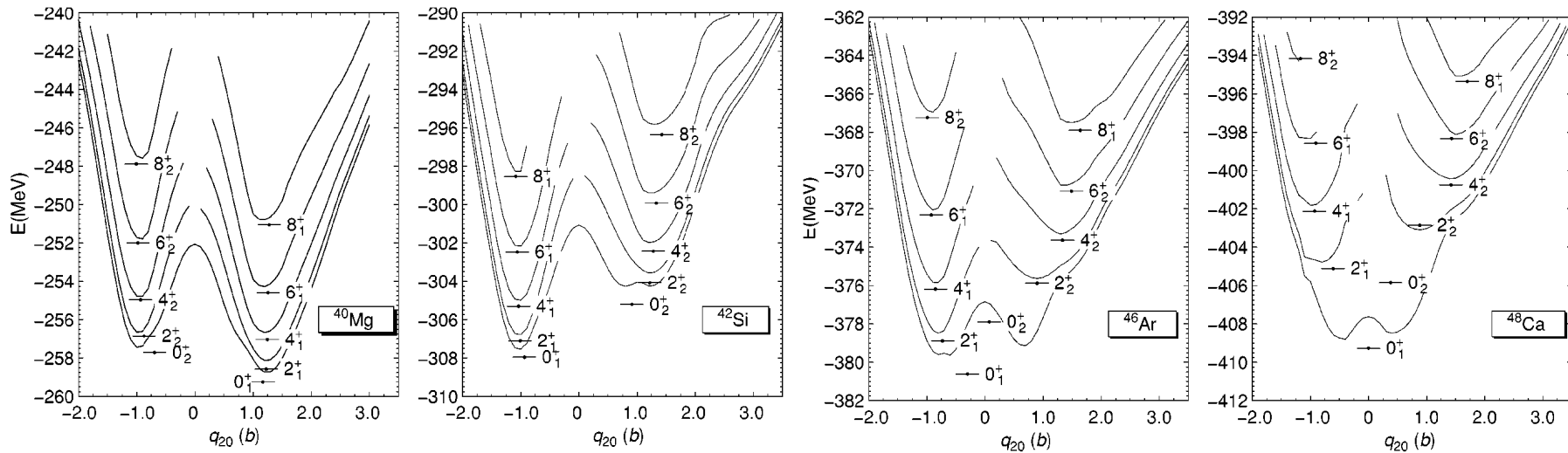

Coulomb excitation of neutron-rich ^{44}Ar at SPIRAL

Magda Zielińska

- Motivation
- Beams, targets, experimental setup...
- Preliminary results
- Conclusions & Outlook

Motivation

- evolution of the N=28 shell closure below ^{48}Ca
- possible shape coexistence

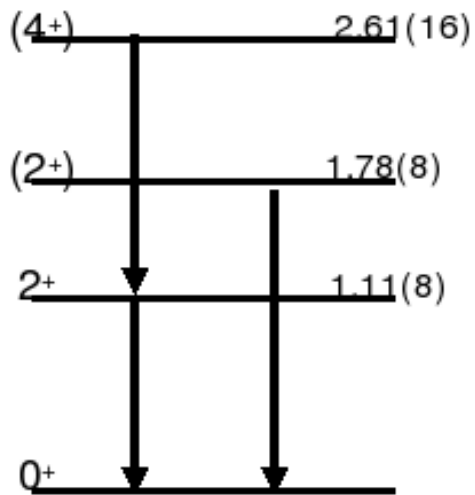


angular momentum projected generator coordinate method calculation

R. Rodríguez-Guzmán et al., Phys. Rev. C 65, 024304 (2002)

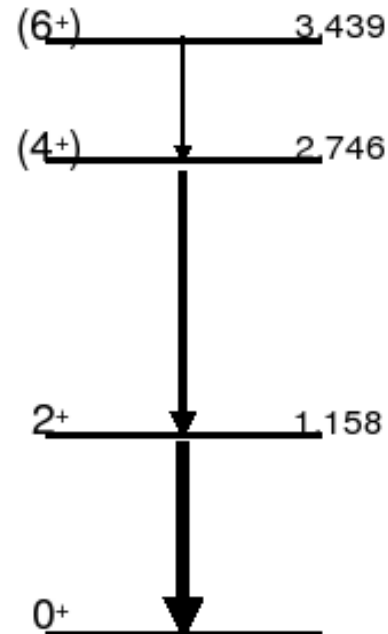
Spectroscopic data on ^{44}Ar

double fragmentation



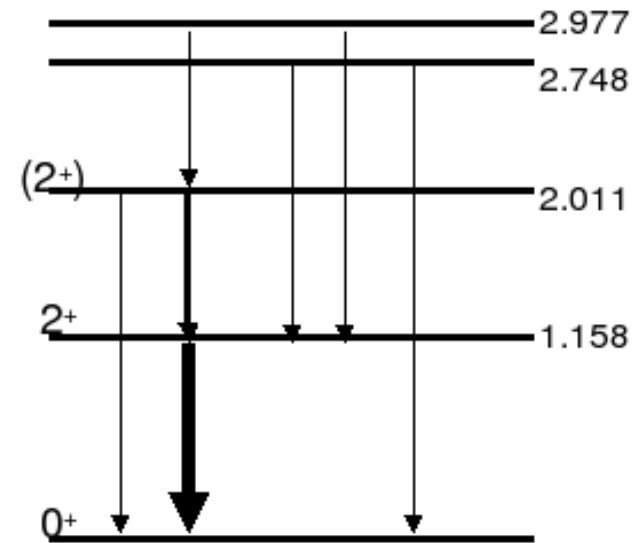
S. Wan et al.,
EPJA 6, 167 (1999)

