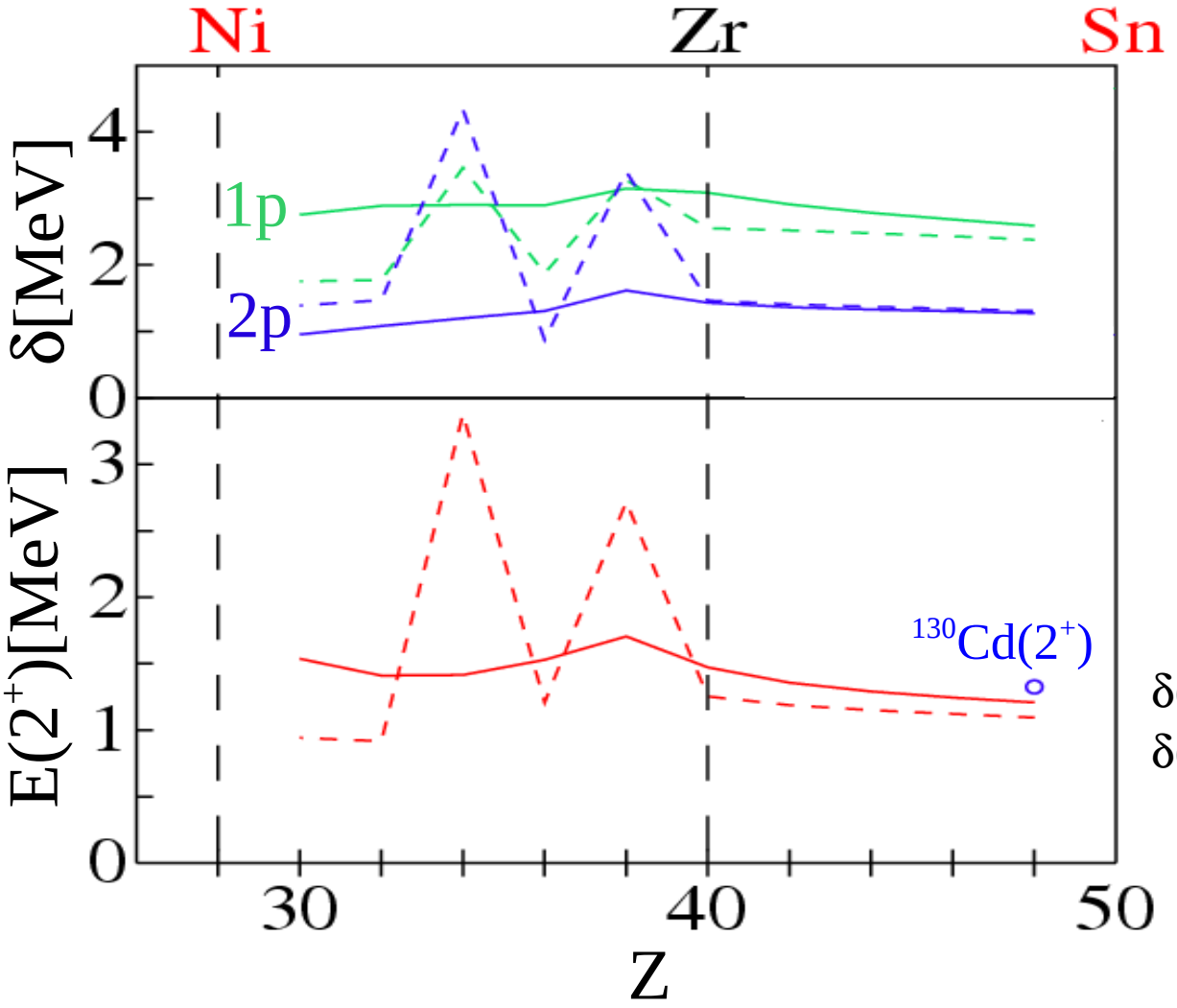
S434: Recchia / Bentley
Transition rates and mirror energy differences in isobaric multiplets

Key nuclei to study around ^{132}Sn





Evolution of the N=82 shell-gap



E_{sp}[MeV]	ENSDF	^{99}In ext
$g_{9/2}$	0	0
$p_{1/2}$	0.30	0.30
$p_{3/2}$	1.65	1.92
$f_{5/2}$	2.75	6.18

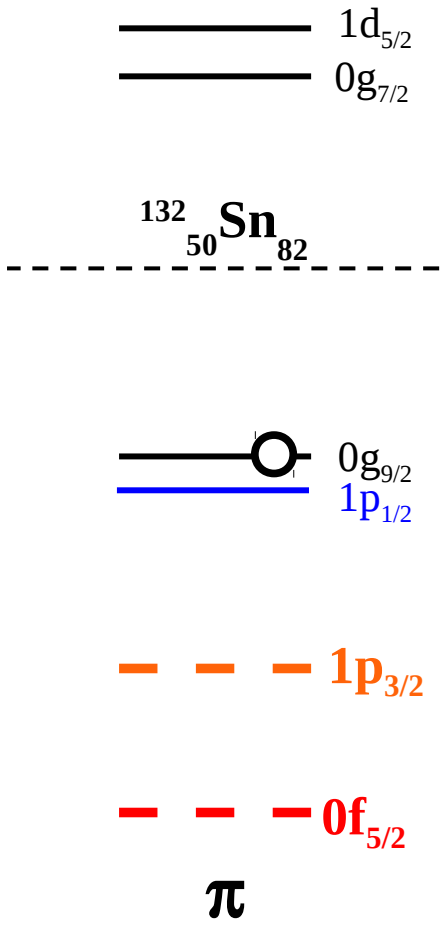
$\delta(1p,Z) = BE(Z+1)+BE(Z-1) - 2BE(Z)$

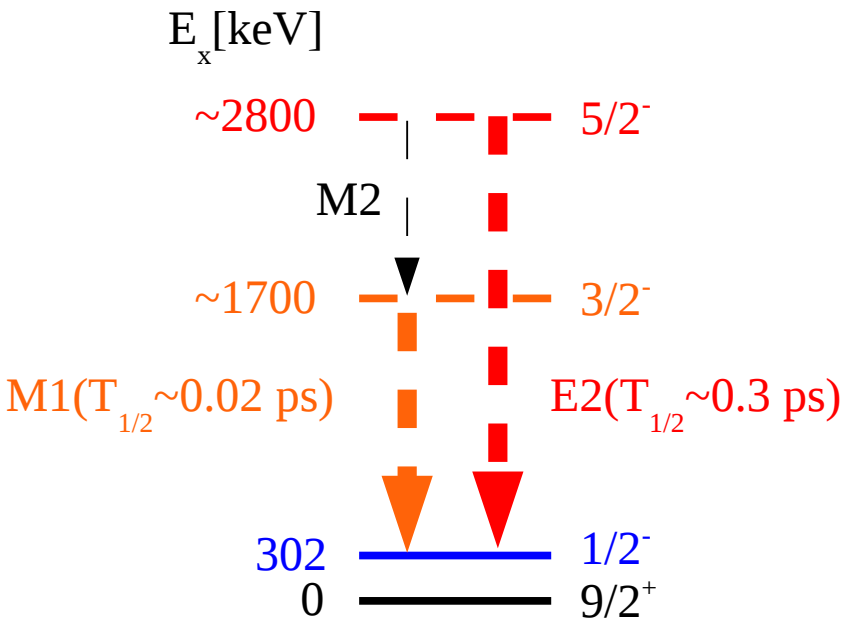
$\delta(2p,Z) = BE(Z+2)+BE(Z-2) - 2BE(Z)$

Shell Model Calculations: H.Grawe

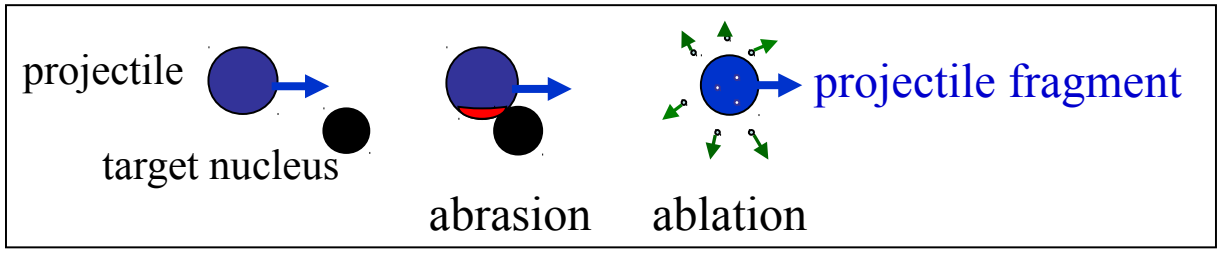
^{130}Cd(2^+): A. Jungclaus et al. PRL 99, 044314 (2004)

Expected level scheme of $^{131}_{49}In_{82}$



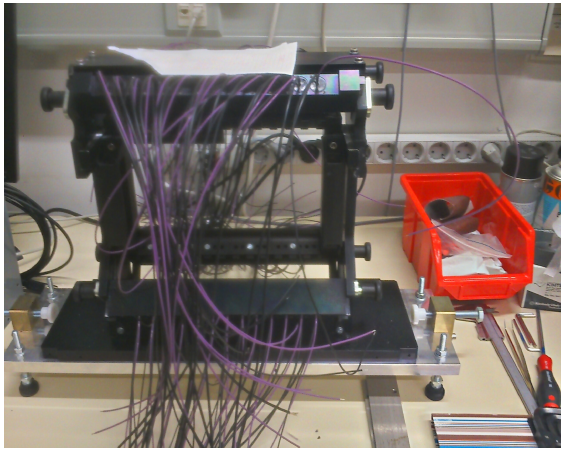


Production, Separation, Identification



Beam

Plastic scintillators
TOF (S2-S4)



