HIGHLIGHTS on Poster Session 3

Thursday, 15:20 – 16:30

Rémi Chipaux

CEA/IRFU

18 posters

16 highlight slides received

2 noshow

PMT (11, PSPMT 6)

APD, PD, SiPM

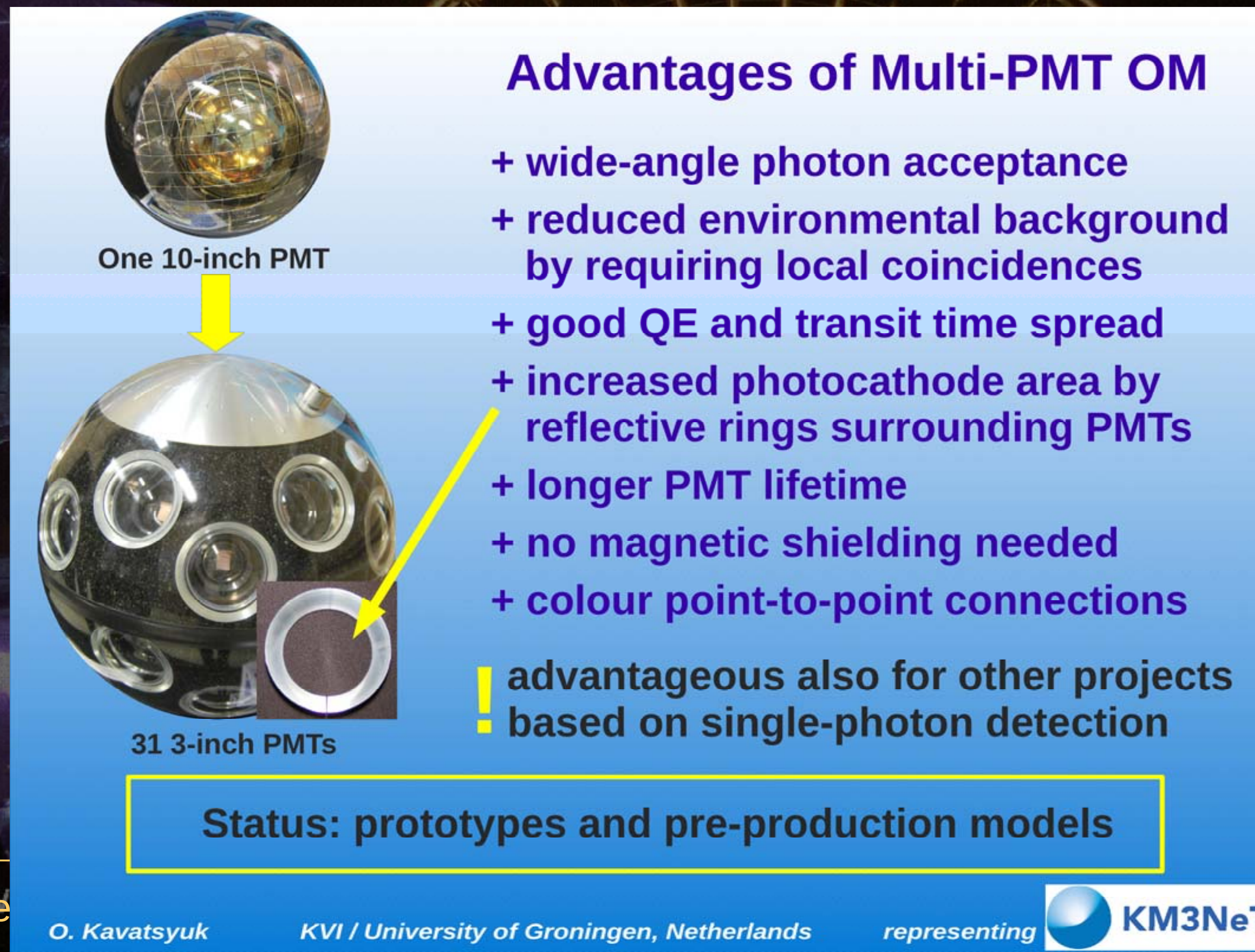
in astro- and high-energy physics (7)

Crystals (2)

II Oksana Kavatsyuk (ID81)

Multi-PMT optical module for the KM3NeT neutrino telescope

Description, comparison, optimisation, simulation of KM3Net optical modules



Oleg Kalekin (ID40)