deep inelastic



B. Fornal et al.,
EPJA 7, 147 (2000)

beta decay

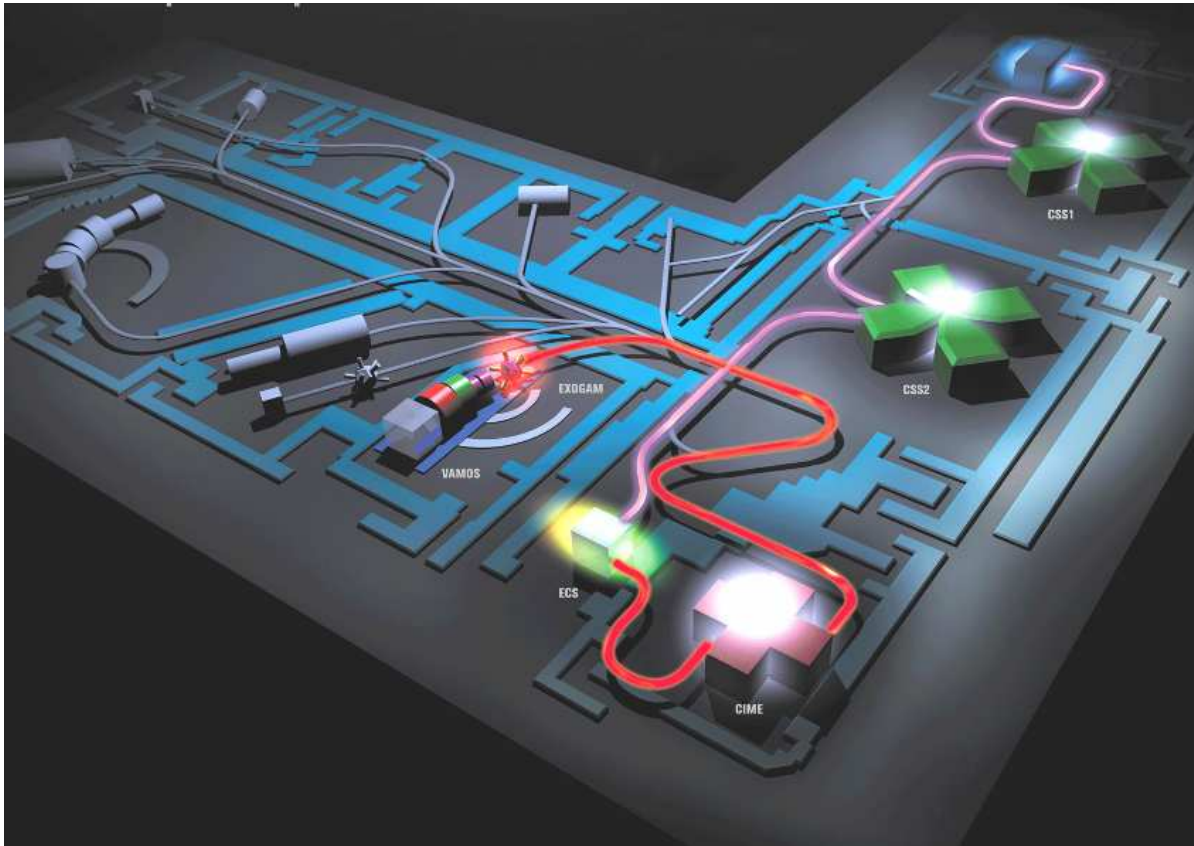


J. Mrazek et al.,
Nucl. Phys. A 734, E65 (2004)

- $B(E2; 2^+ \rightarrow 0^+) = 345 (41) e^2\text{fm}^4$

intermediate energy Coulex, Scheit et al., Phys. Rev. Lett. 77, 3967 (1996)