Production target

Secondary target

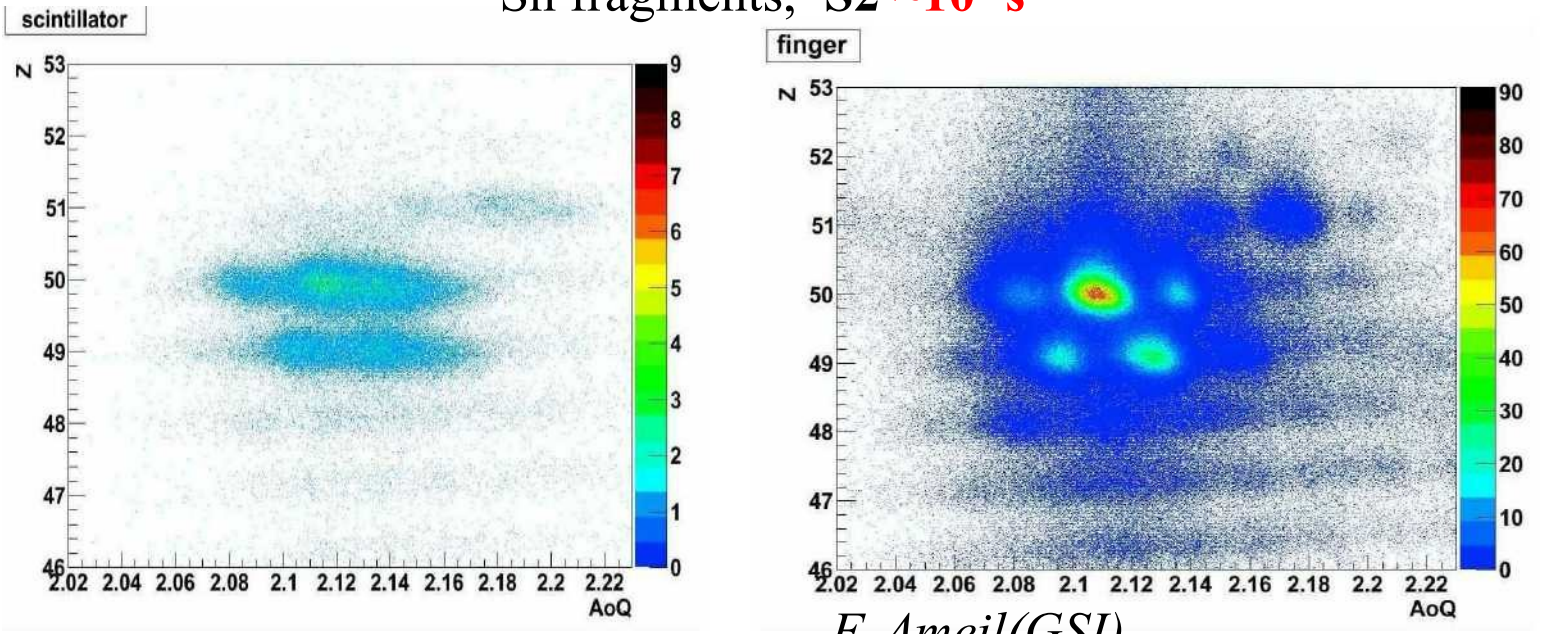
TOF → β

Trajectory reconstruction → ρ

Operation rates of tracking detectors

Detector	Max. Inst. Rate [pps]
X,Y: TPC	a few 10^5
dE: MUSIC detectors (S4)	$<2\times10^5$
TOF: Scintillators (S2)	$<10^6$
Finger Scintillator	a few 10^5 pps/cm
DSSSD	$< 10^5$

^{104}Sn fragments, **S2 ~10^6 s^{-1}**

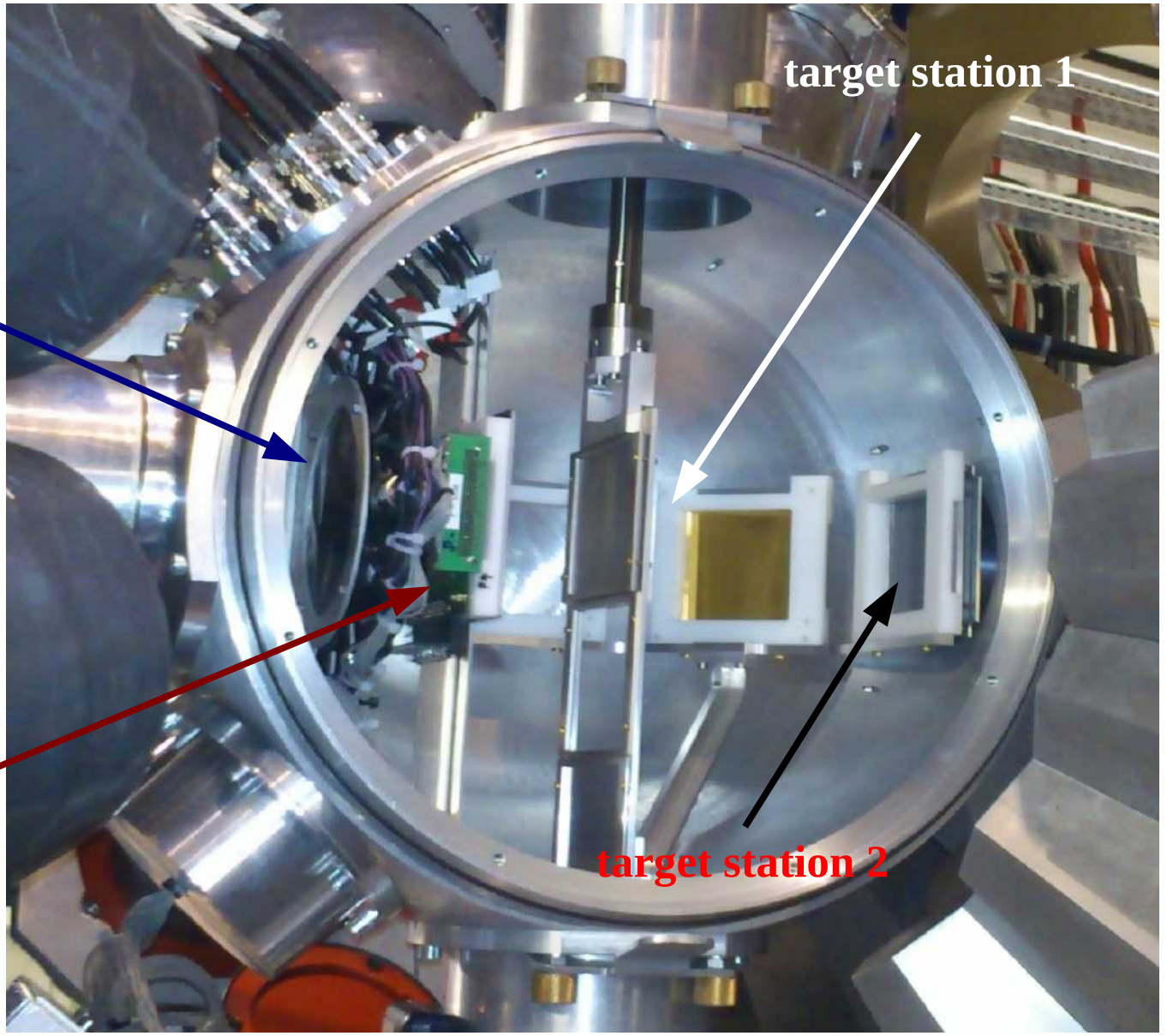


F. Ameil(GSI)

Scattering chamber

target-TOF-START
0.5 mm BC 420
12 PMT

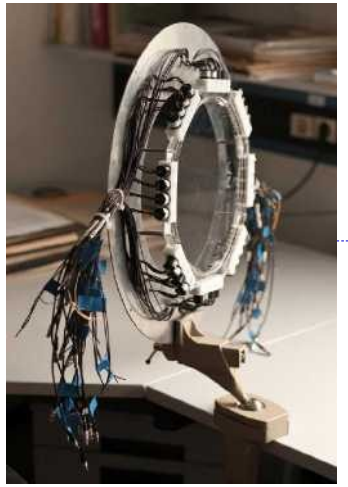
target-XY
DSSSD
58 x 58 mm²
32 x 32 strips



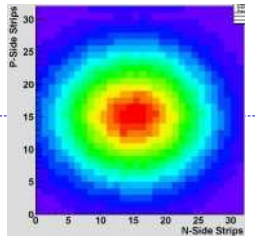
Lund-York-Cologne CAlorimeter

THE UNIVERSITY of York

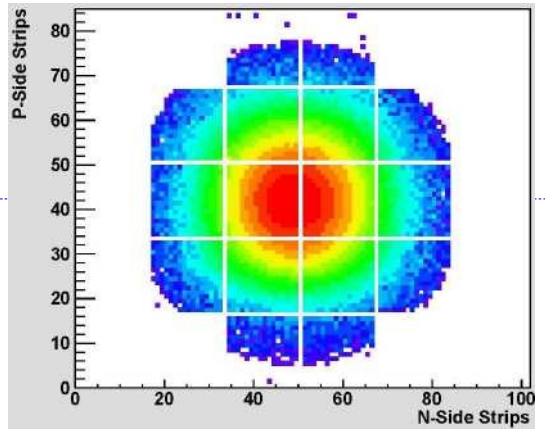
SPEC for NUSTAR



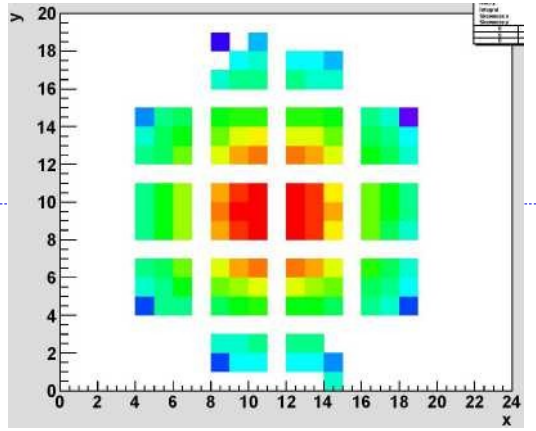
2 mm BC 420
read with 32 PMT
R.Hoischen(LUND), M.Reese(TUD)



