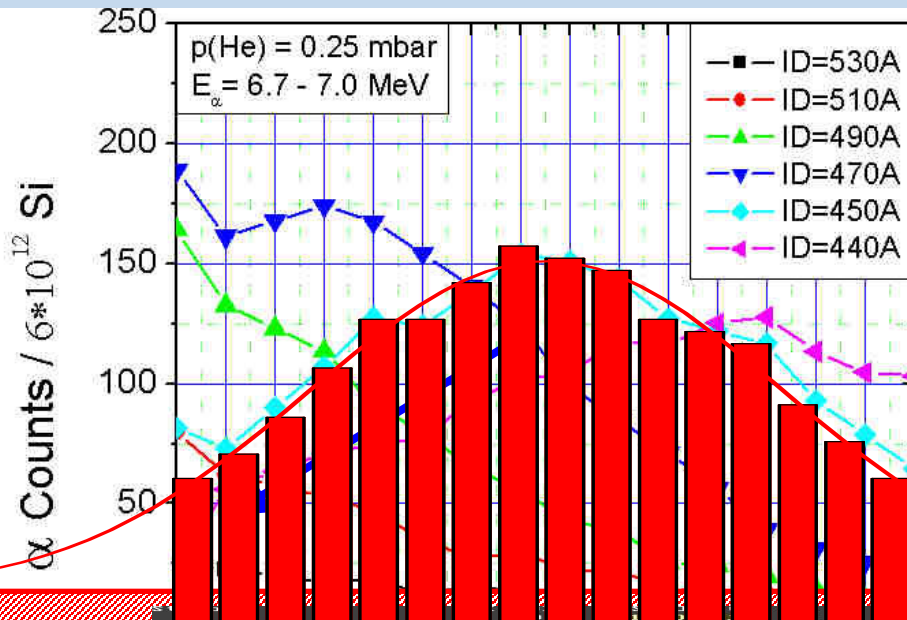
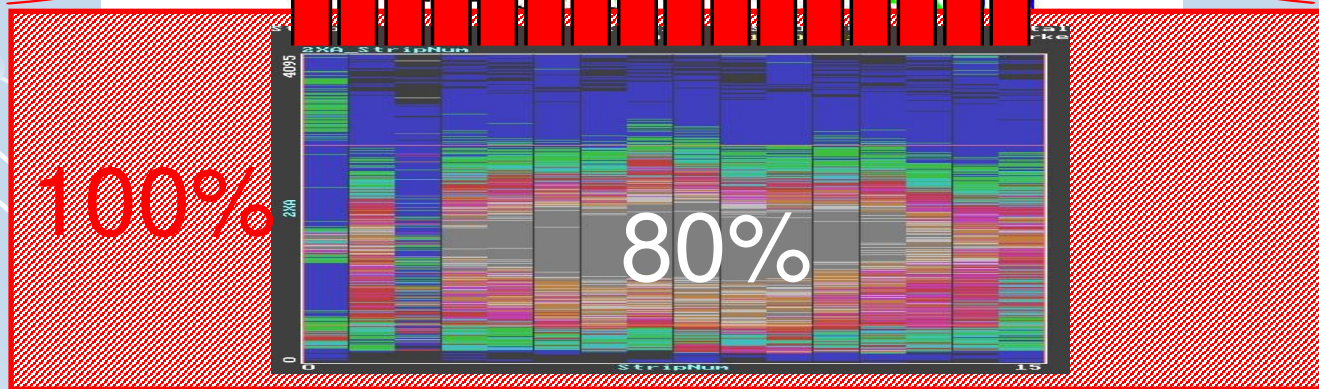