Beams and targets

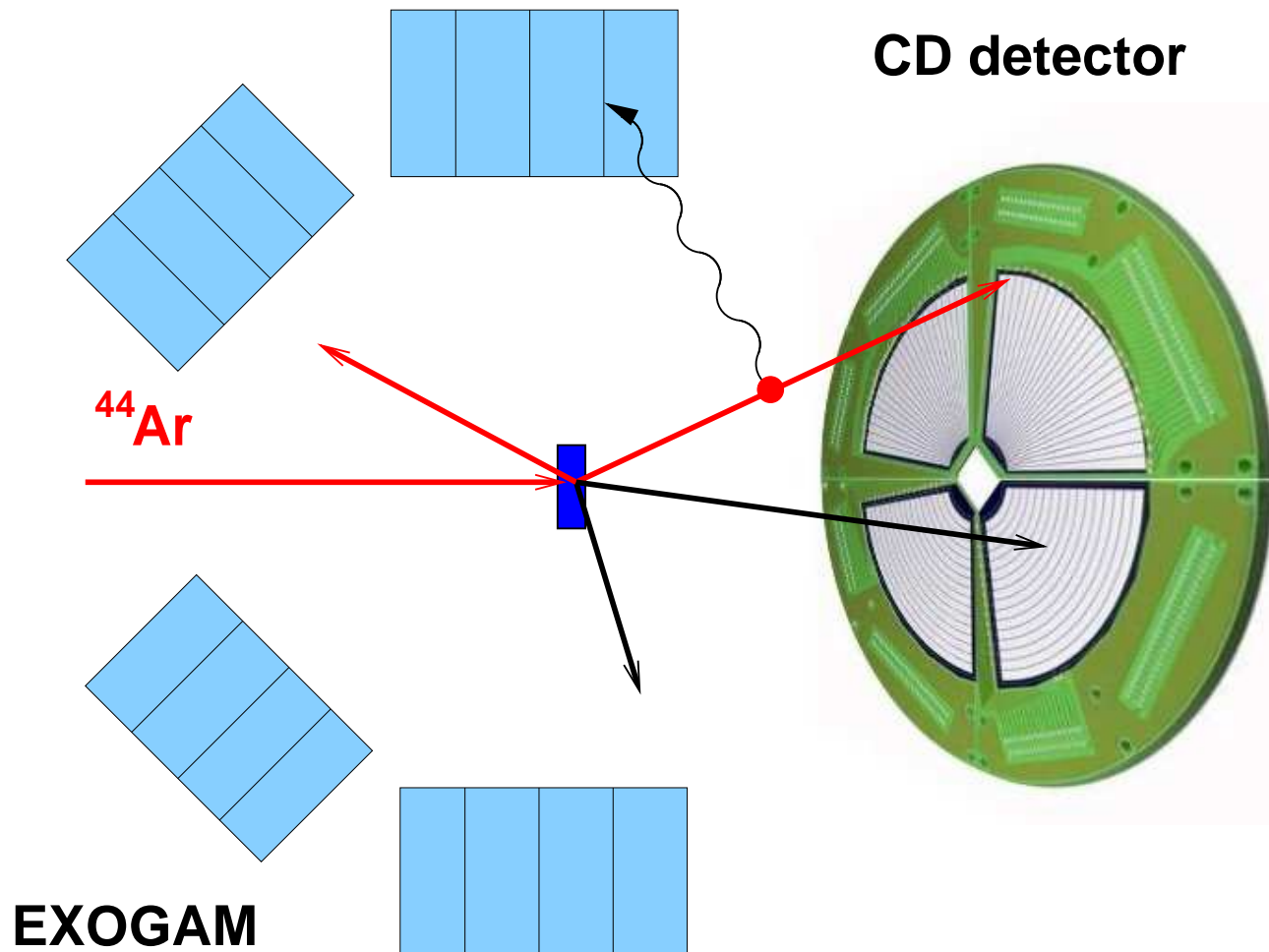


- Primary beam: ^{48}Ca
60 MeV/A,
 $3.5 \mu\text{A}$ (nearly 600W)

- Secondary beam: ^{44}Ar

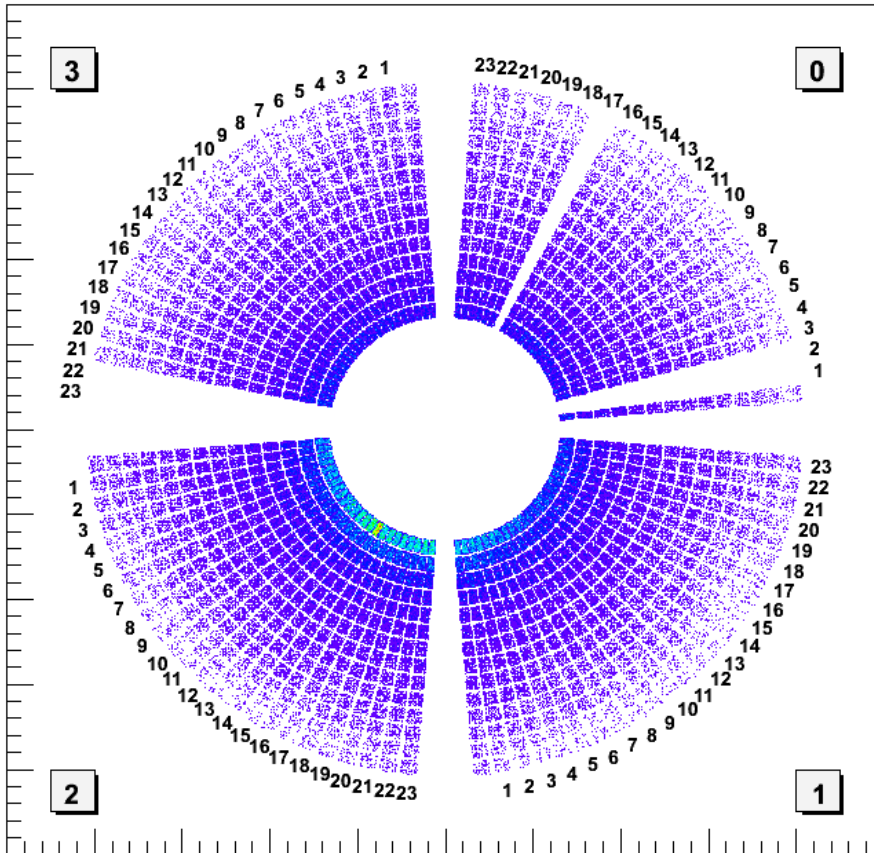
Beam energy	Beam intensity	Target	Target thickness	Duration
3.68 MeV/A	$2.4 \cdot 10^5$ pps	^{208}Pb	1 mg/cm ²	13 UT
2.68 MeV/A	$2.0 \cdot 10^5$ pps	^{109}Ag	0.9 mg/cm ²	8 UT