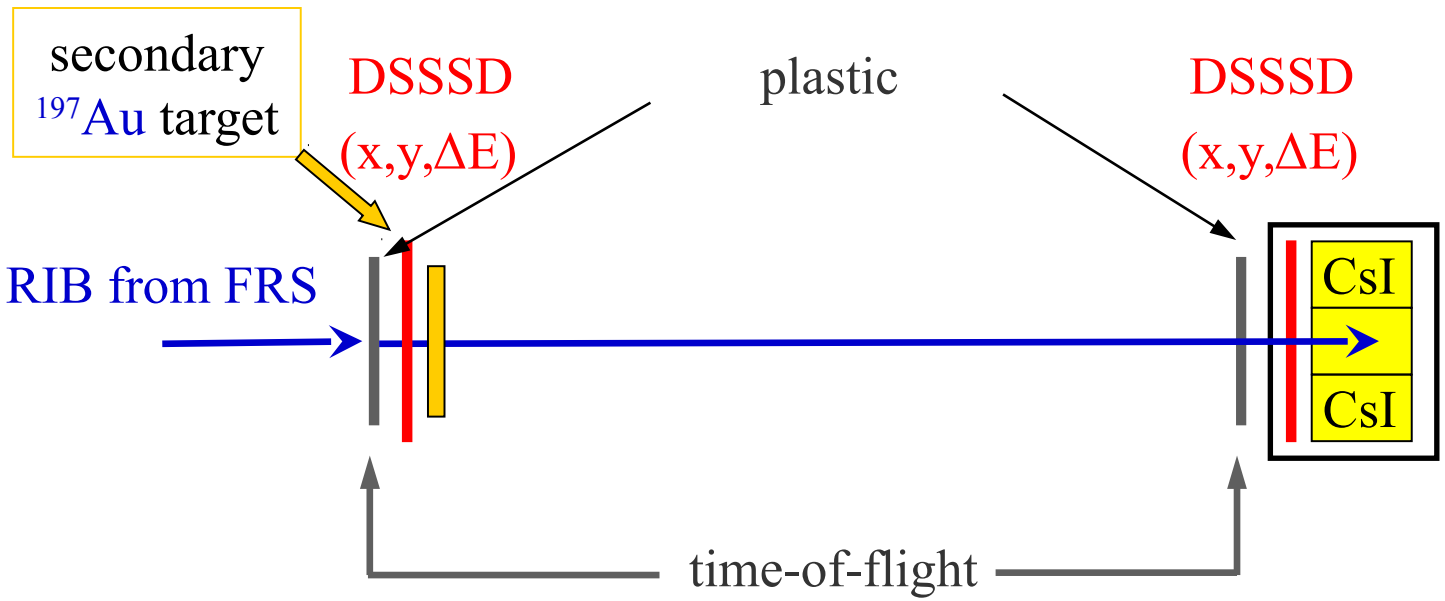
target DSSSD

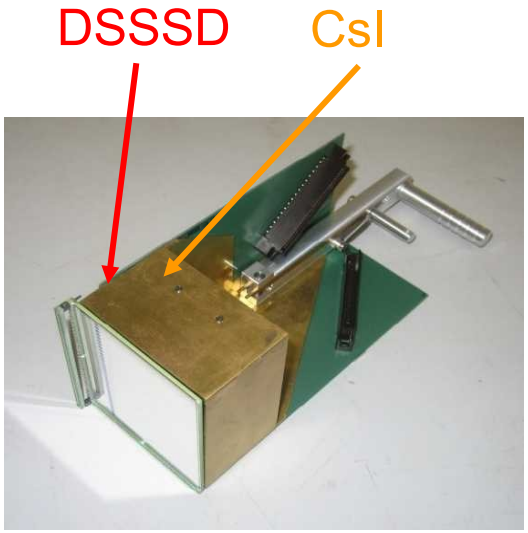


DSSSD wall



CsI wall



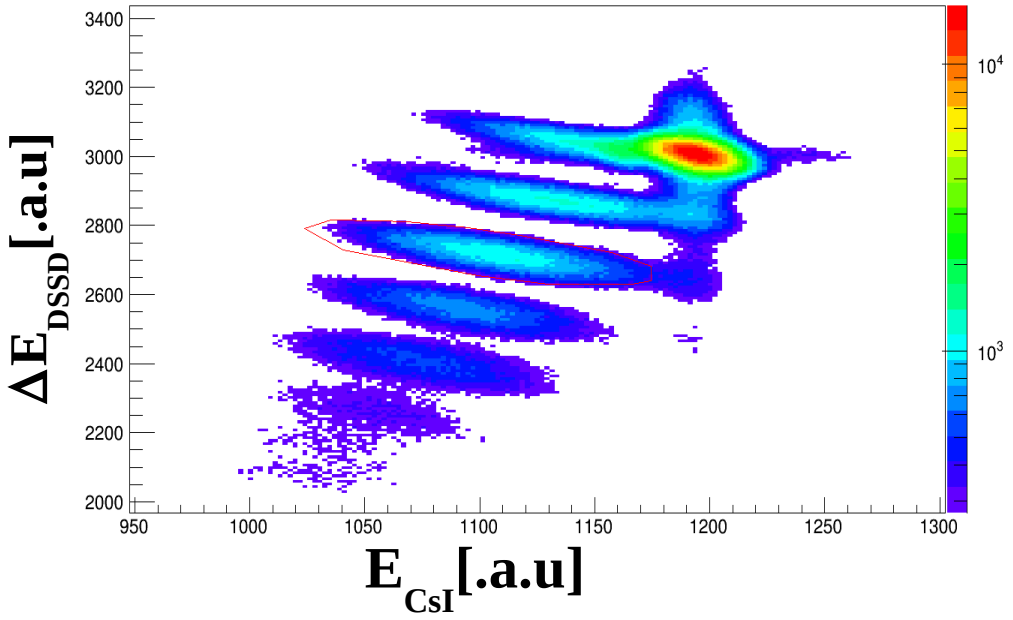


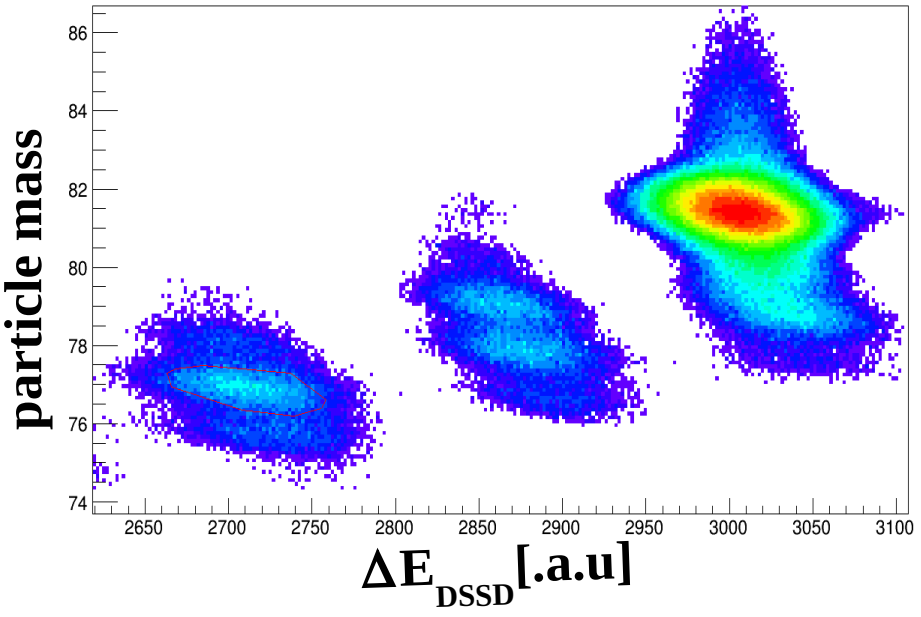
P.Golubev(LUND), A.Went(IKP)

Dec 2013

^{80}Kr +Be

Be: 700 mg/cm^2(3.8 mm)





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

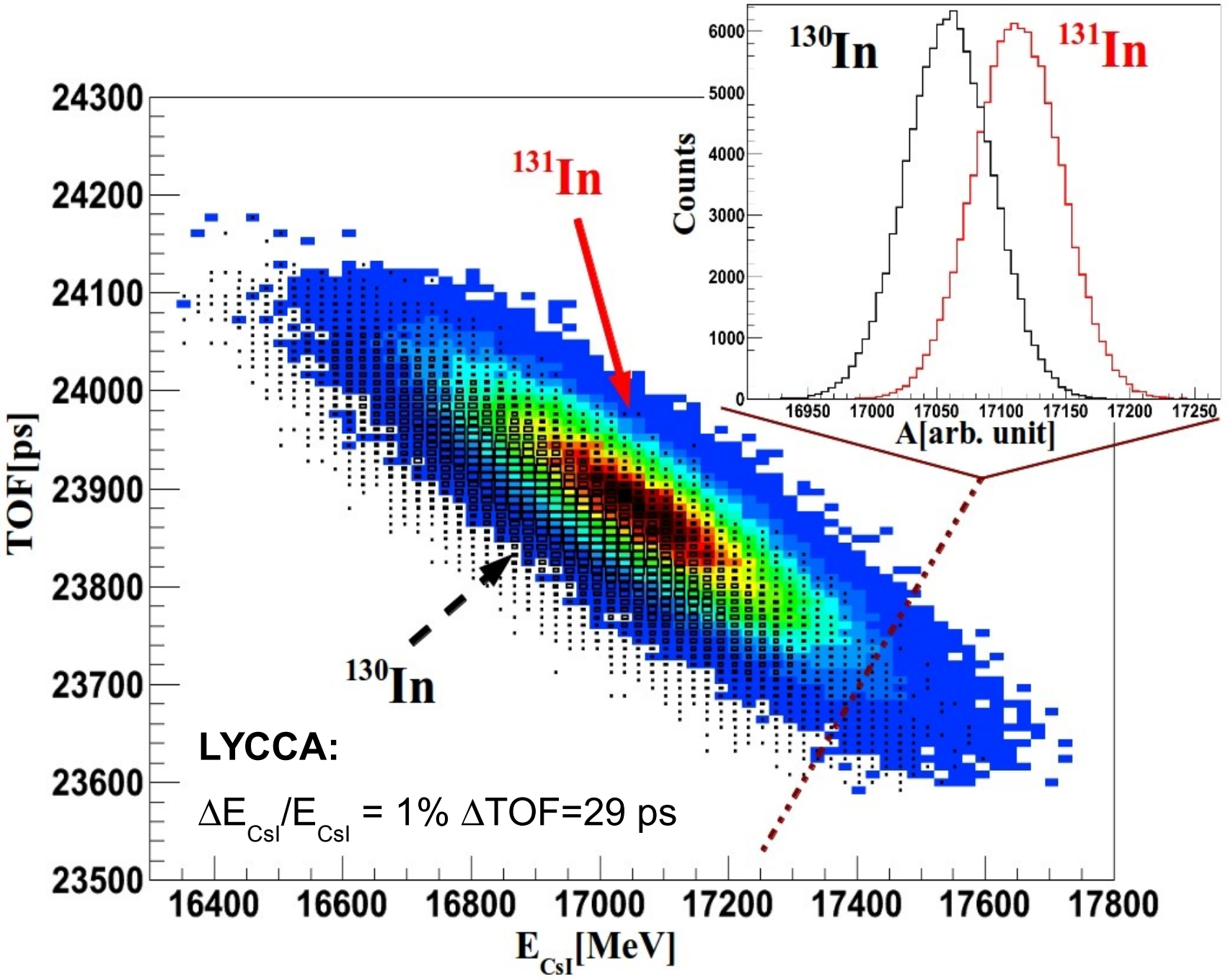
LYCCA Performance During the PreSPEC-AGATA Campaign