The TASCA FPD + DAQ – new developments

HTM – distribution of EVRs in the FPD

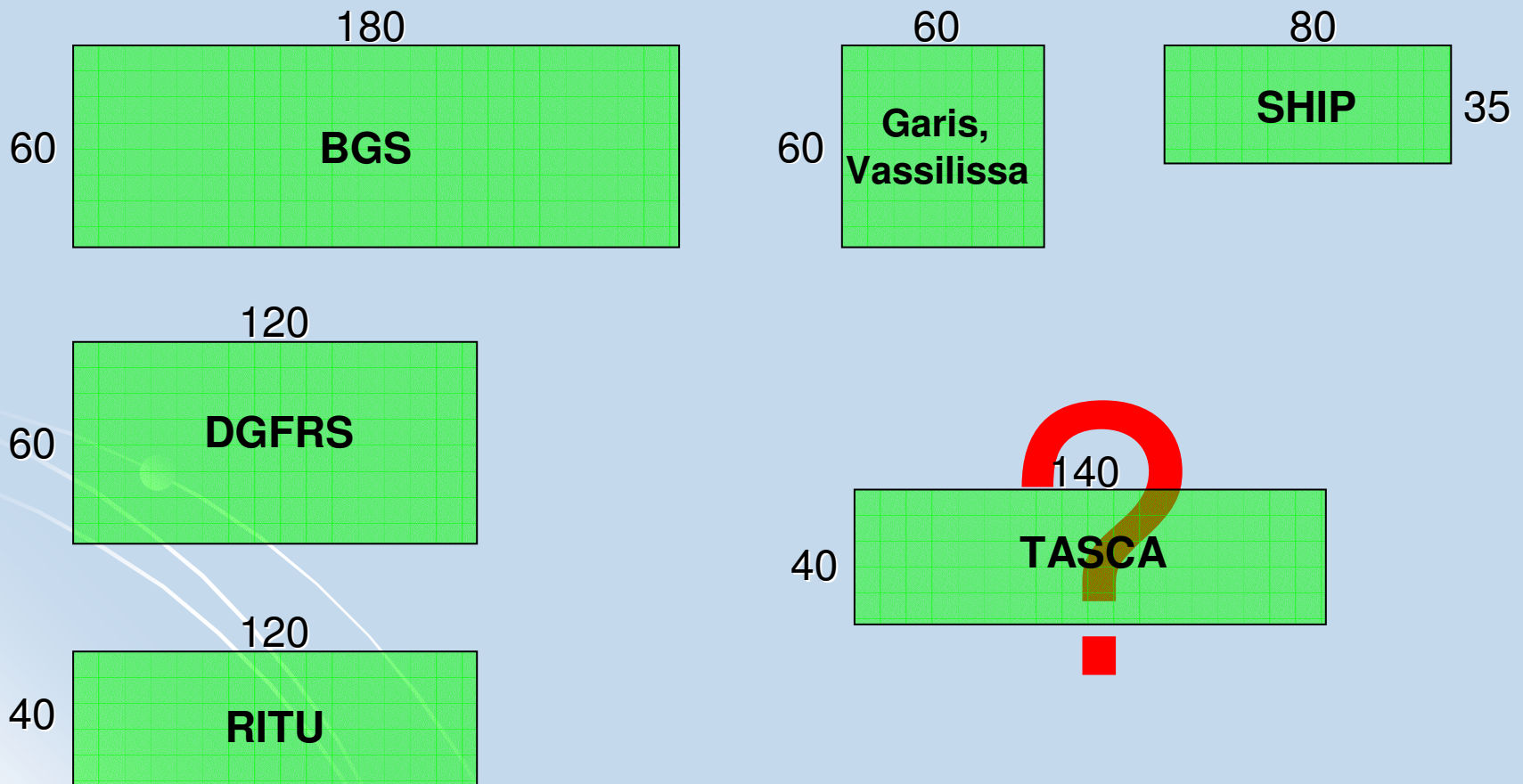


„SHIP“ focal plane detector 35 x 80 mm²

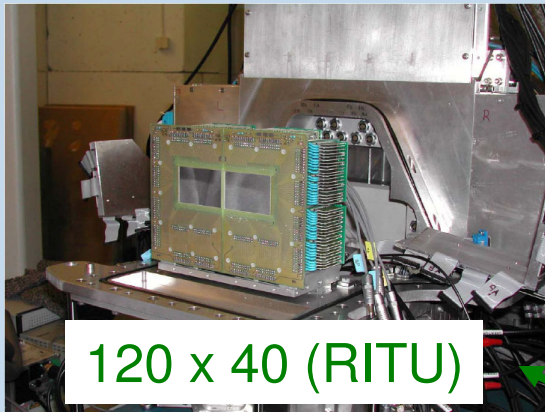


140 x 40 mm²

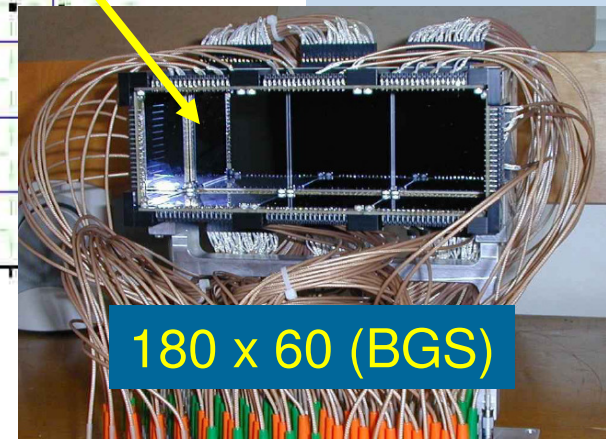
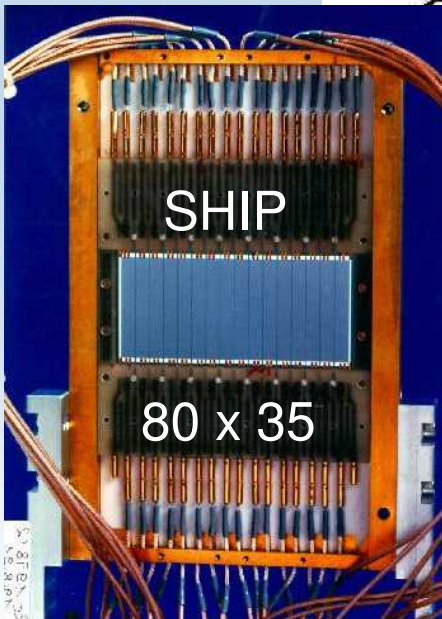
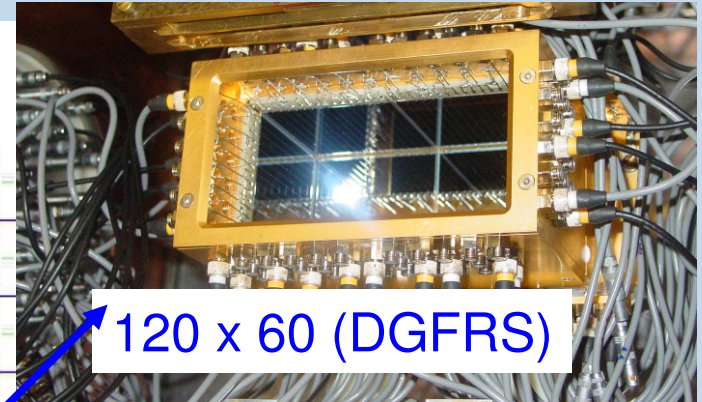
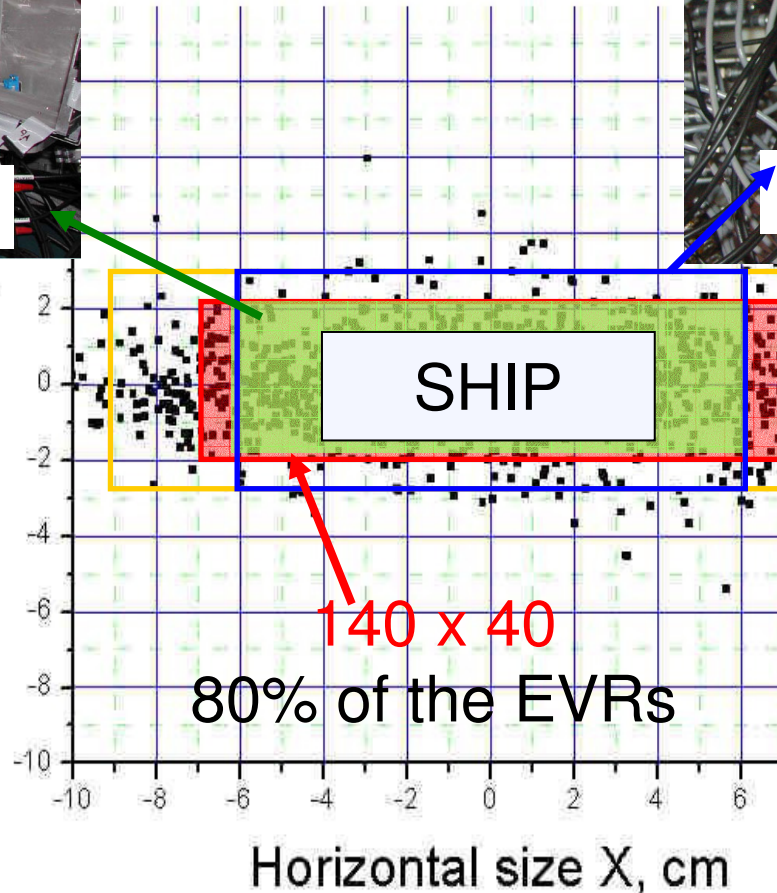
Size of focal plane detector depends on image size of EVRs