Experimental setup

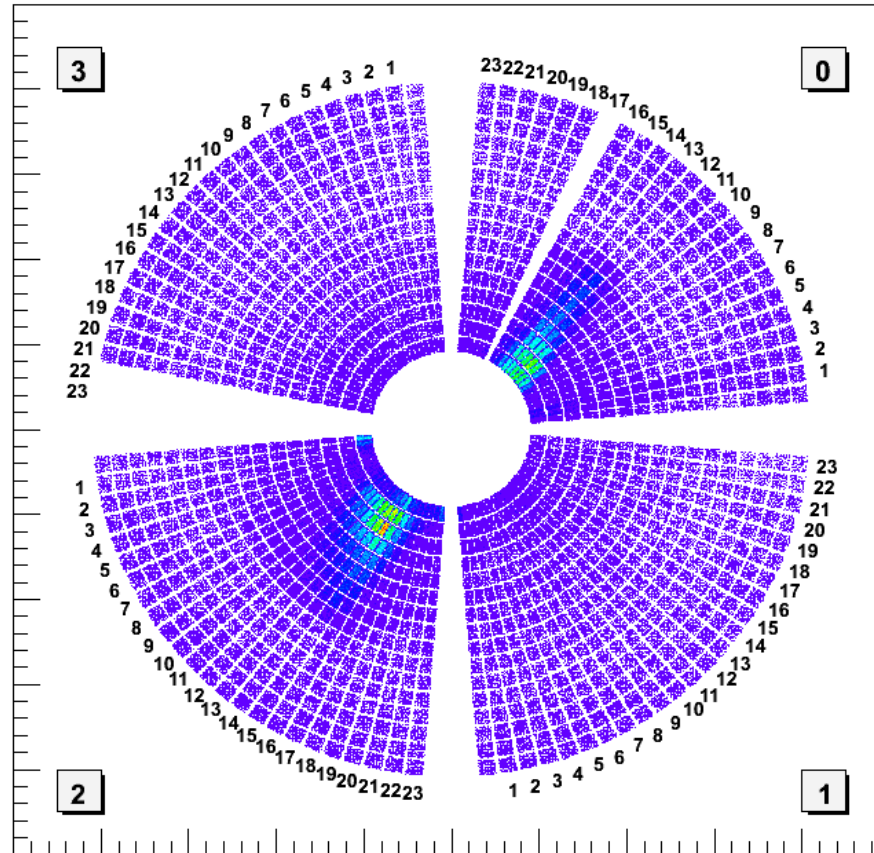


- 10 segmented clovers in EXOGAM (13% efficiency at 1.3 MeV)
- highly segmented particle detector: 96 strips, 16 rings