Pushpendra P. Singh[1,], P. Golubev[2], D. Rudolph[2], for the PreSPEC-AGATA Collaboration*

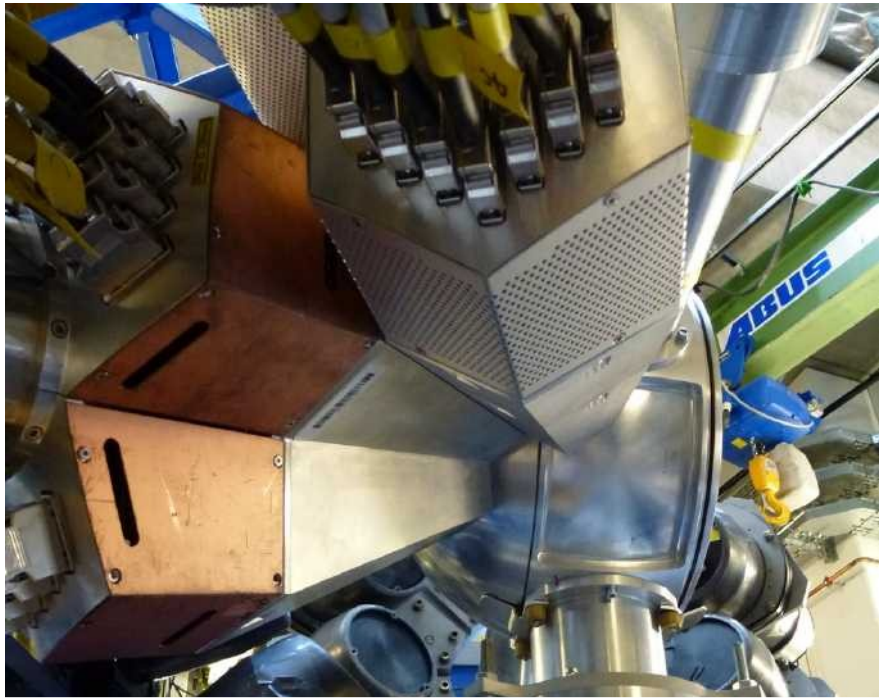
[1]Technische Universität Darmstadt, Germany; [2]Lund University, Sweden