Photomultipliers for the KM3NeT optical modules

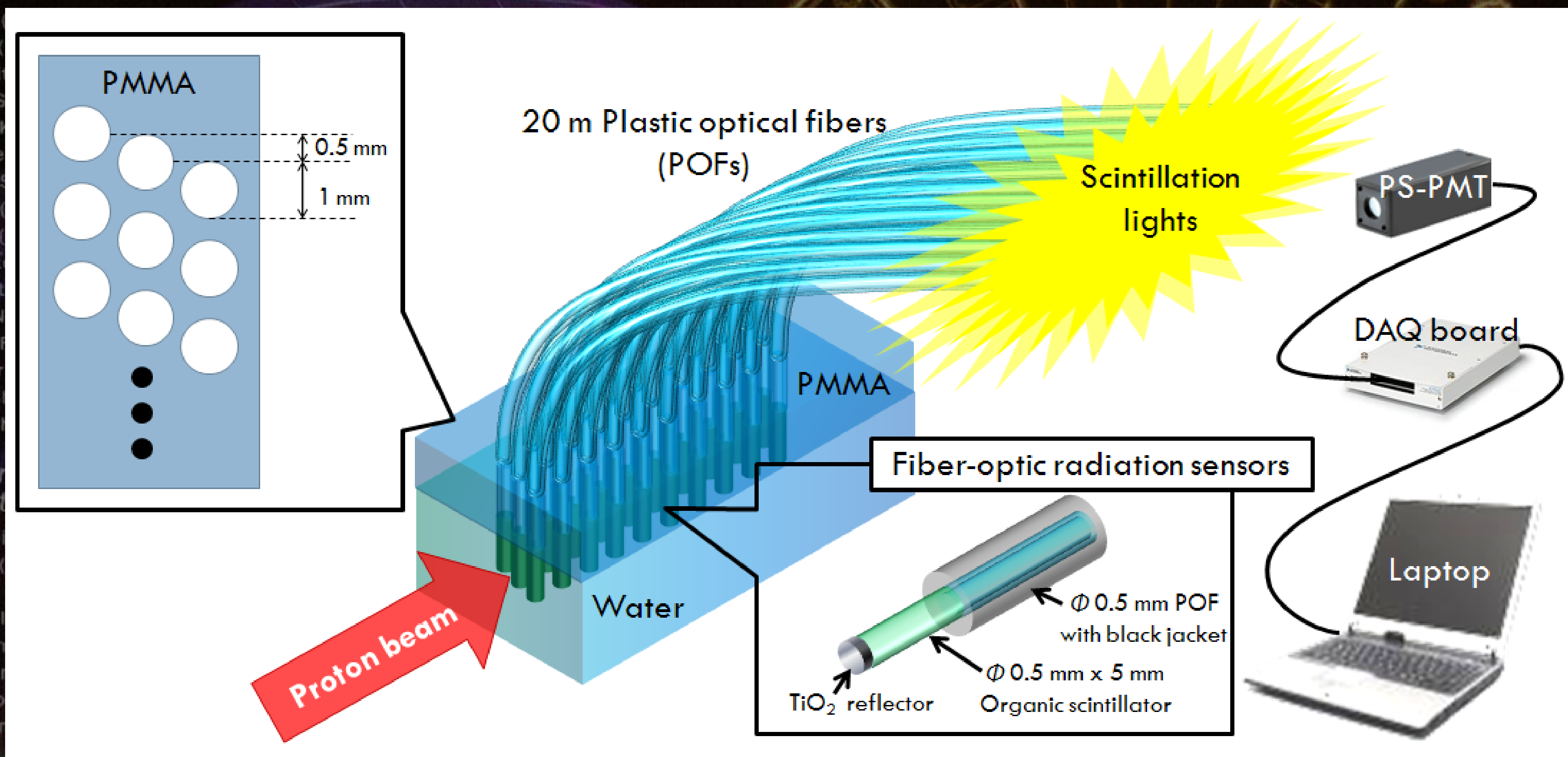
Results of test of 3'' PMTs

R6233-01 from Hamamatsu

D783KFLA from ETEL

Bongsoo Lee (ID61)