EVR distribution and detector size



$^{22}\text{Ne} + ^{244}\text{Pu}$



PSD

vs.

DSSD

😊 good energy resolution

😞 bigger pixel size

😊 smaller pixel size

😊 smaller number of
electronic channels

😞 more electronics needed

😞 problems with position
calibration

😊 position defined by
pixel size

If we have enough electronics, DSSD is more preferable

DGFRS

- **PSD (2 detector)**

Active area: 58*58 mm

Chip dimensions: 60*60 mm

Number of strips : 16 (3.75 mm x 60 mm)

Energy resolution : 40 keV

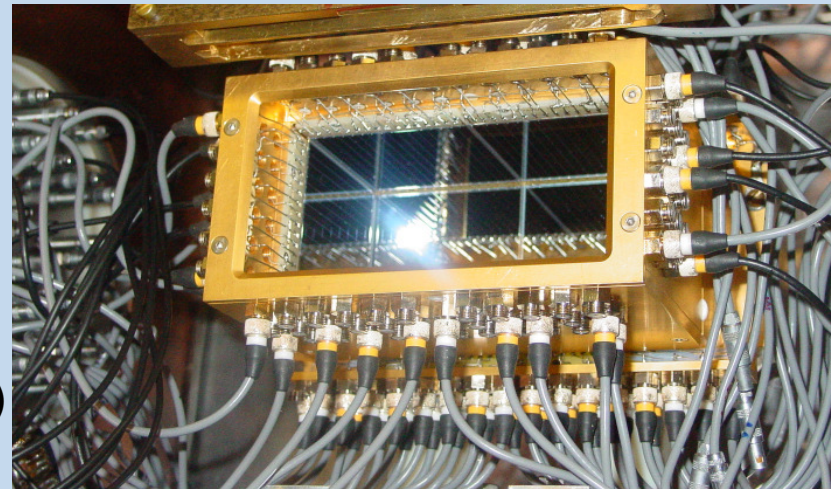
- **SSD (6 detectors)**

Active area: 58*58 mm

Chip dimensions: 60*60 mm

Number of strips : 16 (3.63 mm x 58 mm)

Energy resolution : 20 keV



Total number of channels: 192

28.09.2007

TASCA'07 Workshop

A. Yakushev

A. Yakushev, TU Munich

TASCA detector group meeting - The TASCA PSD - DAQ: new developments 19.03.2007

GREAT

- **DSSD (2 detectors)**

Active area: 60*40 mm

Chip dimensions: 63.5*43.5 mm

Number of strips : 60 + 40

Energy resolution : 17-20 keV

- **PIN diodes (28 detectors)**

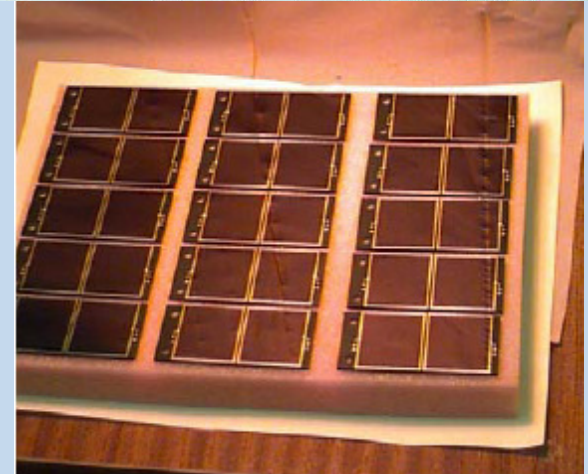
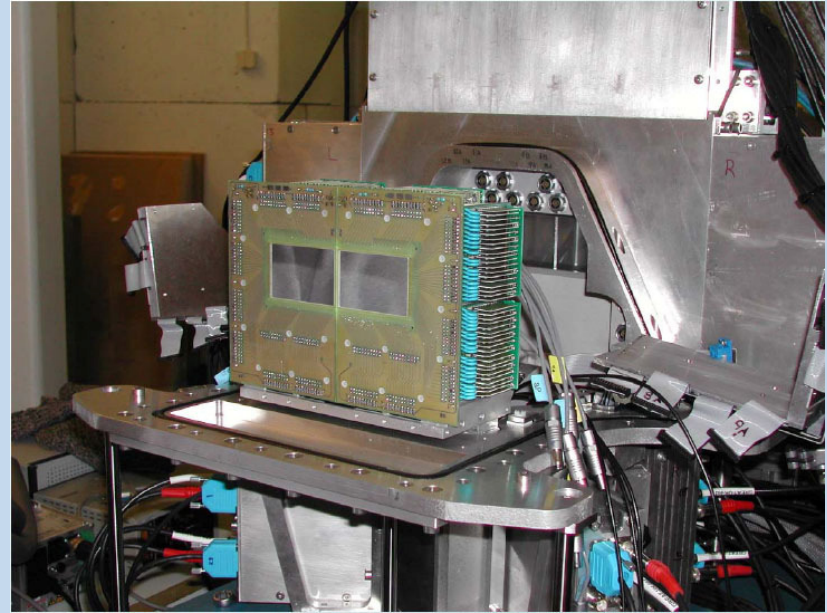
Active area: 28*28 mm