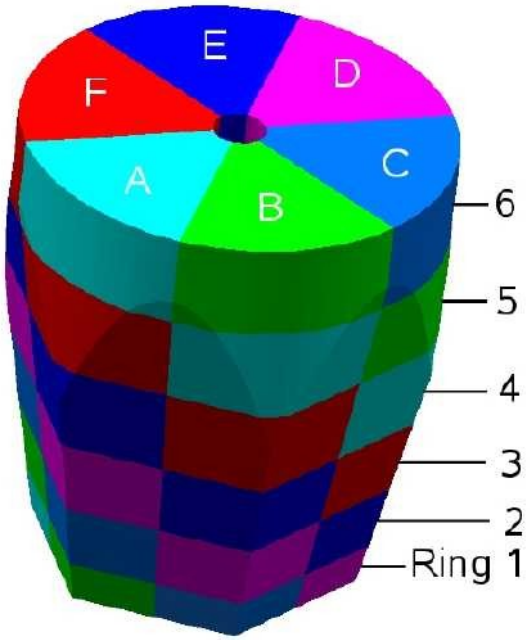
GSI Report, 2012

Particle identification

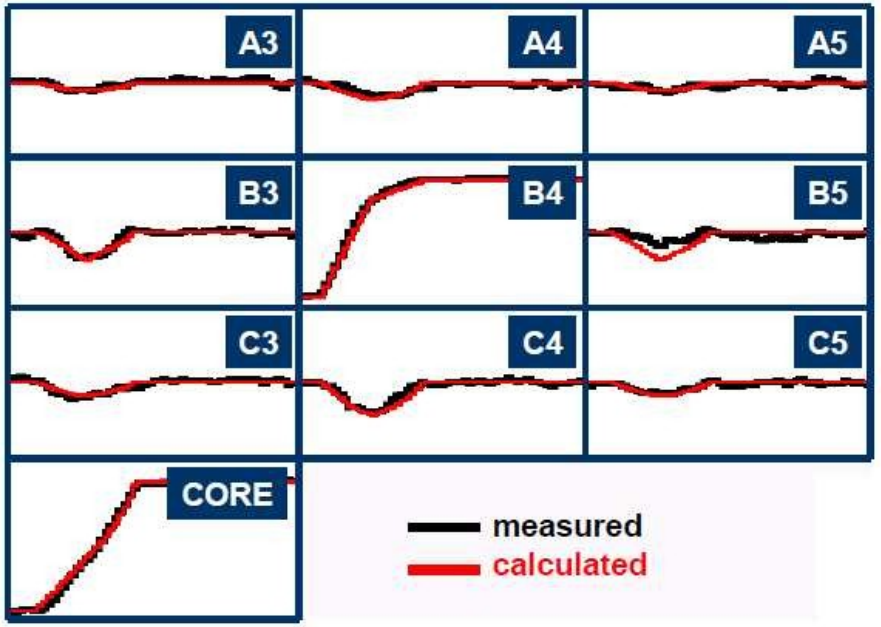


Single AGATA detector

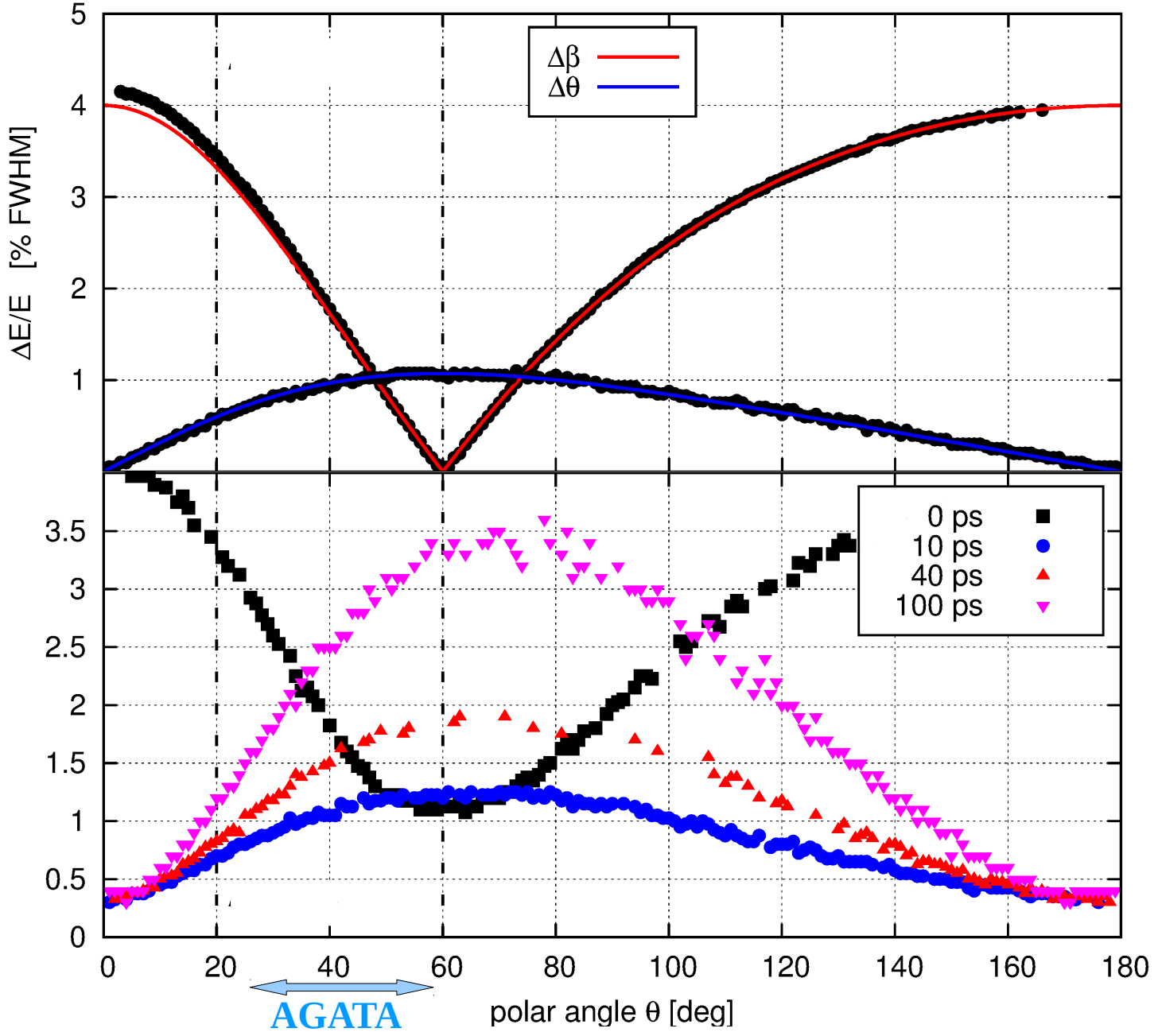




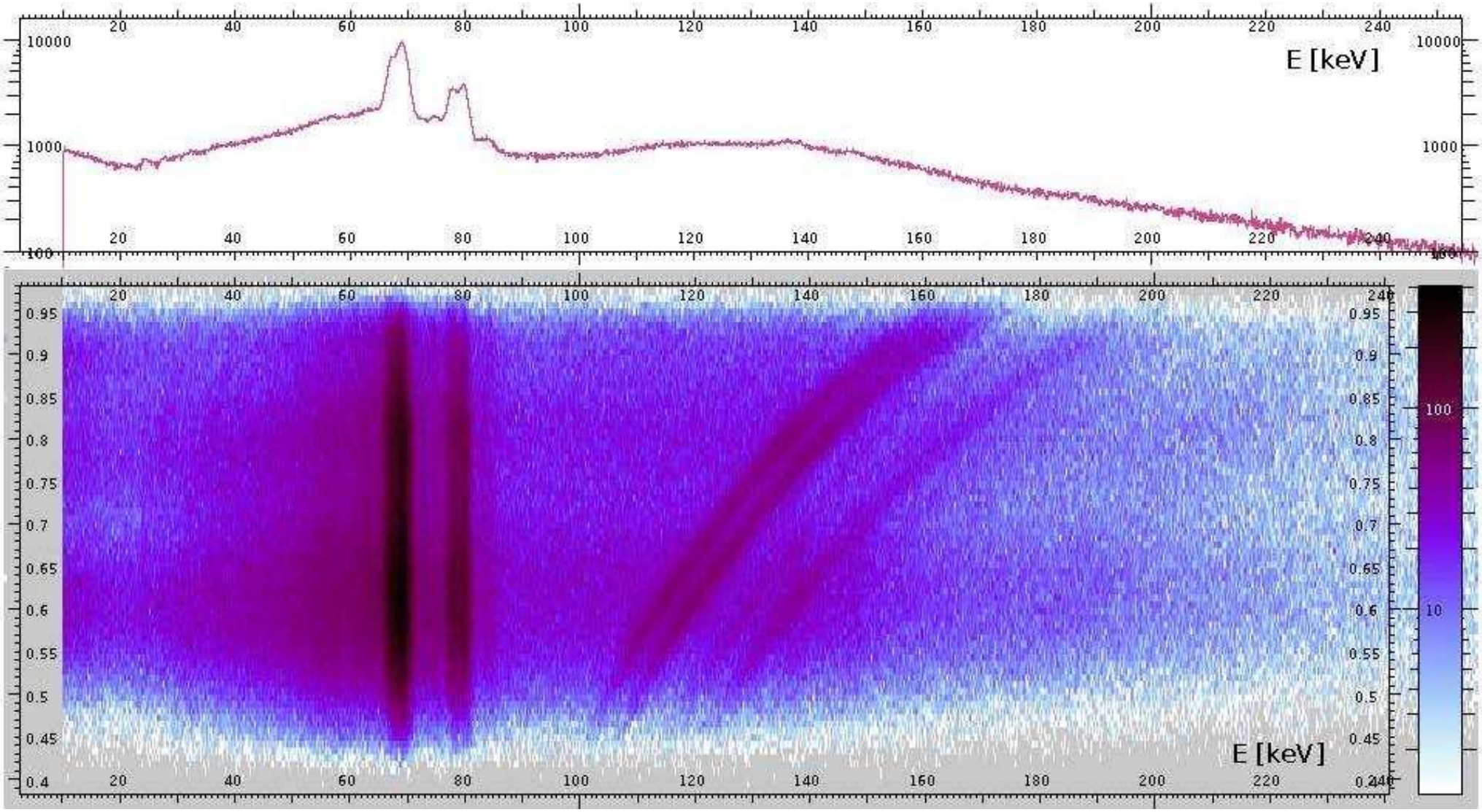
Signals from 36 segments + core
are measured as a function of time
(γ-ray interaction point)