Events distribution in CD

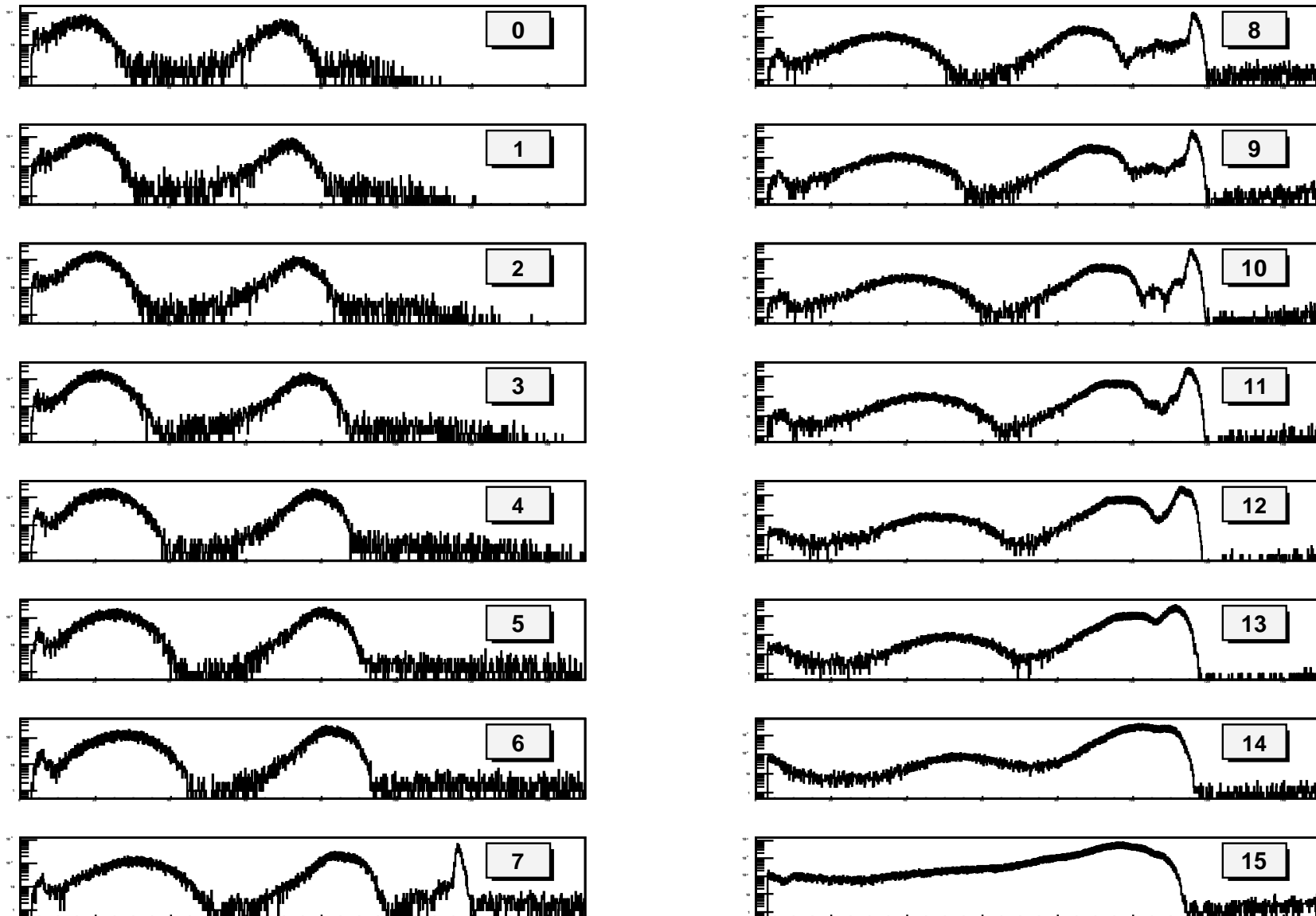


scattered beam

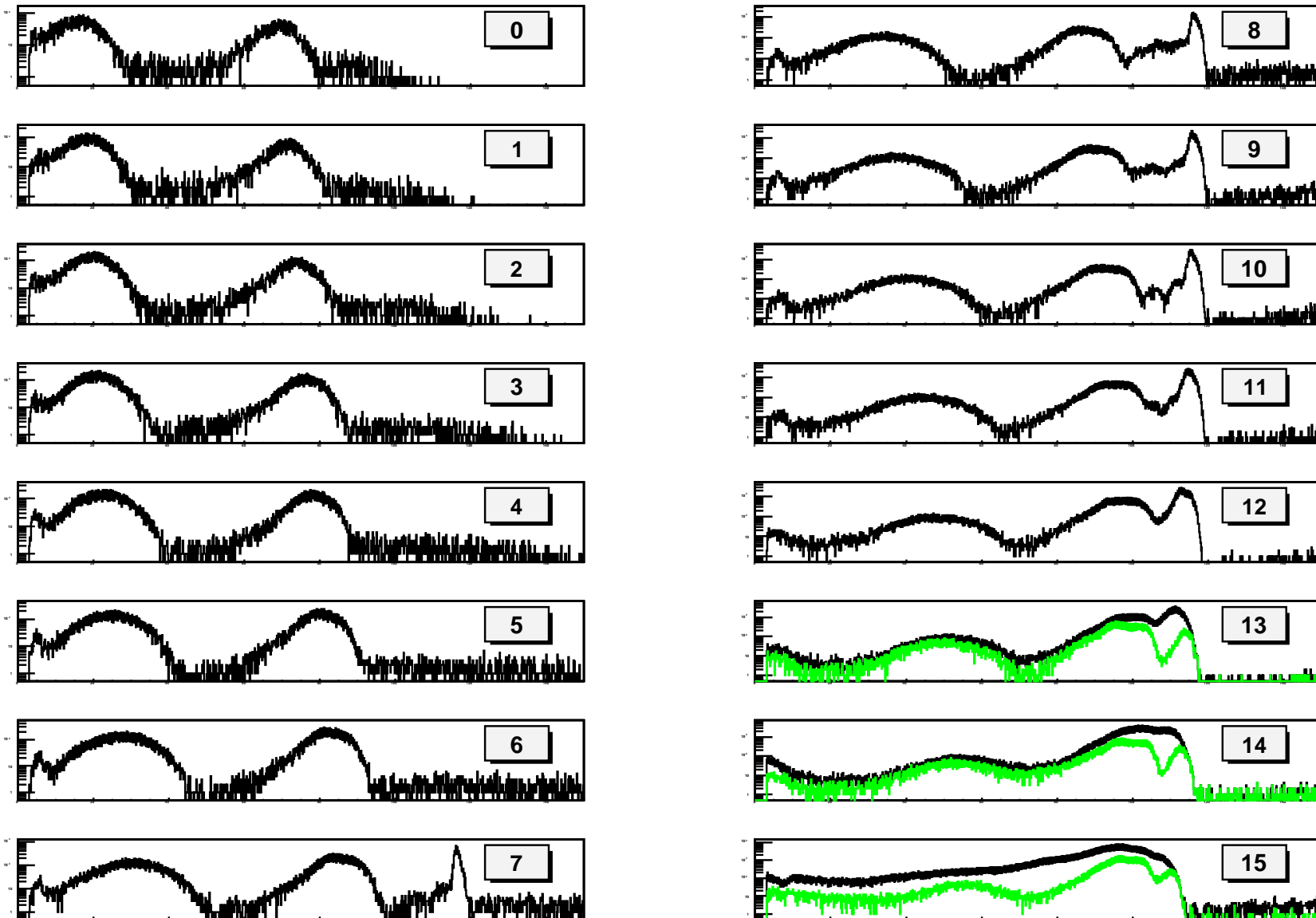


direct beam

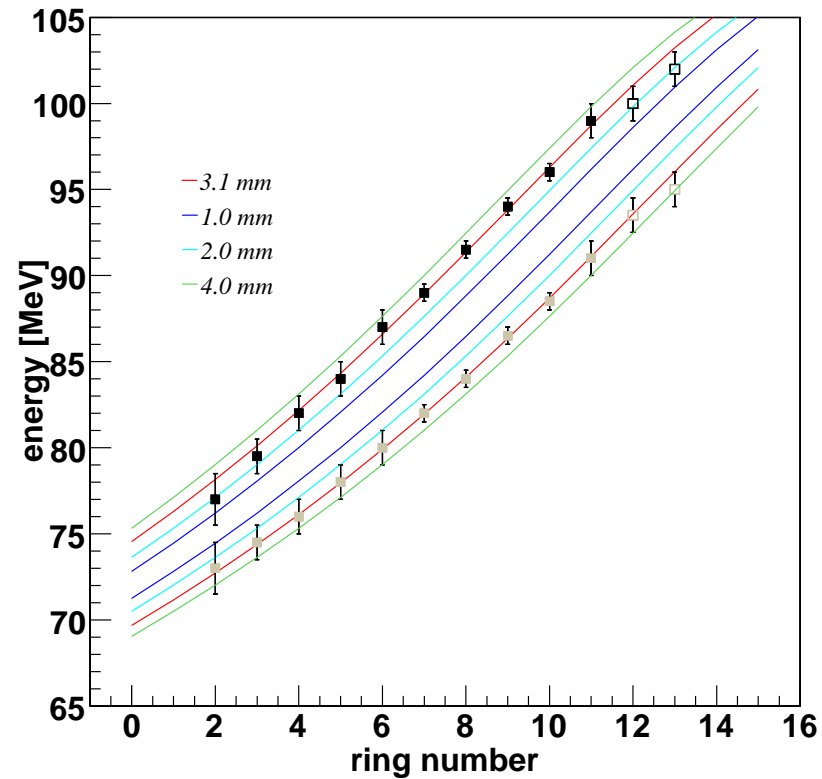
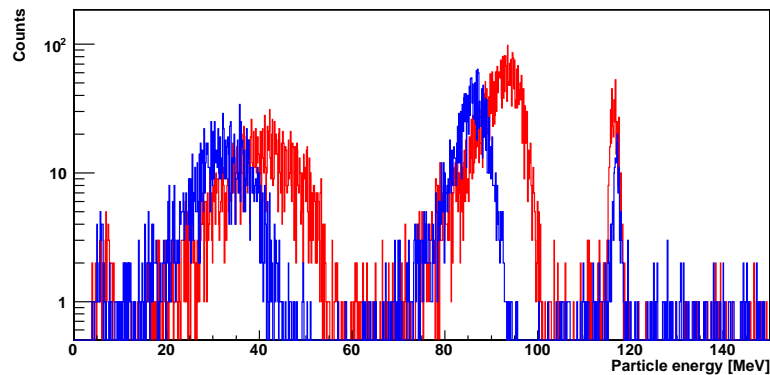
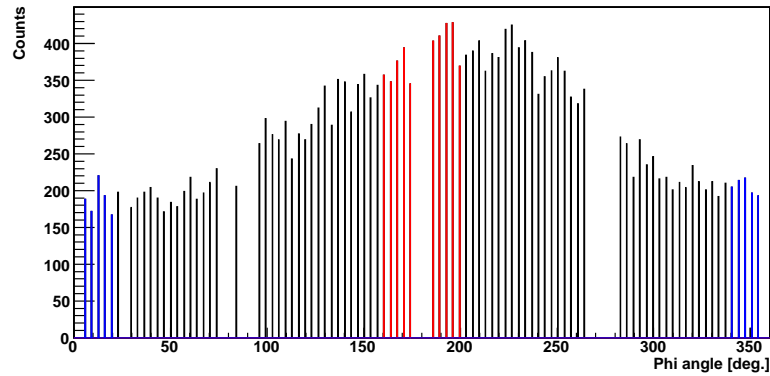
Recoil and scattered beam identification



