

# Report Status and Perspectives on the Detector WG

Olivier DORVAUX  
for the PARIS collaboration

SPIRAL 2 Week

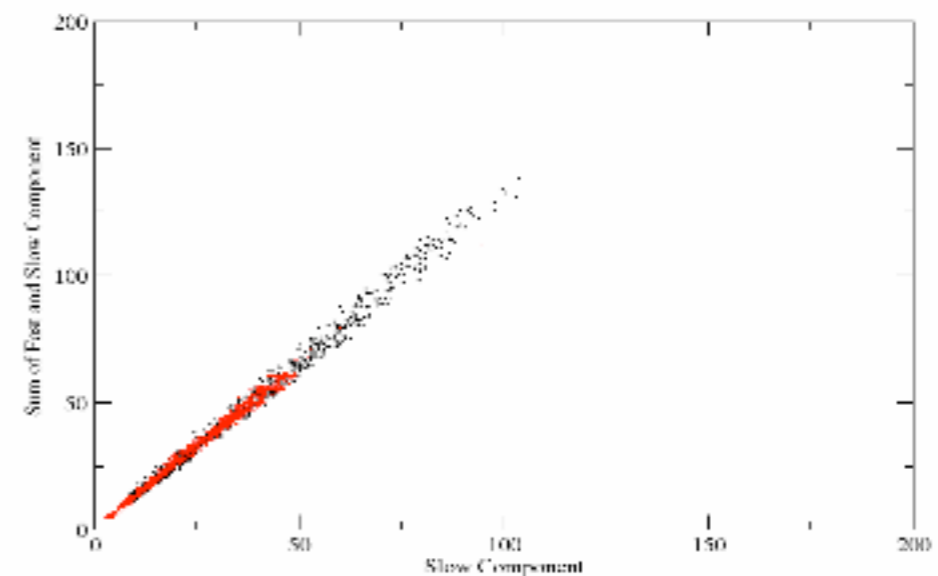
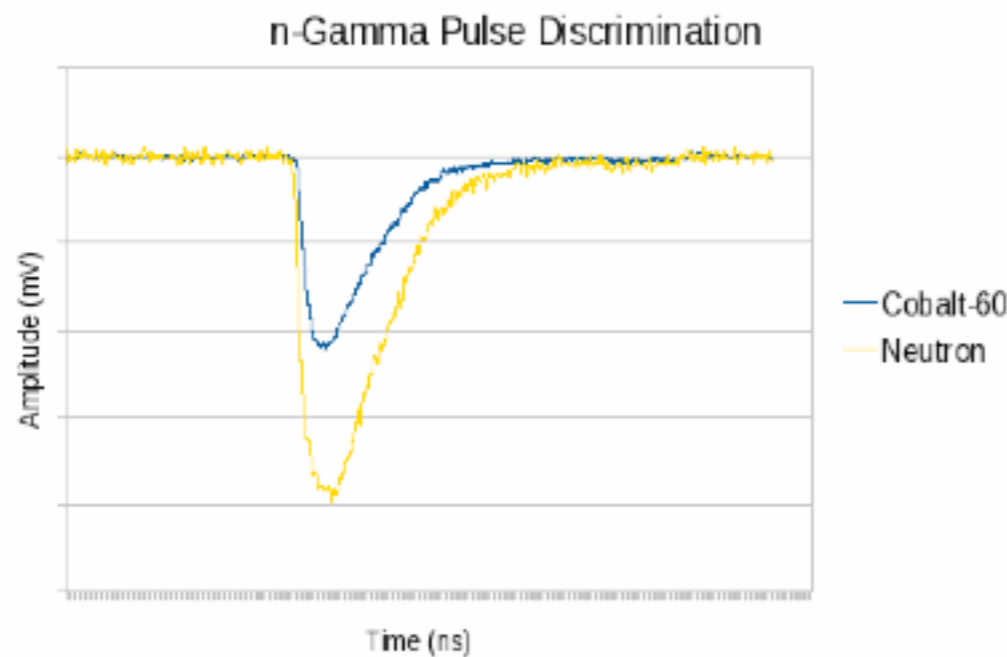