AGATA energy resolution

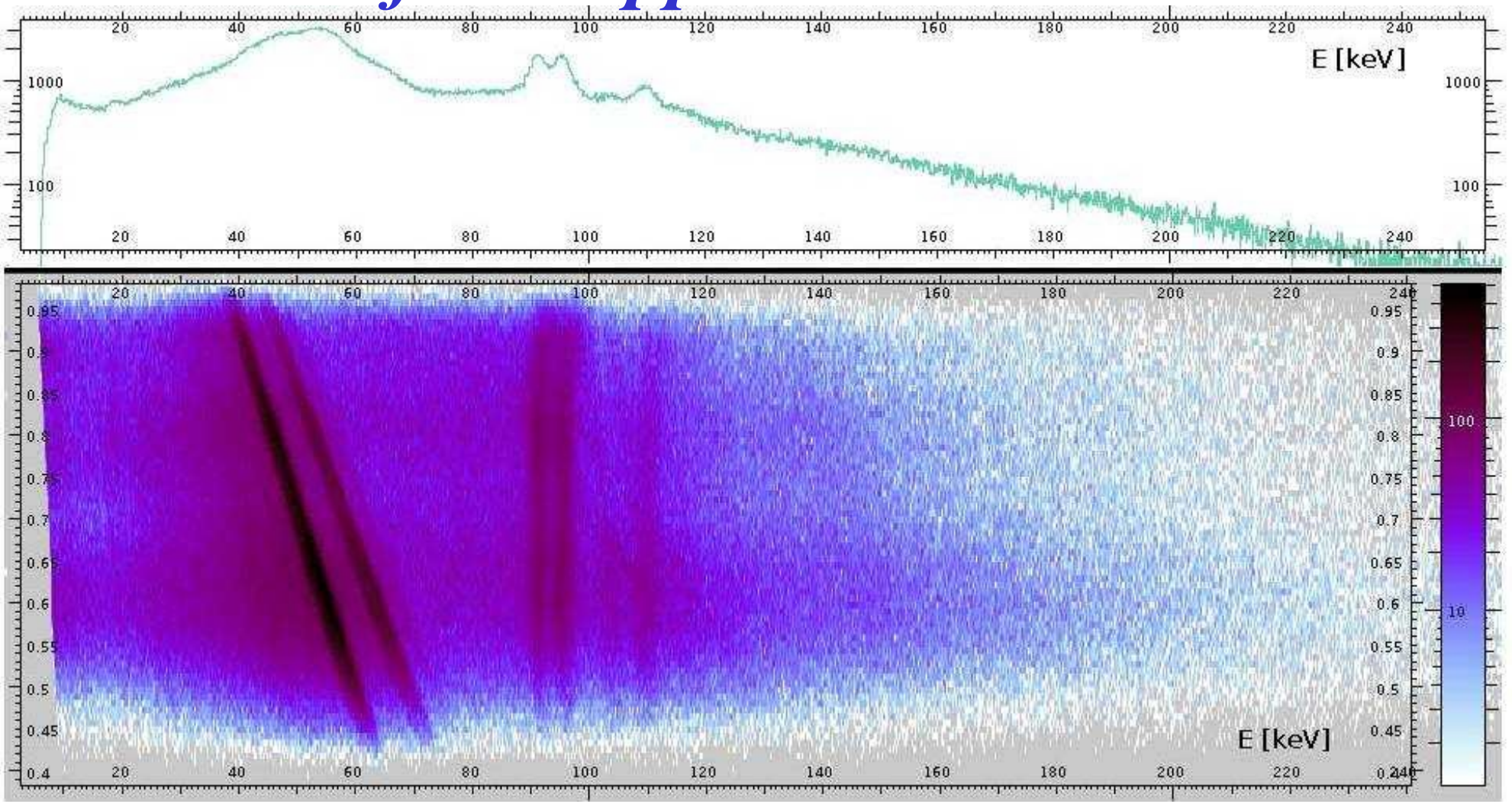


^{238}U on ^{197}Au at 180 MeV/u

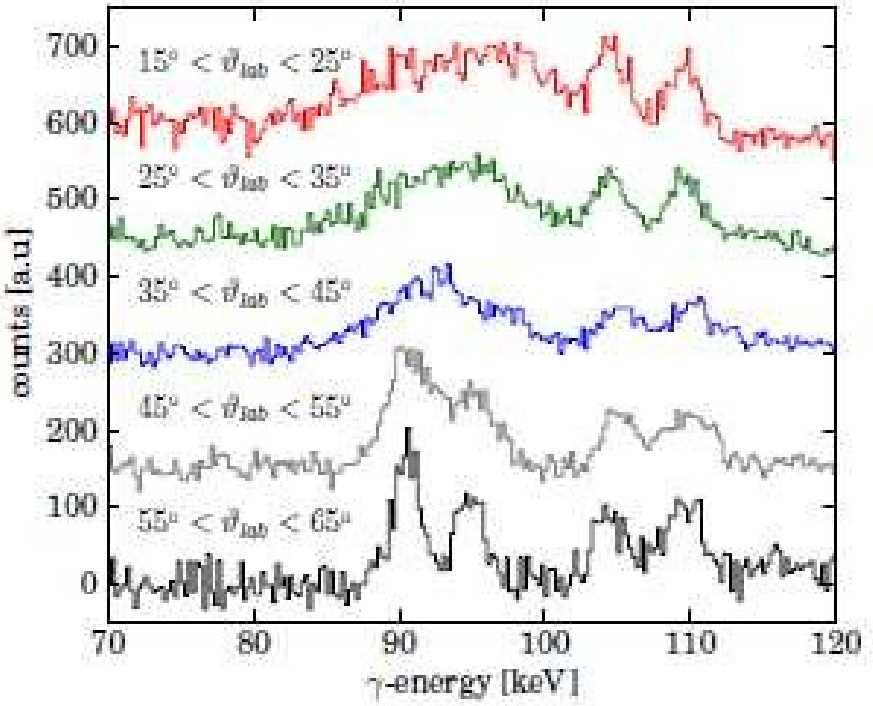


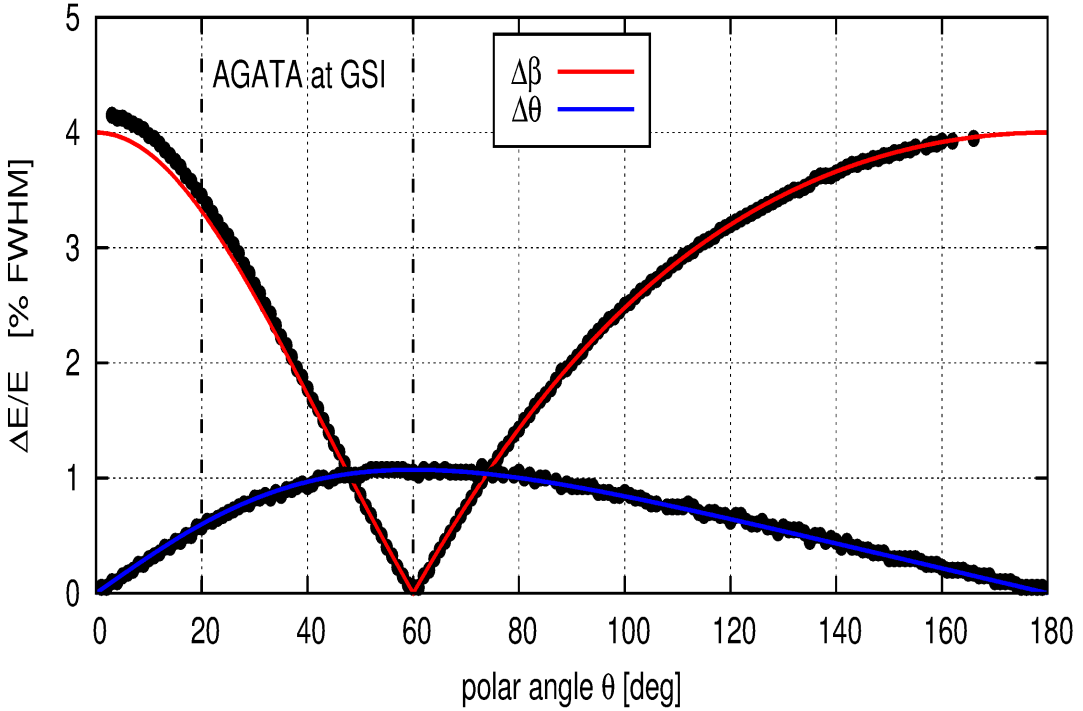
M. Reese (TUD)

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



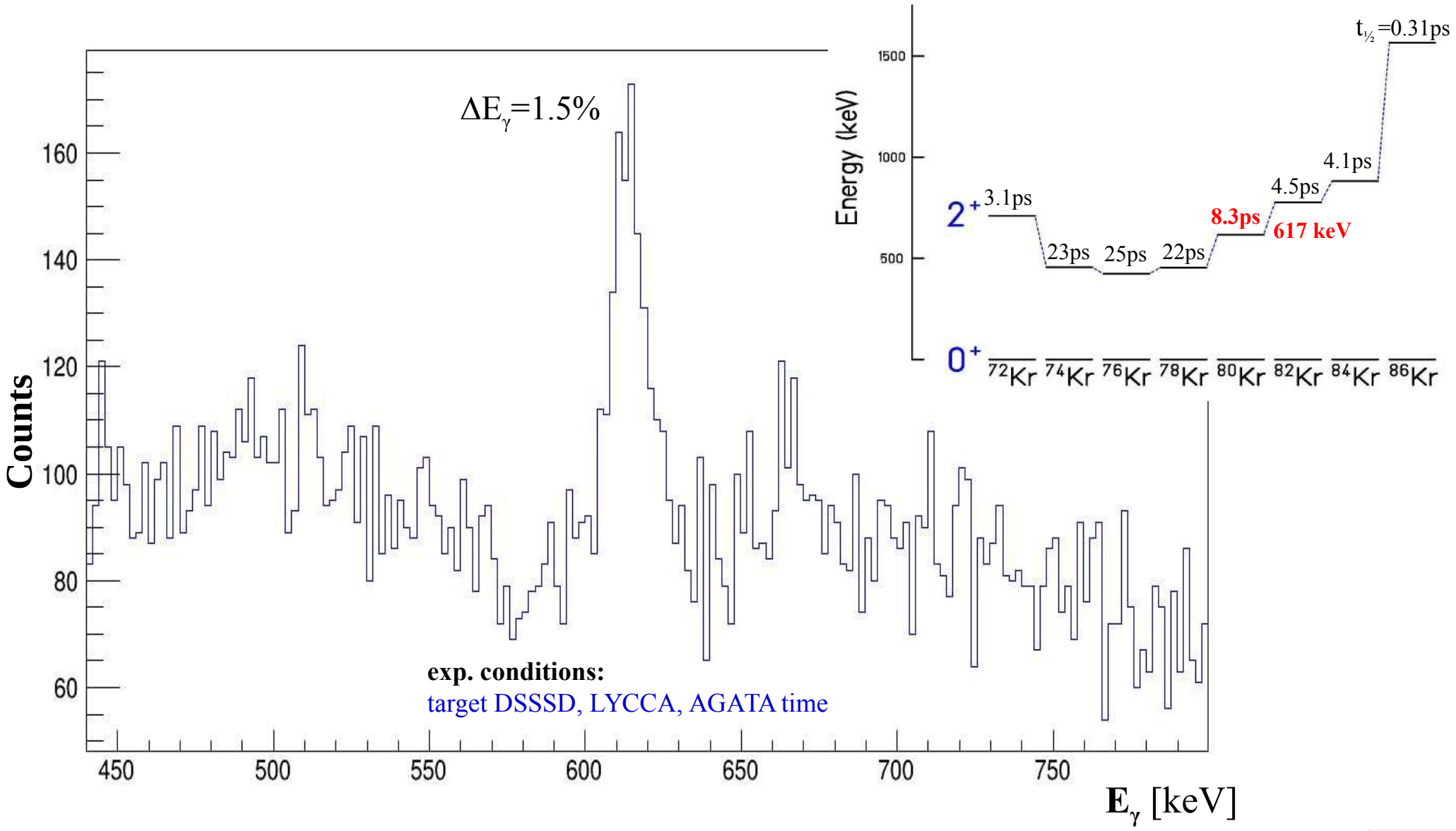
AGATA energy resolution





Coulomb excitation: ^{80}Kr+Au

Au: 400 mg/cm^2(0.2 mm)



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Dec 2013

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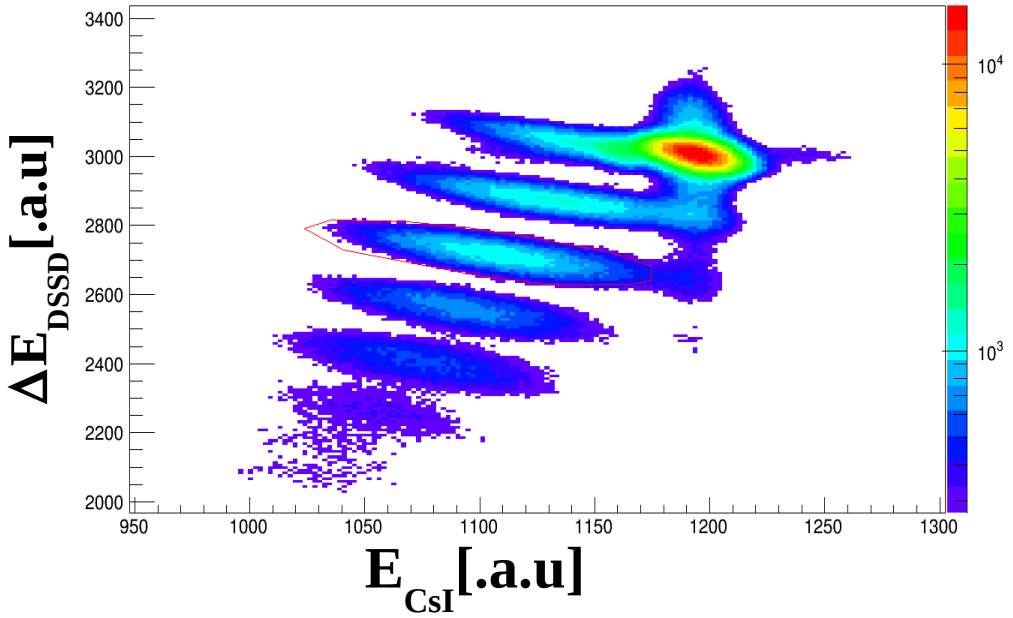
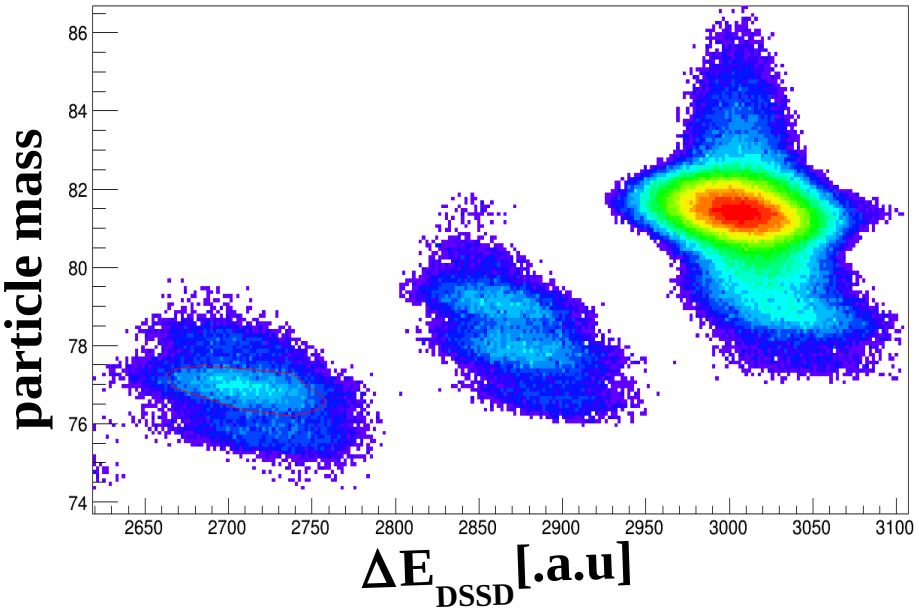
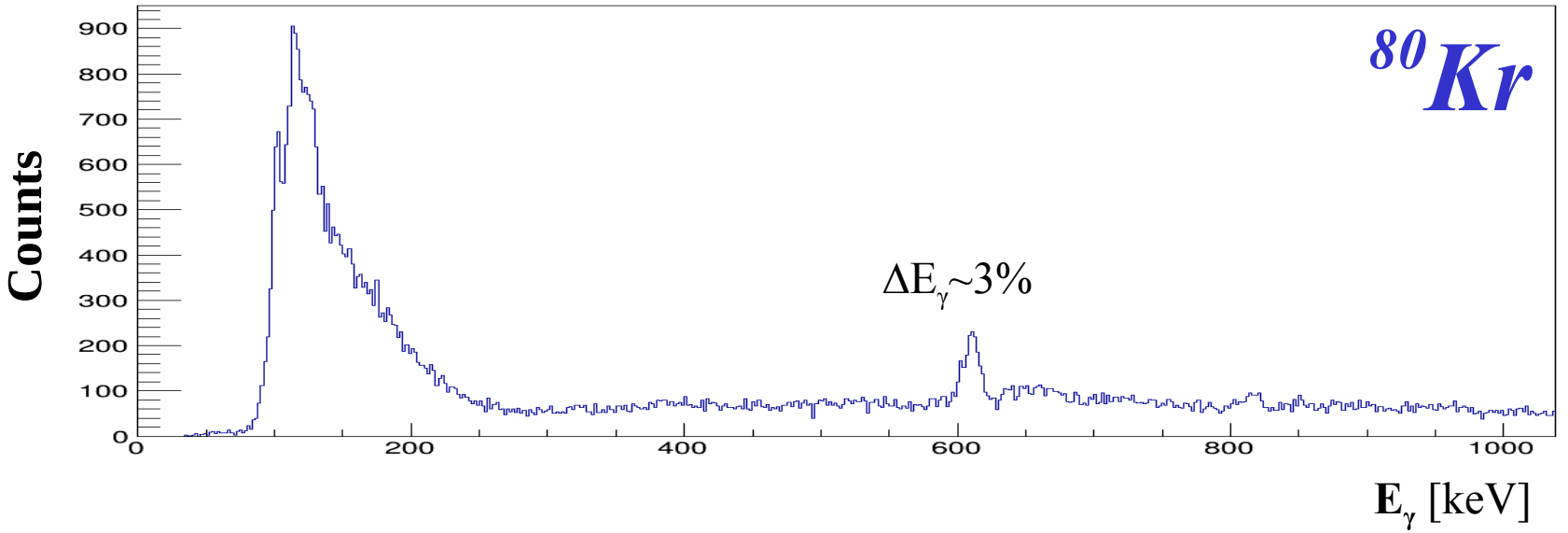
^{80}Kr +Be