Recoil and scattered beam identification

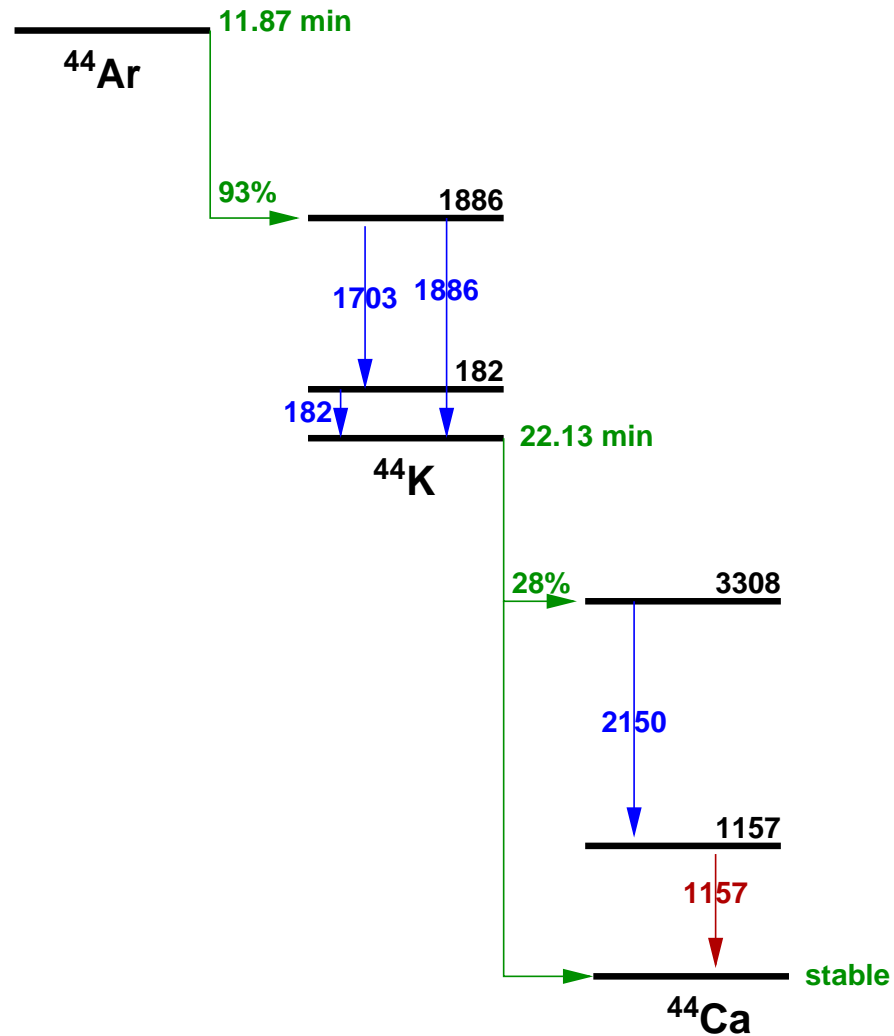
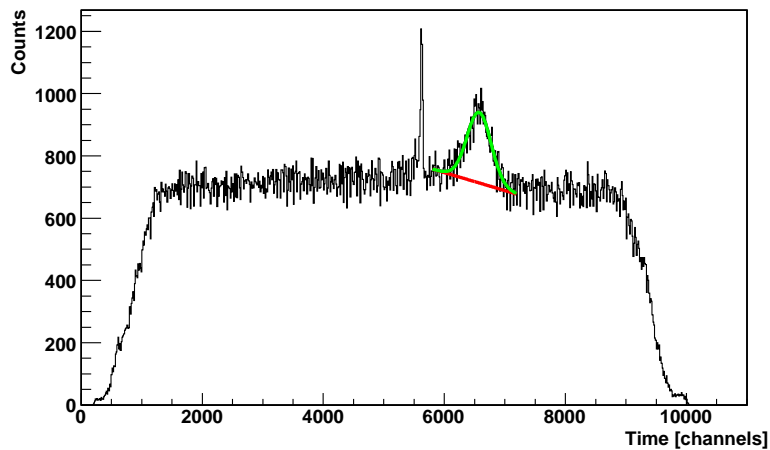
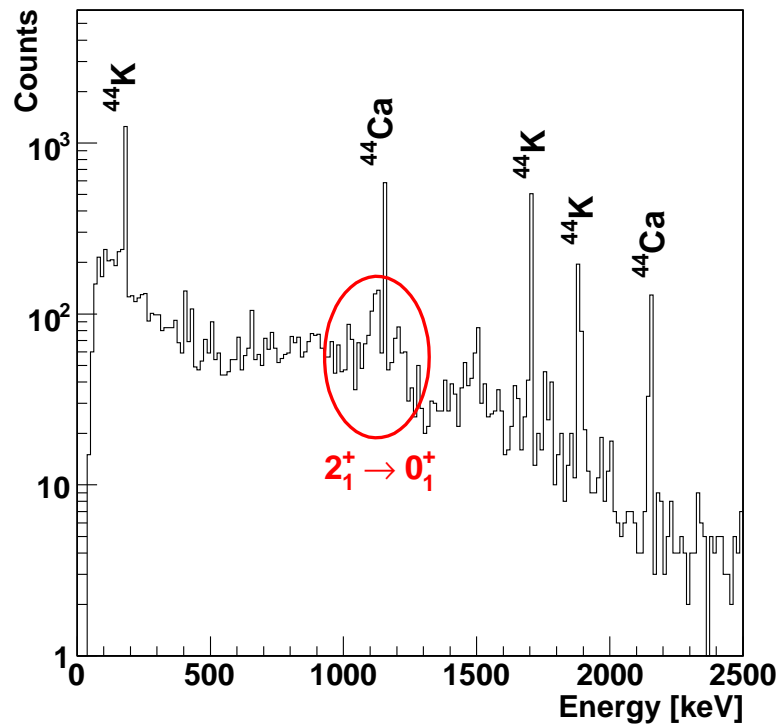