# What has been done...

## 1. First step of n- $\gamma$ discrimination

Oliver Roberts, Pankaj Joshi, David Jenkins, Bob Wadsworth, Adam Tuff (York University)

$$N = A.e^{\frac{-t}{\tau_f}} + B.e^{\frac{-t}{\tau_s}}$$



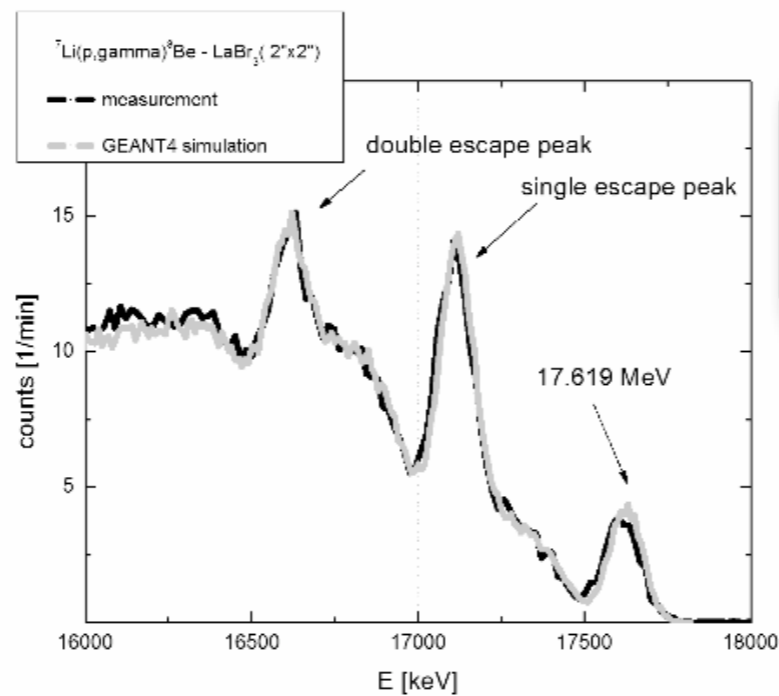
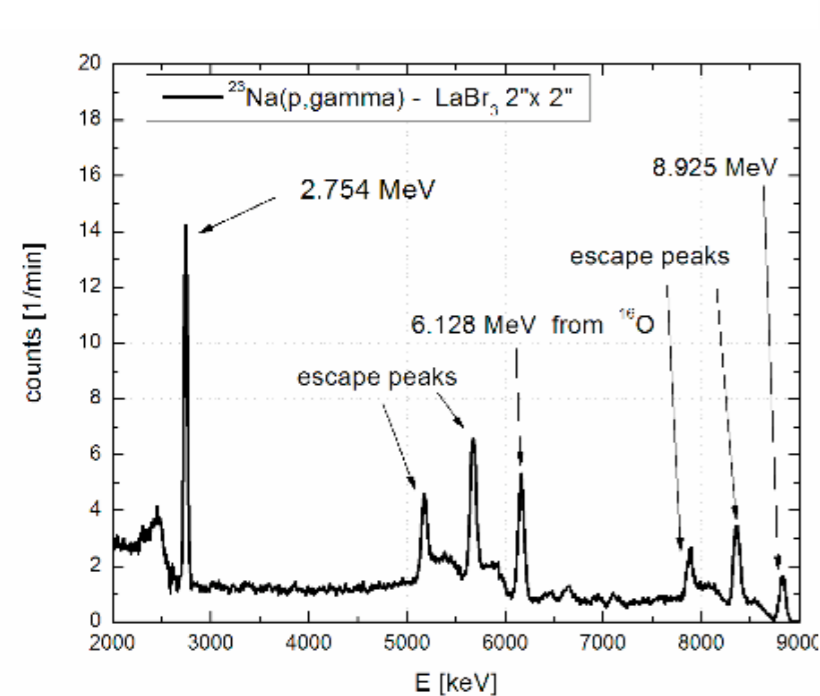
n- $\gamma$  discrimination unsuccessful with a 1.5" x 1.5" LaBr<sub>3</sub>:Ce crystal due to intrinsic excited state emission after neutron activation