Thickness: 500 μm

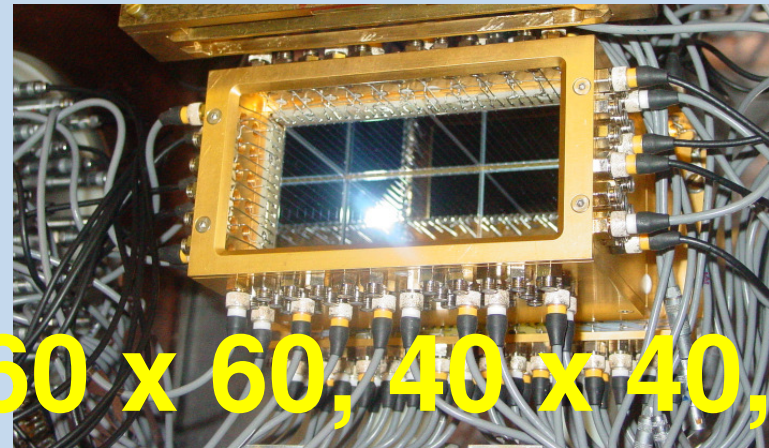
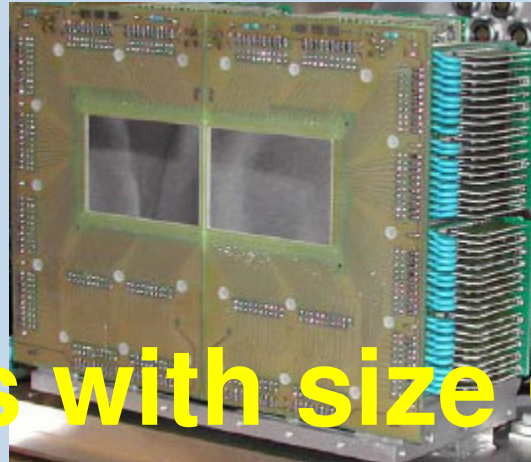
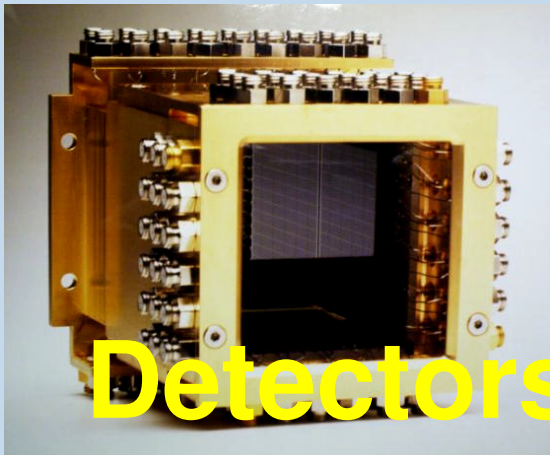
β resolution: ~ 5 keV

2 chips on motherboard

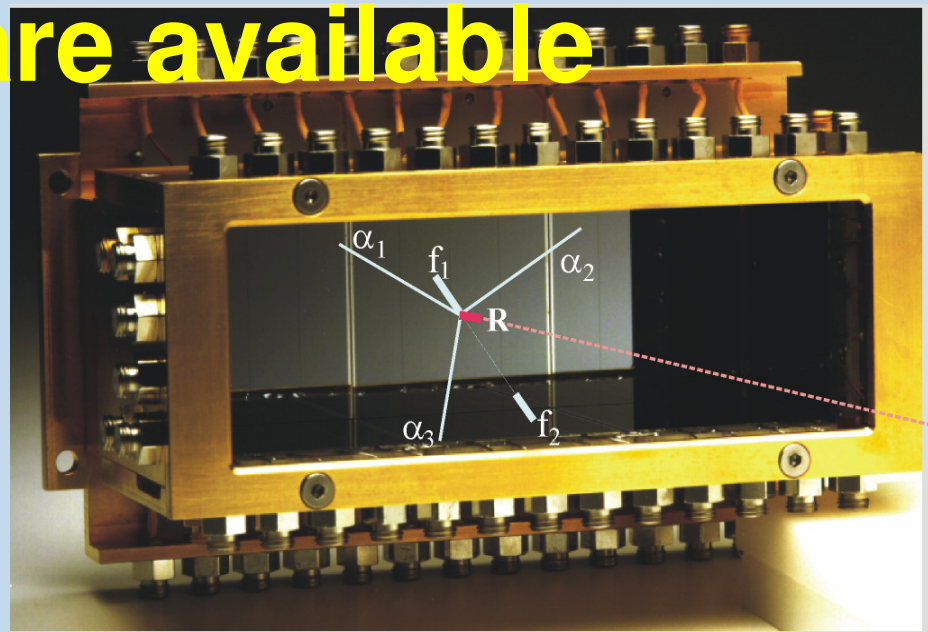
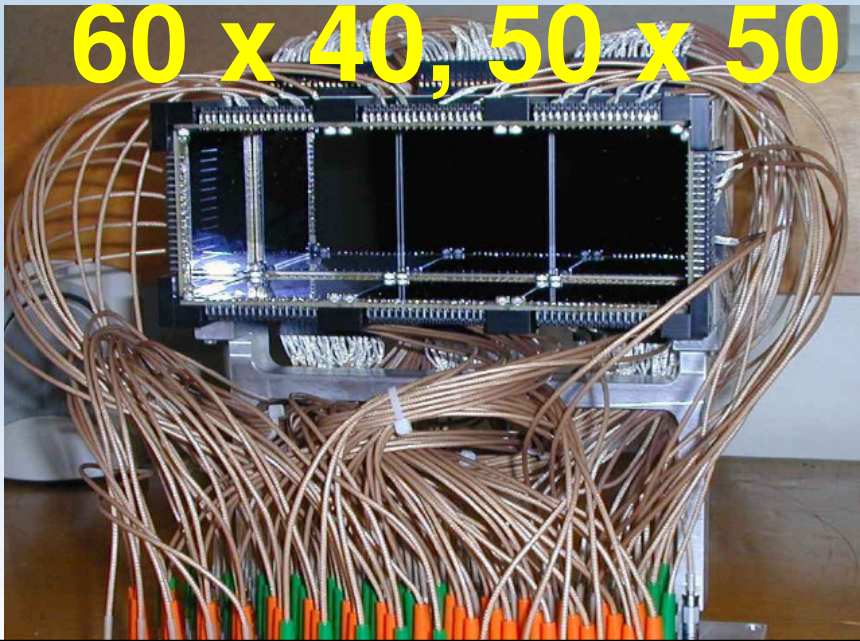
Total number of channels: 228