Estimation of displacement based on particle energy



- confirmed by Doppler correction

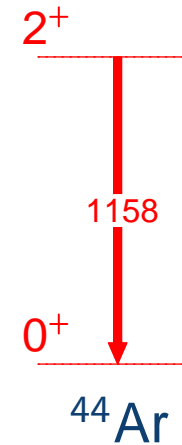
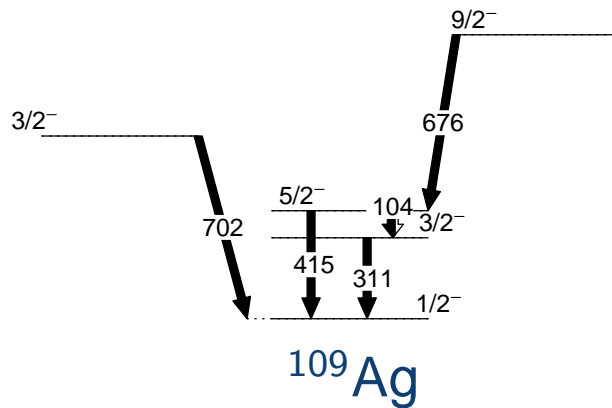
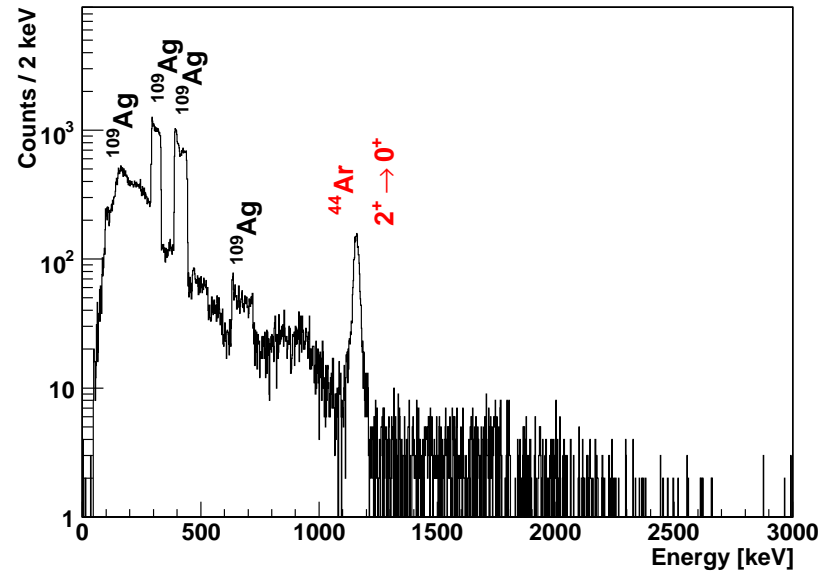
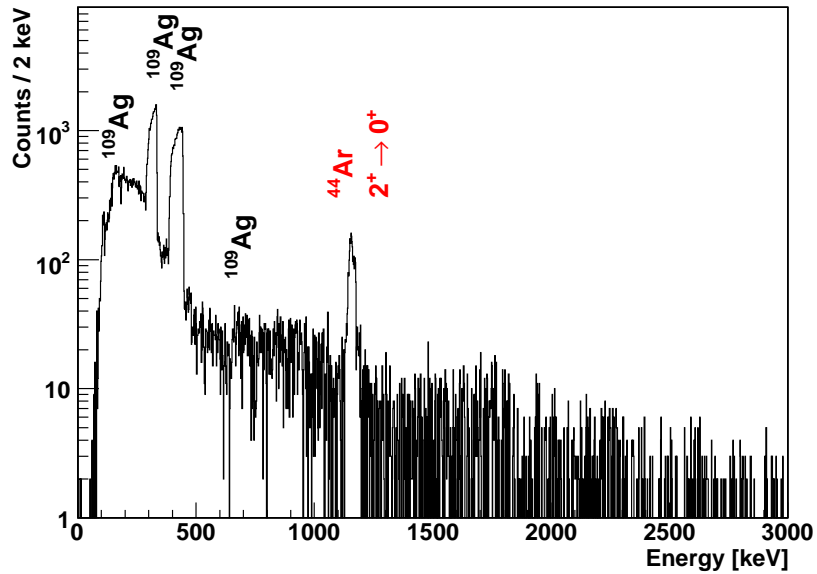
Background from beta-decay