# What has been done...

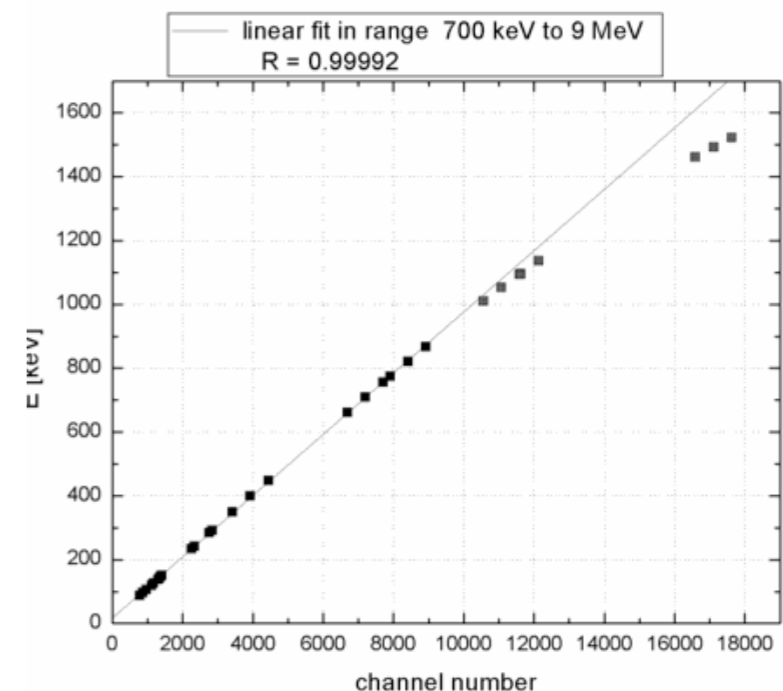
## 2. LaBr<sub>3</sub>:Ce efficiency measurements

M. Ciemala, D. Balabanski, M. Csatlos, J.M. Daugas, G. Georgiev, M. Kmiecik, A. Krasznahorkay, S. Lalkovski, A. Lefebvre-Schuhl, R. Lozeva, A. Maj, A. Vitez

IFJ PAN, Krakow, INRE Sofia, ATOMKI Debrecen, CSNSM Orsay, IKS, KU Leuven



based on (p, γ) reactions performed at the 5 MV Van de Graaff accelerator of ATOMKI leading to γ energies from 1,4 to 17,6 MeV



linearity of Energy resolution versus  $\sqrt{E}$

# What has been done...

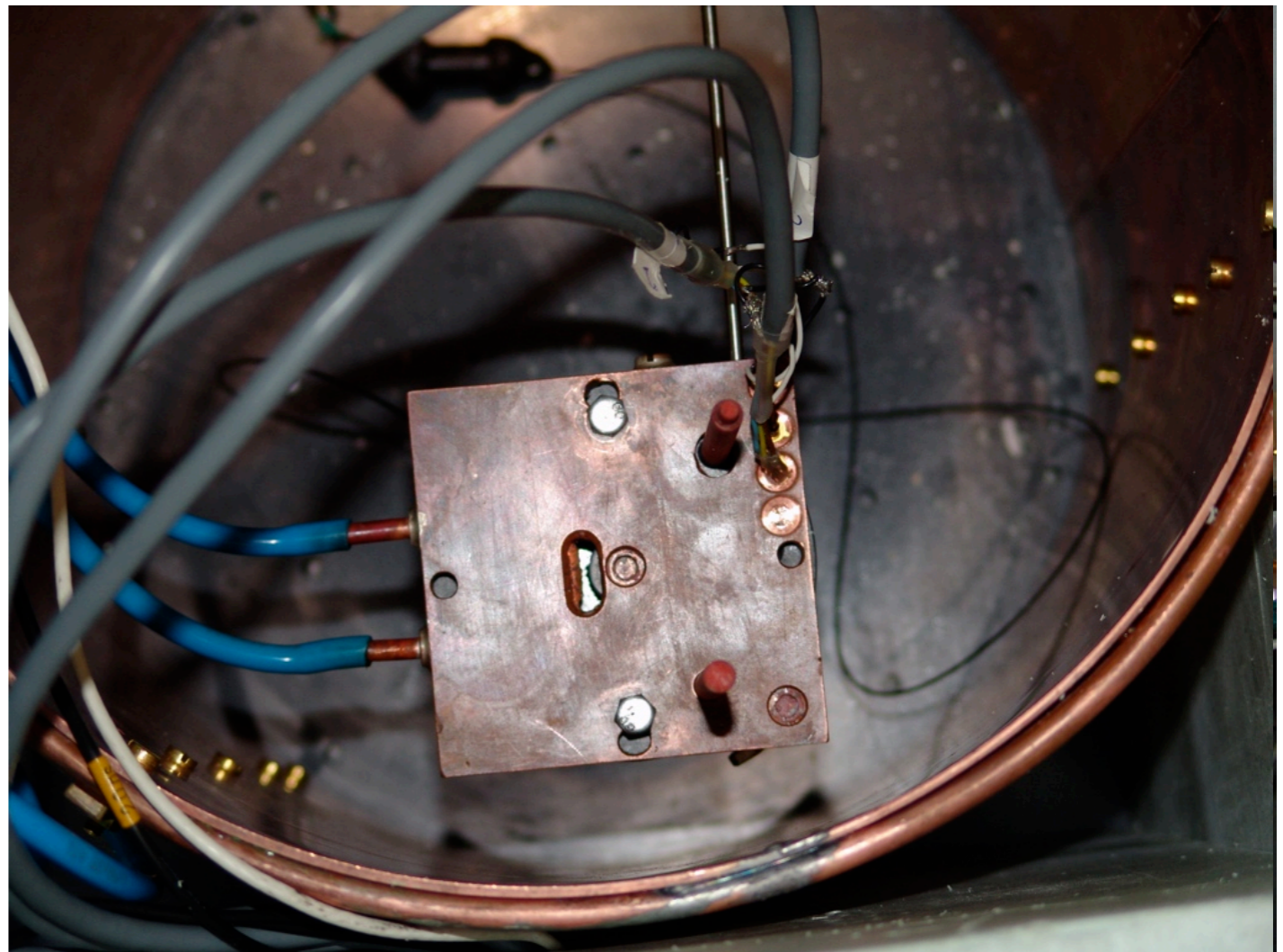
## 3. APD characterization (temperature control)