FPD setups



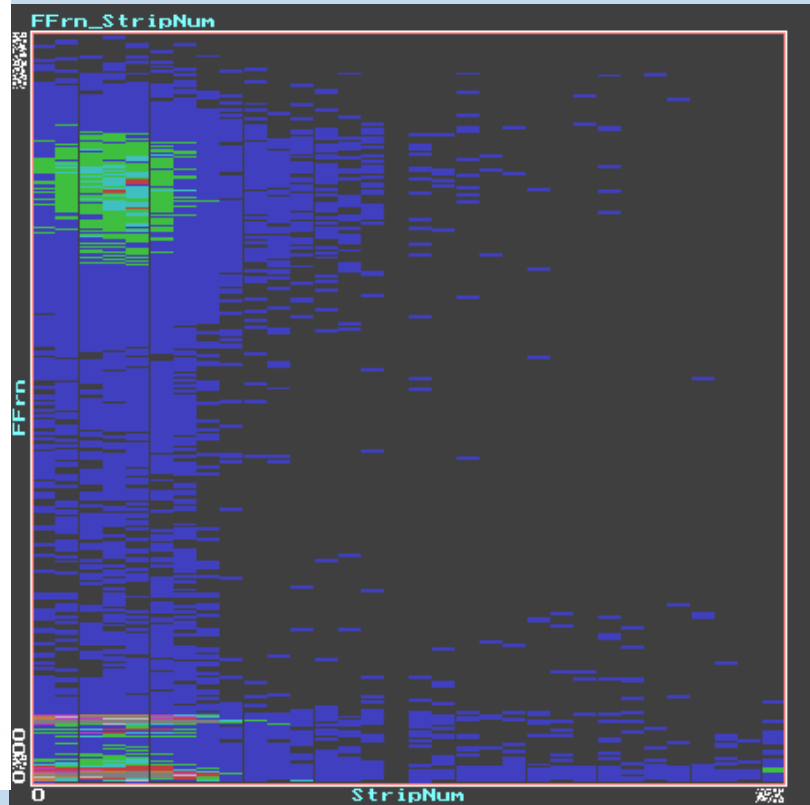
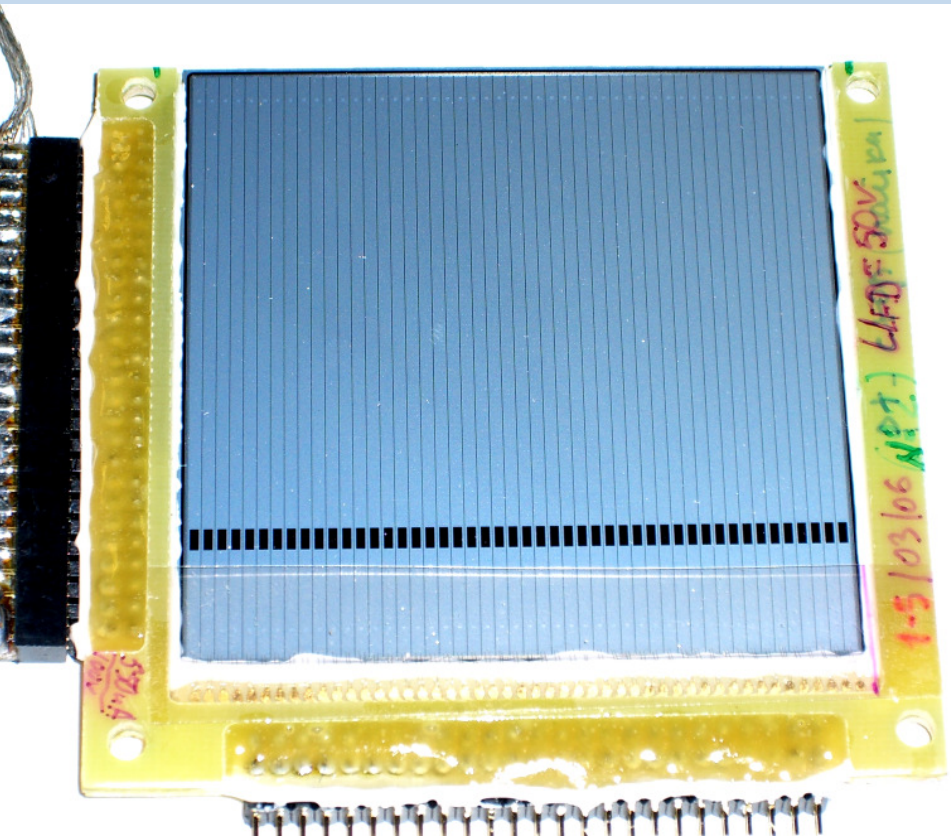
Detectors with size 60 x 60, 40 x 40, 60 x 40, 50 x 50 are available