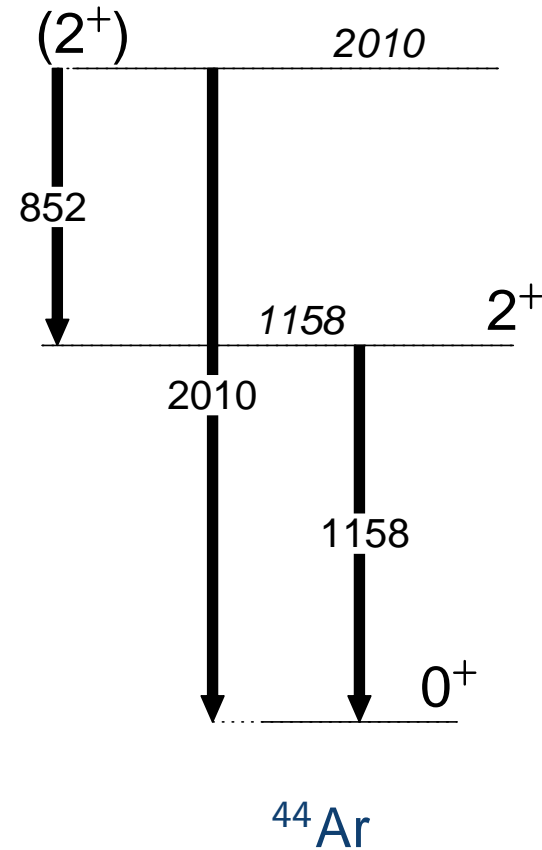
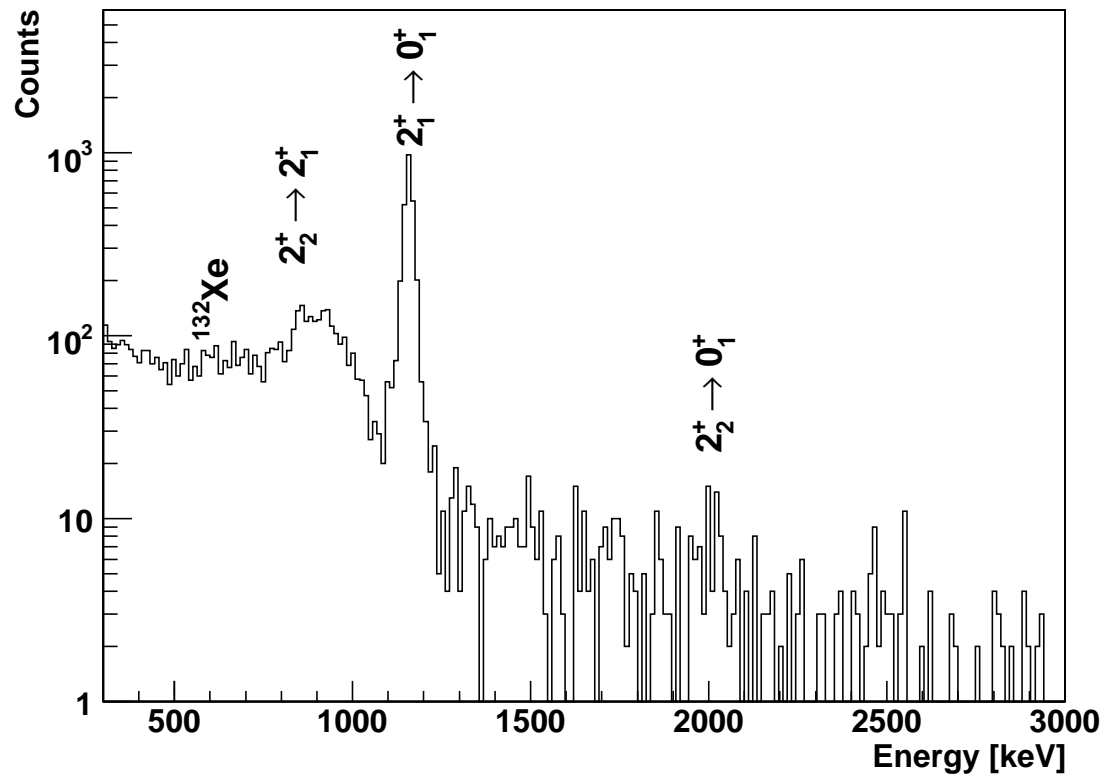
Gamma spectra – Ag target

projectile detected

recoil detected



Gamma spectra – Pb target



To do:

- analysis of ^{109}Ag data with GOSIA2, then ^{208}Pb with GOSIA
- To be obtained:
 - $B(E2; 2_1^+ \rightarrow 0^+)$ value determined with higher precision;
 - quadrupole moment of the 2_1^+ state;
 - transitional matrix elements between the observed states (0^+ , 2_1^+ , 2010 keV (2_2^+))
- Future plans – low-energy Coulomb excitation of ^{46}Ar

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Detector shape on (theta,phi) plane