Th. Adam, J. Devin, O. Dorvaux, Ch. Finck, C. Mathieu, P. Médina, Ph. Peaupardin, M. Rousseau, J. Schuller

IPHC-DRS Strasbourg

Interfaced with labview :

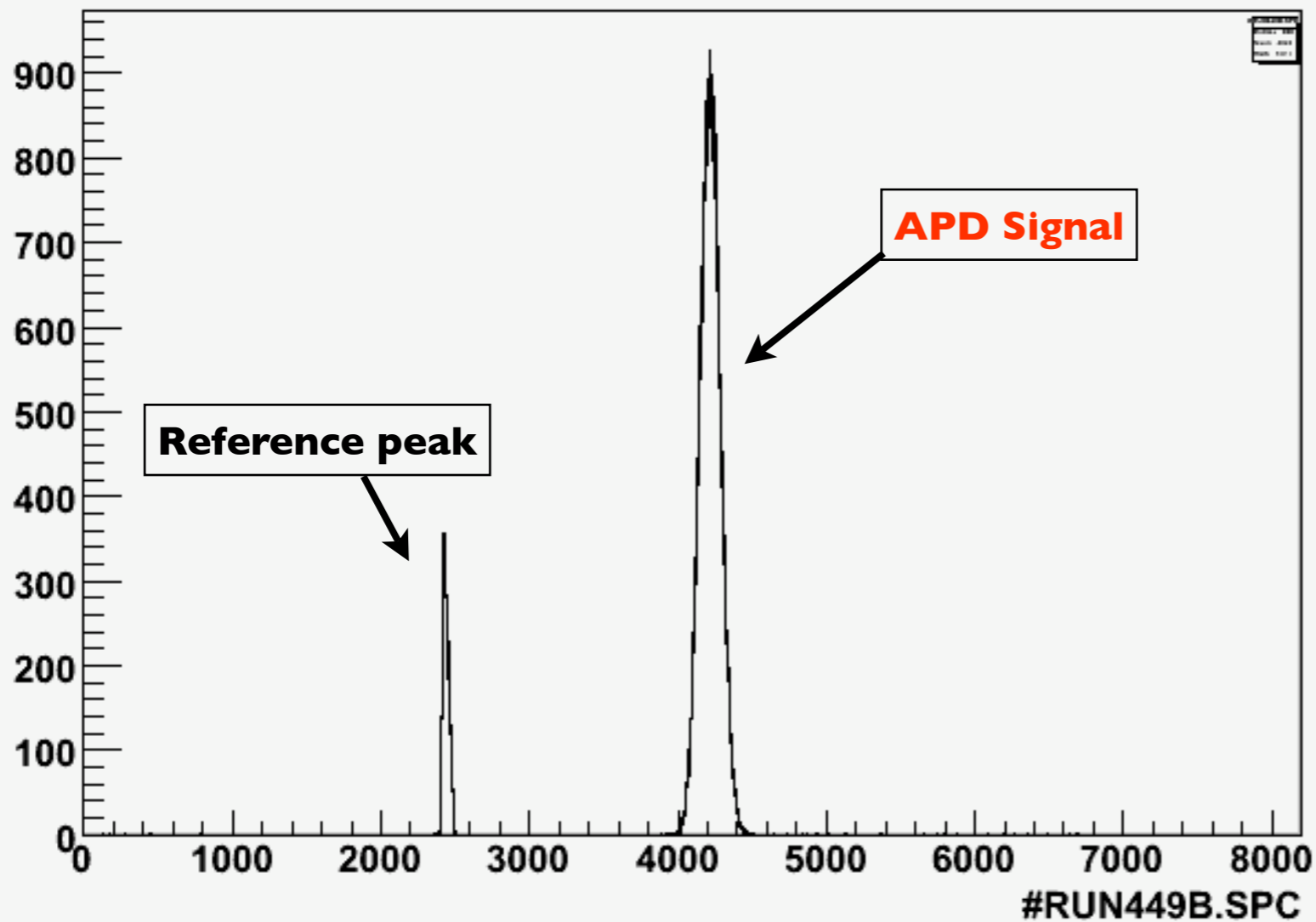
- Temperature through 3 captors within a precision of  $0.1\text{ }^{\circ}\text{C}$  : used range from  $-20\text{ }^{\circ}\text{C}$  up to  $+30\text{ }^{\circ}\text{C}$
- High Voltage within a precision of  $0.01\text{ V}$  and leakage current of  $1\text{ nA}$ .