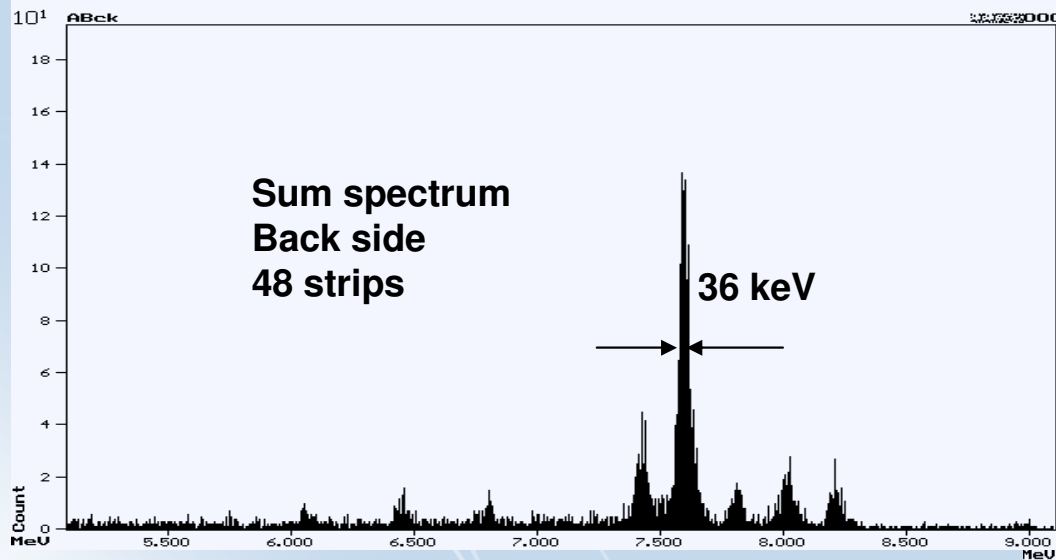
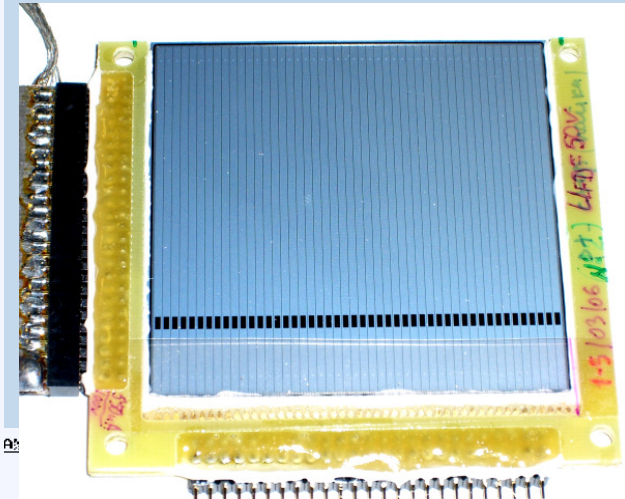
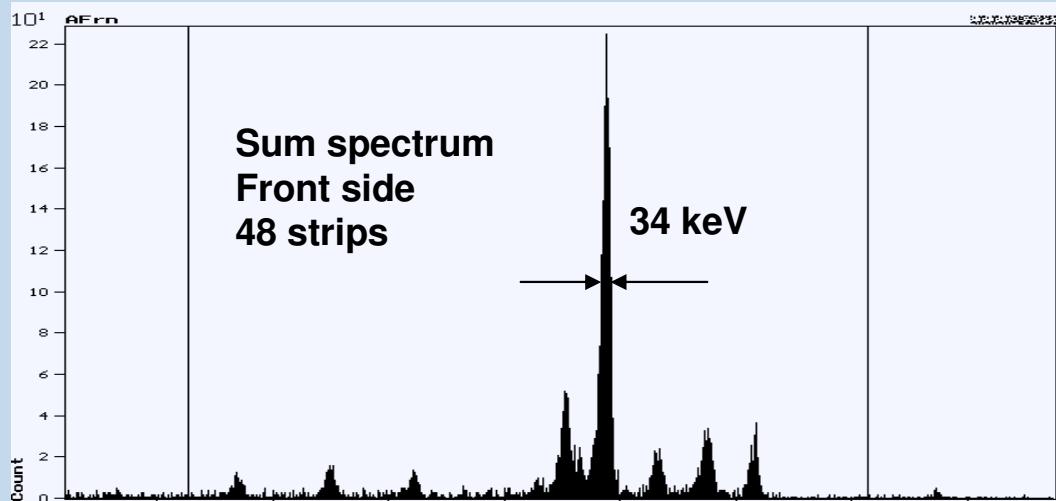
28.09.2007
TASCA'07 Workshop
Davos, Switzerland

