SALSA and its current activity







Description of SALSA











Description of SALSA





SALSA electronics





-8 V792 QDCs (CAEN)
-Readout via MBS in a RIO4-8072RE
-Fast N840 LED (CAEN)
-TFA-474 (ORTEC)
Gate an delay generators GG8020 (ORTEC)



AGATA electronics



800 Años 1218-2018

Second generation AGATA digital electronics:

- 4 DIGI OPT12 (ASCOM)
- GGP (bus PCI-Express, Padova) in HP DL360pGen8 server







Right now acquiring a pulse data base corresponding to this AGATA detector





Resolutions (keV) with the digital electronics

Segment label	FWHM at 59.54 keV	FWHM at 661,66 keV	FWHM at 1173.23 keV	
А	1.2	1.6	1.9	
В	1.2	1.4	1.9	
С	1.1	1.5	1.8	
D	1.3	1.7	1.9	
E	1.2	1.6	2.0	
F	1.2	1.5	1.8	
CORE	2.1	2.3	2.6	



Measurements with a 1-mm collimated ¹³⁷Cs source to determine segment edges





Submilimetric XY-mechanics for source positioning



Spectra from the A segment centre







Spectra at the AB edge



The y camera of SALSA



- Four 52x52x5 mm³ LYSO crystals
- Four 64-fold pixelated PSPMTs, model Hamamatsu H10966A-100



Optimization of the y camera



Image of a NaI(Tl) detector as seen by the γ camera when applying the Anger's algorithm



Optimization of the y camera



$$f(x,y) = A \exp\left\{-\frac{1}{2} \left(\frac{(x-x_0)^2}{\sigma_x^2} + \frac{(y-y_0)^2}{\sigma_y^2}\right)\right\}$$



Characterization of a High Spatial Resolution Gamma Camera for Scanning HPGe Segmented Detectors. A. Prieto and **B. Quintana**, IEEE TNS 60 (2013), 4719-4726

Optimization of the y camera



Image of the NaI(Tl) detector with our algorithm





PSPMT	σ _{xo} (mm)	σ _{yo} (mm)						
ZK0021	0.43	0.42	1.32	0.19	0.33	0.44	0.11	1.61
ZK0084	0.31	0.36	1.40	0.22	0.28	0.31	0.25	1.31
ZK0065	0.30	0.34	1.25	0.24	0.43	0.37	0.37	1.22
ZK0079	0.71	0.66	1.18	0.48	0.58	0.67	0.69	1.49
	X axis	(inner)	X axis (edges)	Y axis	(inner)	Y axis	(edges)

Positions in the y camera

- (x, y) given by the γ -camera position algorithm
- z calculated from MC simulations



MEAN FREE PATH = 1.15 cm

Other elements of SALSA: the ²²Na source



Other elements of SALSA: the ²²Na source

Position of positron annihilation (XY plane projection)



Algorithm to compare pulses



Wilcoxon signed-rank-based technique for the pulse shape analysis of HPGe detectors. S. Martín *et al*. NIMA 823 (2016), 32-40.



Algorithm to compare pulses



Results of a Broad Energy Range detector (BEGe): pulse shape simulation



Algorithm to compare pulses



Results of a Broad Energy Range detector (BEGe): experimental pulse shapes



Measurements performed in U. Liverpool in 2011



SALSA algorithm







OUTPUT Set of groups with their correspondi ng pulses

SALSA algorithm





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1218~2018

SALSA algorithm



STEP 3



OUTPUT Set of groups with their correspondi ng pulses





Study of accuracy in the position determination with SALSA, a γ-scanning system for the characterization of segmented HPGe detectors. A. Hernández-Prieto et al., NIM A 823 (2016) 98-106





Detector	$\sigma_{X_D} \ (\mathrm{mm})$	$\sigma_{Z_D} \ ({ m mm})$	$\sigma_{Y_D} \ ({ m mm})$
BEGe	± 1.08	± 1.08	± 0.98
PLANAR	± 0.92	± 0.92	± 0.94
AGATA	± 2.05	± 2.05	± 1.84





Measurements in Compton mode





Measurements in Compton mode



Determining the dead layer of the BEGe detector



Determining the dead layer of the BEGe detector



Determining the dead layer of the BEGe detector