# What has been done...

## 3. APD characterization : some new results

RUN449B.SPC



Evolution of Gain and Resolution of APD 8664-1010 with temperature and high voltage using blue LED (420 nm)

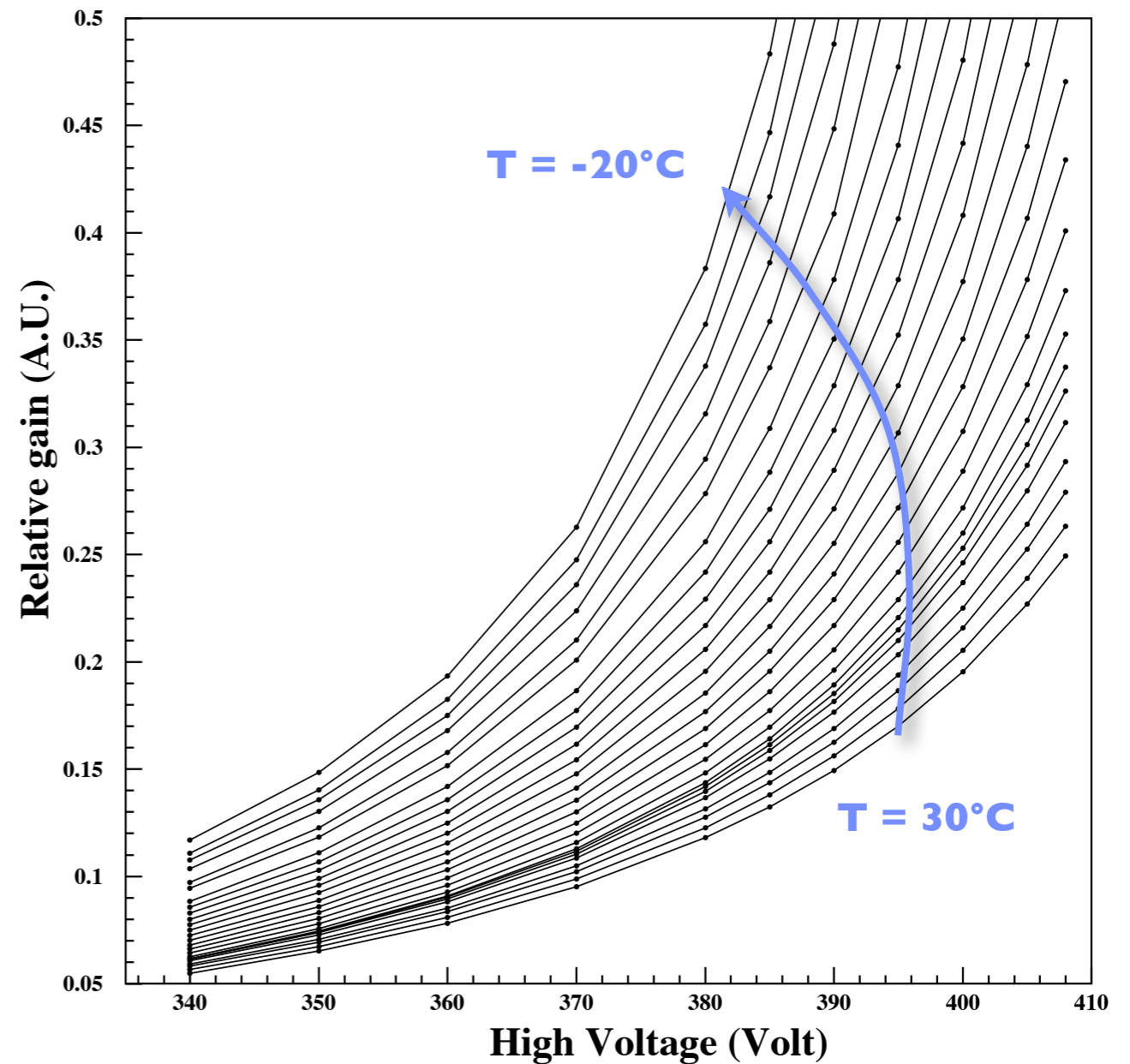
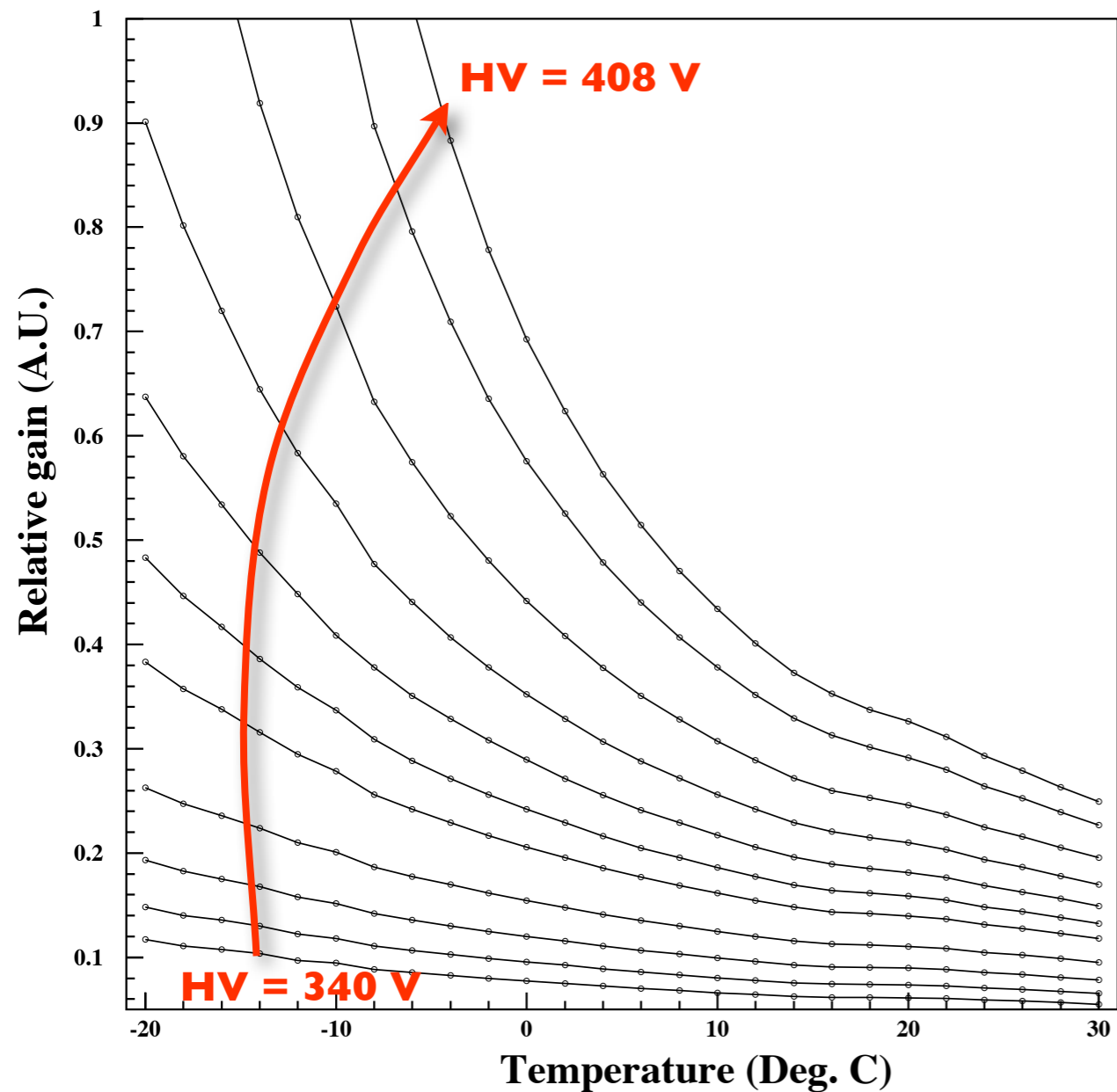
$$G = \frac{\text{APD Signal Position}}{\text{Reference Peak Position}}$$