A. Yakushev, TU Munich
The TASCA FPD+DAQ – new developments

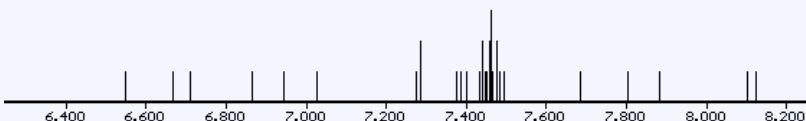
First probing DSSD at TASCA



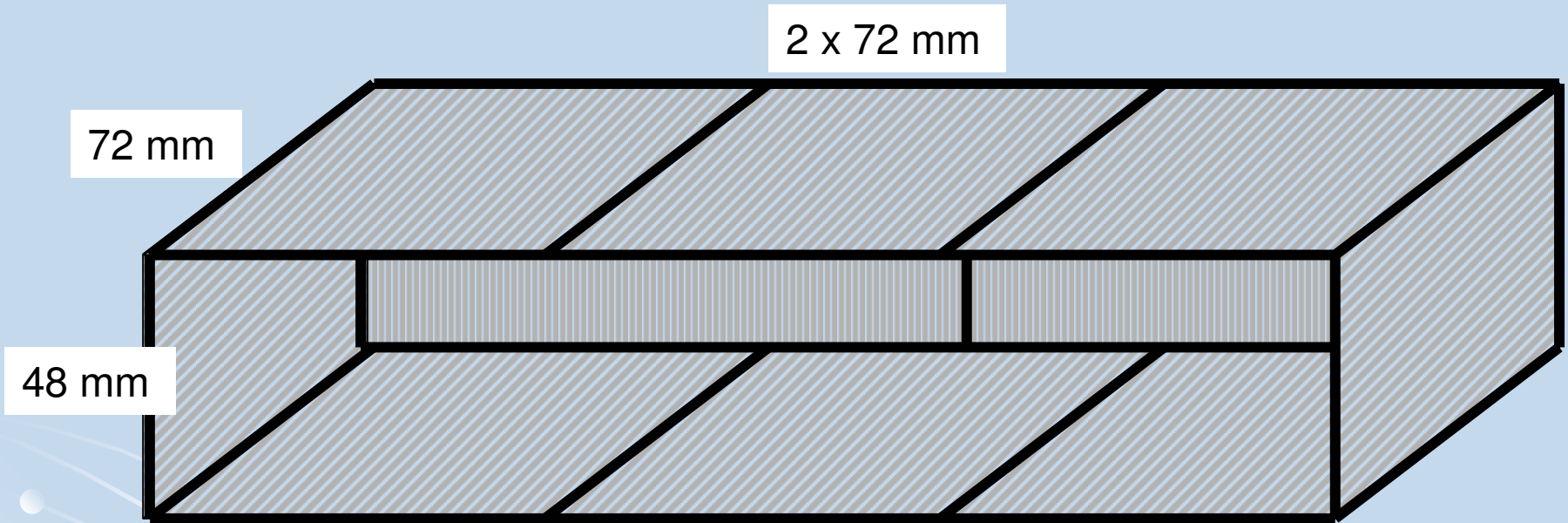
First probing DSSD at TASCA



Single pixel spectrum



Development of DSSD and SSD with size 72 x 48 mm²

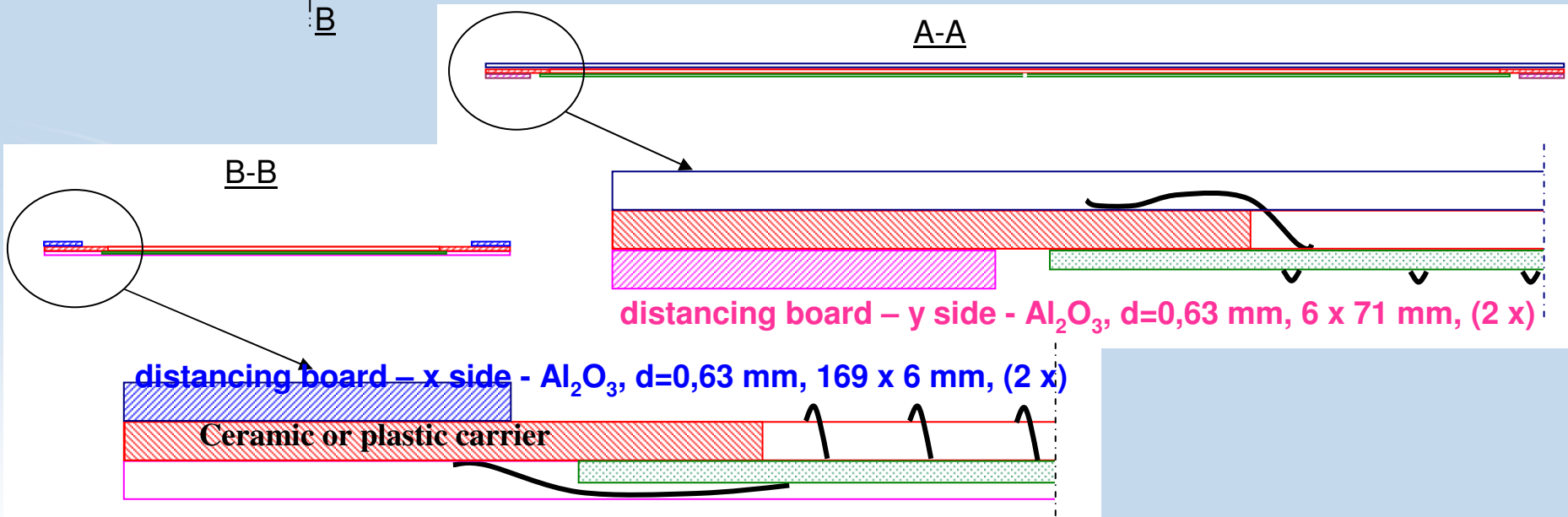
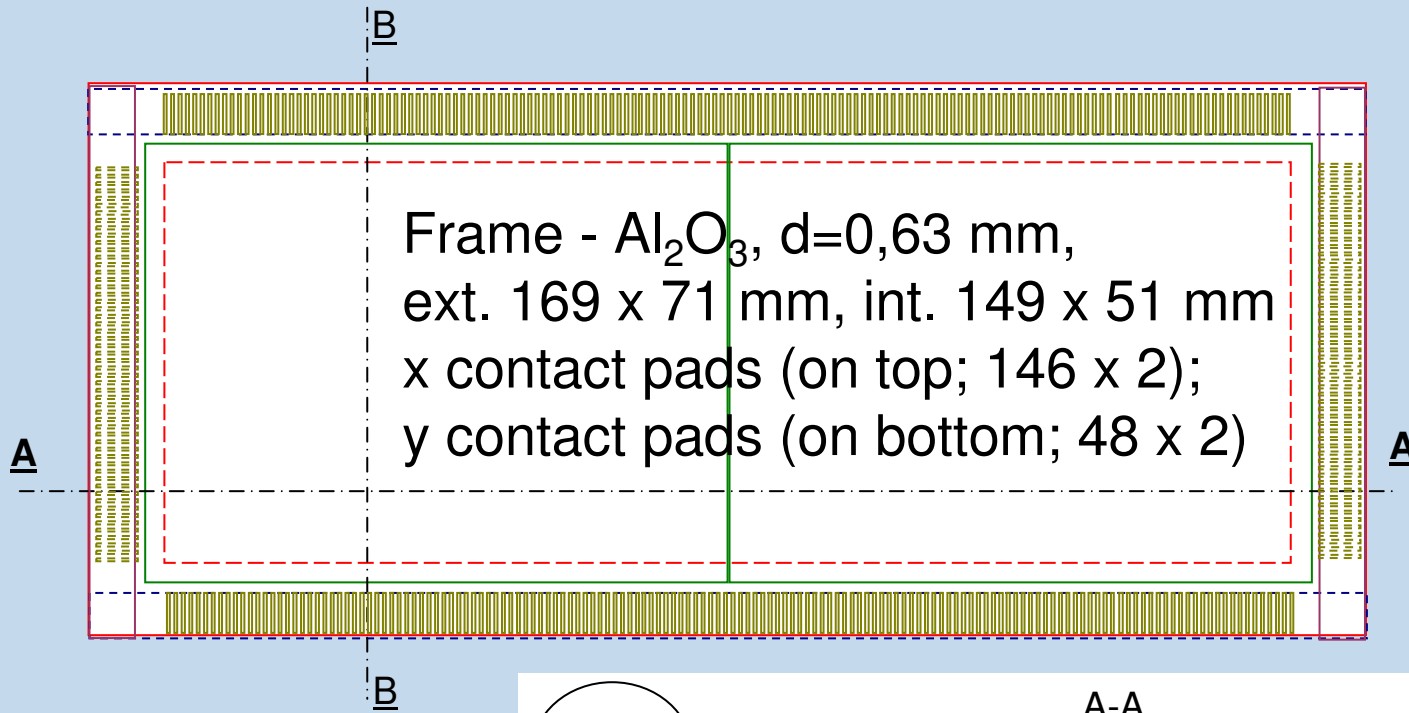