Be: 700 mg/cm^2(3.8 mm)







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

Dec 2013

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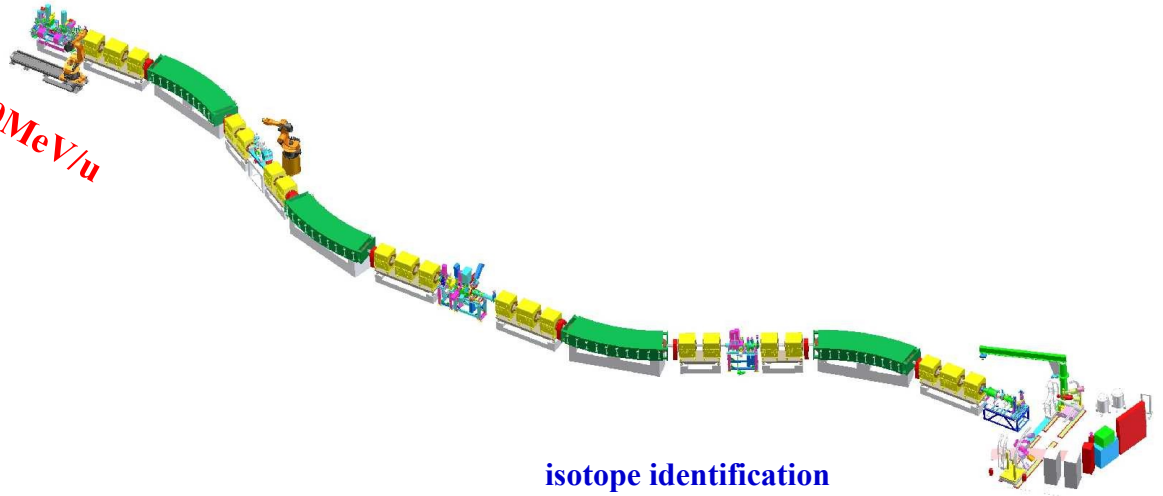
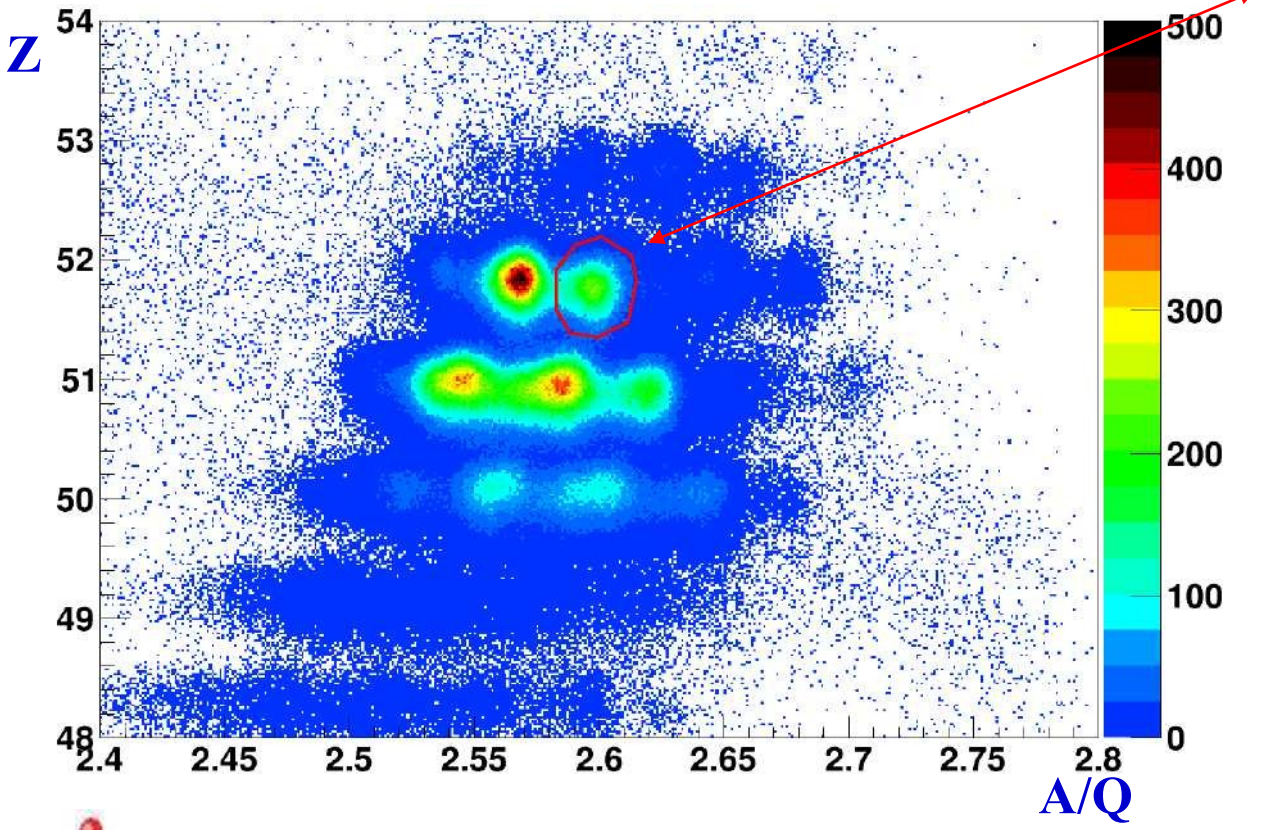
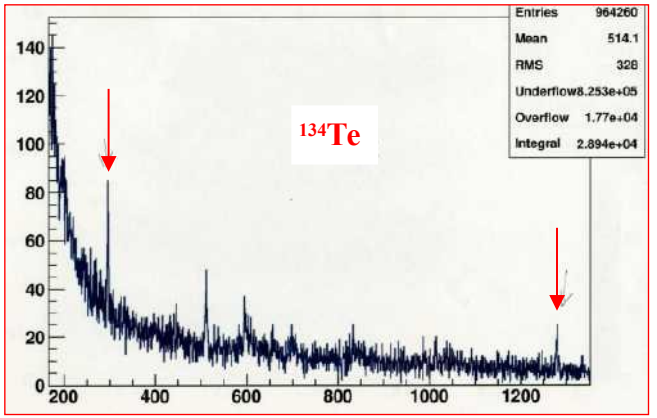
Scattering experiment at 100 MeV/u