$$R = \frac{\text{FWHM}}{\text{APD Peak Position}}$$



# What has been done...

## 3. APD characterization : some new results



# Next steps for year 2009...

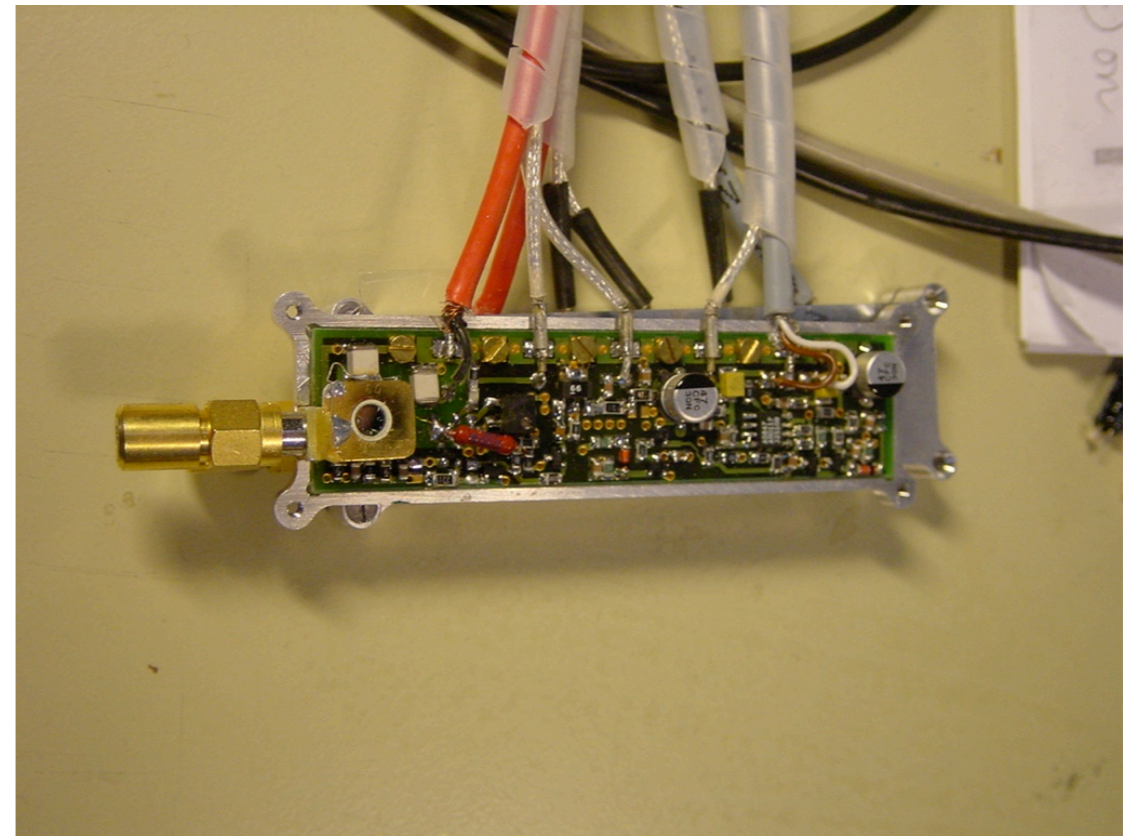
## 1. New preamplifier

Rather stable

Well adapted to high capacitance detectors

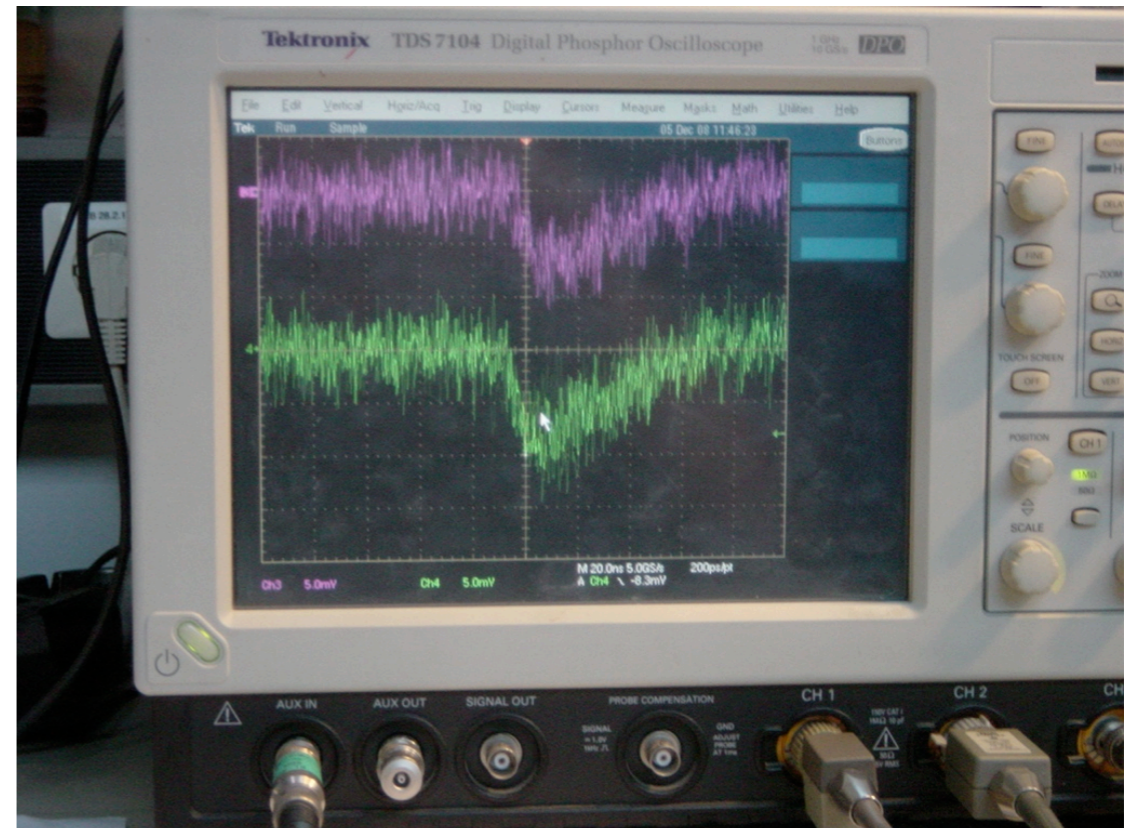
Energy and timing outputs

M. Ciobanu, IEEE 2008, FOPI collaboration



## 2. n- $\gamma$ discrimination

Pulse shape analysis and time-of-flight with digital electronics  
(timing algorithm)



# Next steps for year 2009...

## 2. Test of next configurations (conditioned by time delivery of new crystals!) with sources (and then with beams)

- LaBr<sub>3</sub>:Ce (1" x 1" x 2") coupled with APDs : IPHC Strasbourg
- LaBr<sub>3</sub>:Ce and CsI(Na) (1" x 1" x 6") individual crystals : IPHC Strasbourg
- LaBr<sub>3</sub>:Ce and CsI(Na) phoswich configuration : York University
- LaBr<sub>3</sub>:Ce large size (2" x 2" x 4" and 2" x 2" x 2") : IPN Orsay and Krakow ?
- LaCl<sub>3</sub> : what size ? : GANIL

## 3. Special requirements

- From where (which collaboration) can we borrow a LaBr<sub>3</sub> crystal from now to ~April 2009 ...?
- Will PARIS be used in special conditions (Intermediate Focal Plane of S3,...) ?