2 x DSSD 72 x 48 mm² (1 mm pitch)
8 x SSD 72 x 48 mm² (16 or 8 strips)

Geometrical efficiency for alpha particle detection

Focal plane detector dimensions, mm	Box depth, mm	Efficiency
120 x 40	60	72.1%
120 x 60	60	69.9%
144 x 48	72	72.1%

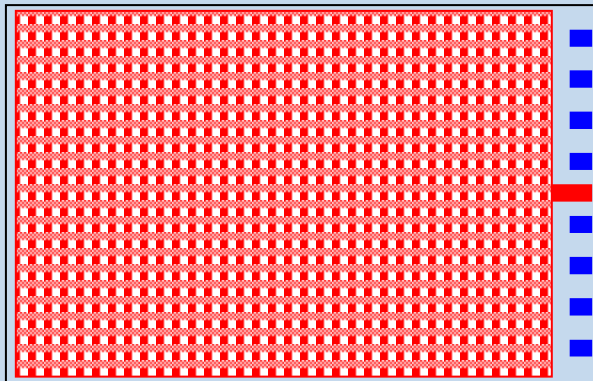
Double sided strip detector (DSSD) /Warsaw/



DSSD structure (p+ - n - n+)

<i>Structure size “mechanical”</i>	<i>77 x 56 mm</i>
<i>Structure size “electronic”</i>	<i>74 x 50 mm</i>
<i>Active area</i>	<i>72 x 48 mm</i>
<i>Number of vertical strips</i>	<i>72</i>
<i>Number of horizontal strips</i>	<i>48</i>
<i>“X” Strip (p+ - anode) pitch</i>	<i>1 mm</i>
<i>“Y” Strip (n+ - cathode) pitch</i>	<i>1 mm</i>
<i>Total thickness of the structure</i>	<i>310 ± 10 μm</i>
<i>Thickness of the n active layer</i>	<i>305 ± 10 μm</i>

Single side strip detector (SSSD) /Warsaw/

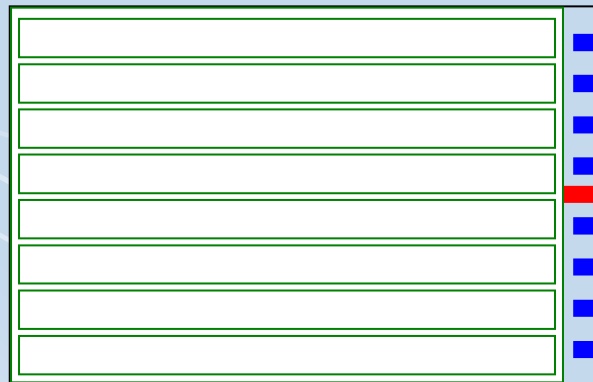


Ceramic carrier

Al_2O_3 ceramic $d=0,63$ mm, 80 x 48 mm

Common cathode

Anode pads (16 x)



Detector

SSSD structure (p+ - n - n+)

Structure size	<i>72 x 48 mm</i>
Active area	<i>70 x 46 mm</i>
Number of strip	<i>16 or 8</i>
Pitch	<i>2,875 or 5.75 mm</i>
Total thickness of the structure	$500 \pm 20 \mu\text{m}$
Thickness of the n-active layer	$495 \pm 20 \mu\text{m}$

Electronics: possible solutions

1. Integrated preamplifiers and flash ADCs –
development by J. Hoffmann, GSI
prototype could be ready in two years

☺ stored pulse shape gives more information

2. Electronics from Dubna

16x preamplifiers

16x amplifiers with 2 outputs (alpha and SF)

CAMAC based ADCs or VME based ADCs

☺ proved and stable

☺ can be used for other experiments (chemistry)