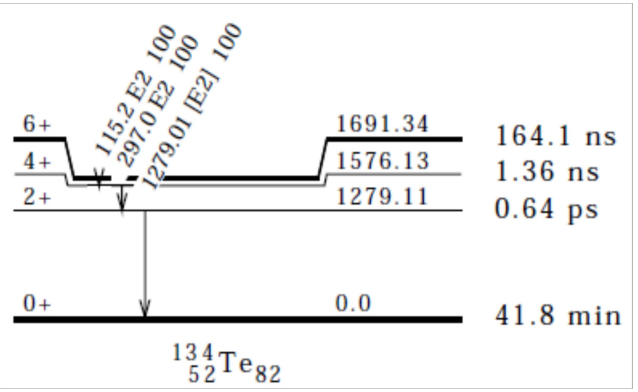


isotope identification



AGATA spectrum

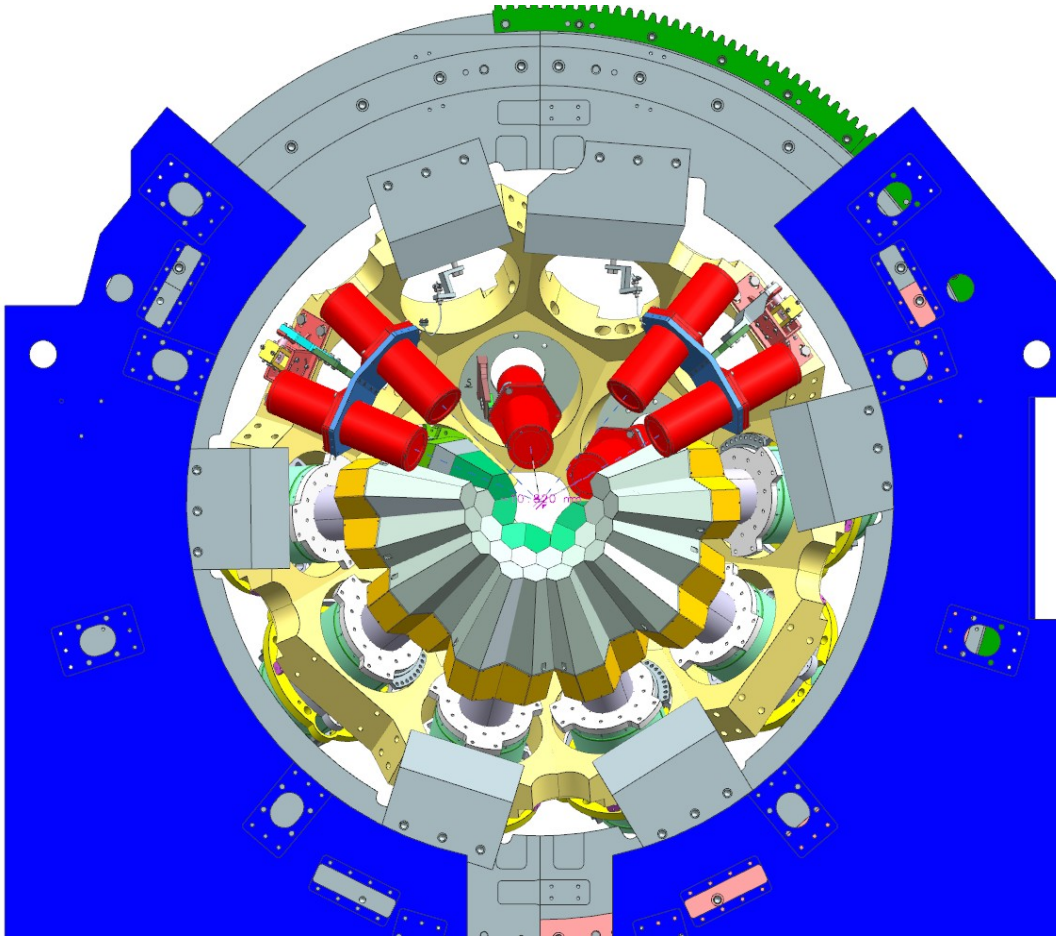


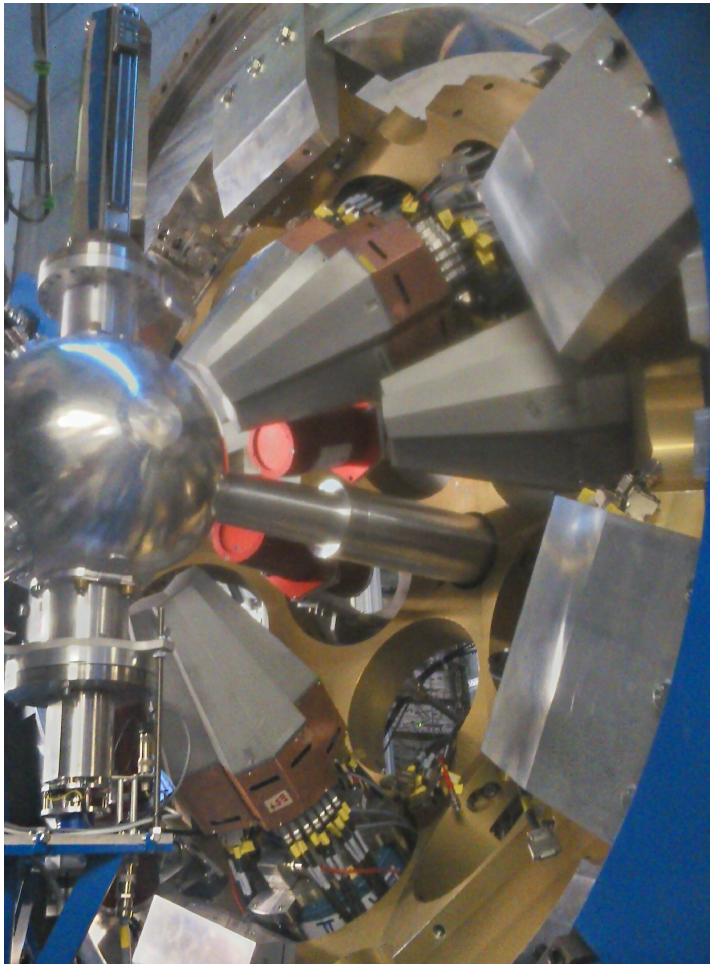


SPEC for NUSTAR

AGATA layout 2014

23 crystals





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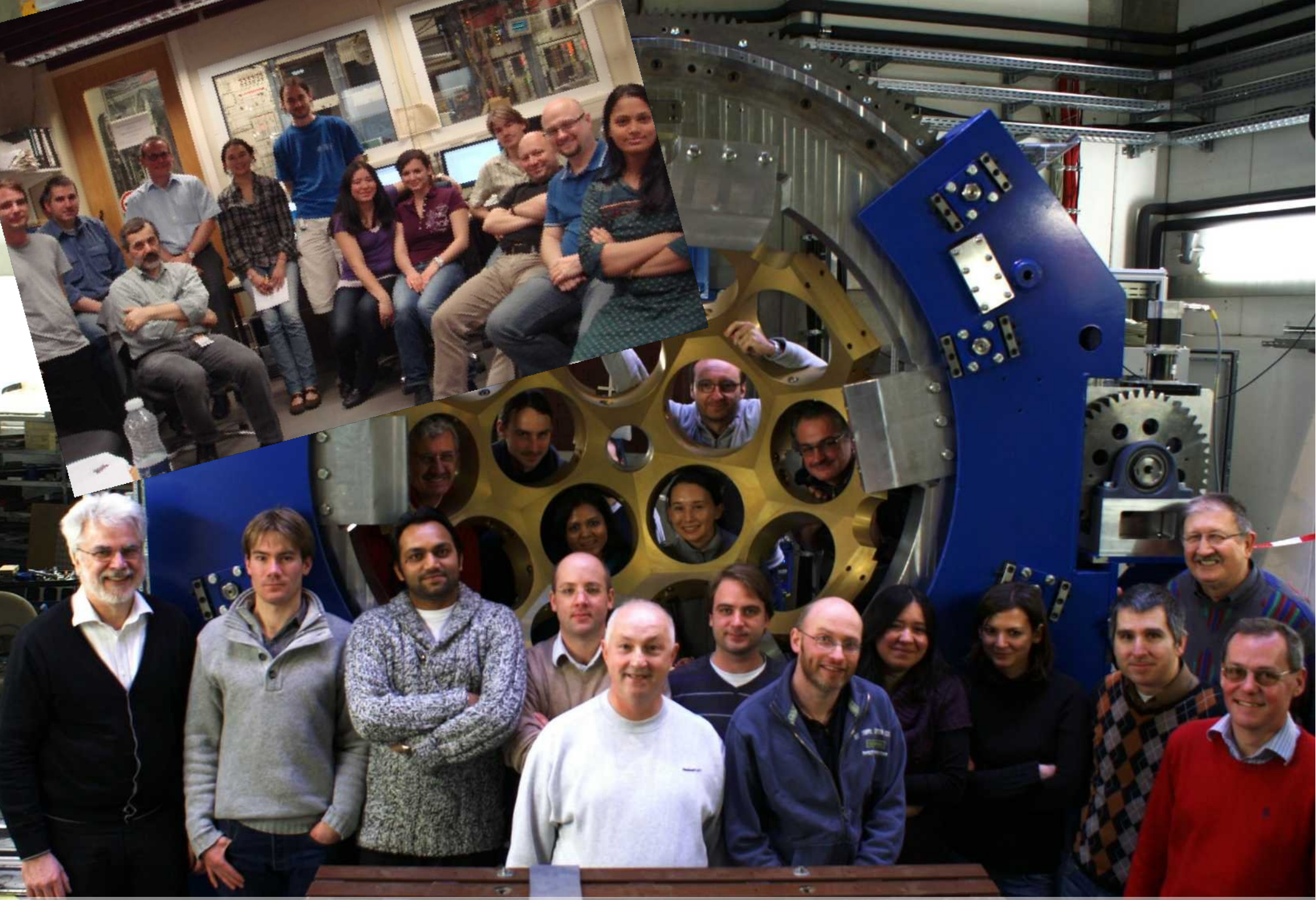

Ivan Kojouharov, Michael Reese, Namita Goel, Liliana Cortes, Frederic Ameil, Bogdan Szczepanczyk
H.-J. W., Damian Ralet, Pushpendra Singh, Stephane Pietri, Tobias Habermann, Edana Merchan, Giulia Guastalla, Plamen Boutachkov, Adolf Brünle,
Ian Burrows, Jonathan Strachan, (Paul Morral), Jürgen Gerl, (Henning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