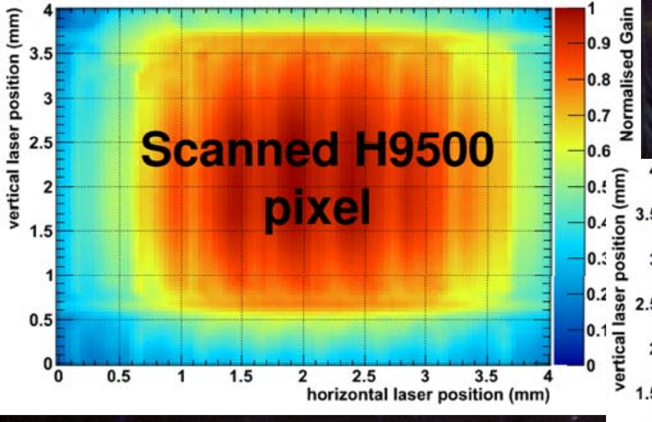
Multidimensional fiber optic radiation sensor for ocular proton therapy

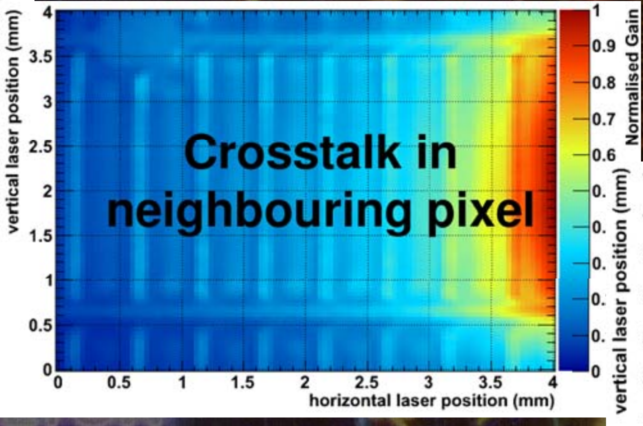


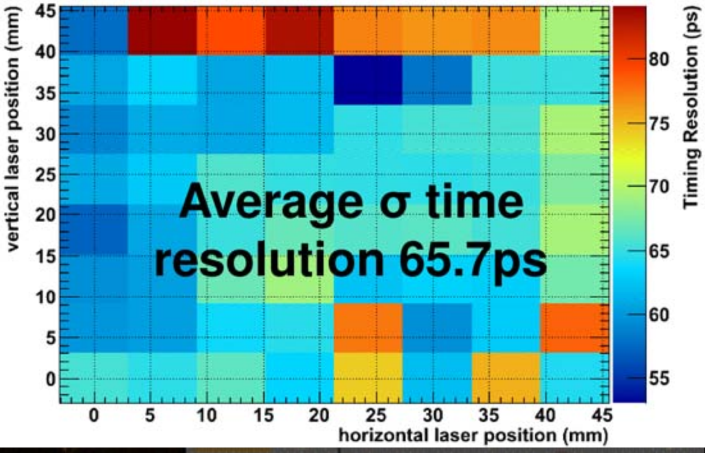
IV Rachel Montgommery (ID67)

Multi-anode photomultiplier tubes studies for imaging applications

Precise study of homogéneity of H9500 and H8500 Hamamatsu MAPMTs





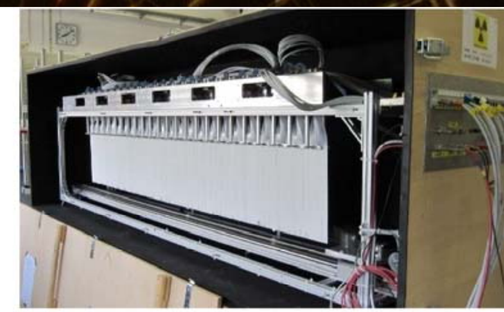


Anselm Esser (ID75)

Characterization and calibration of a scintilating fibre detector

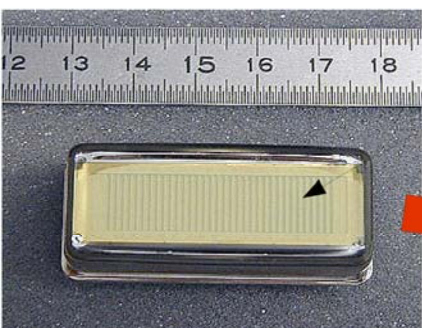
How do you calibrate a fibre detector with ~20000 scintillating fibres and 4600 channels?

Solution: Automatize the **entire** process!



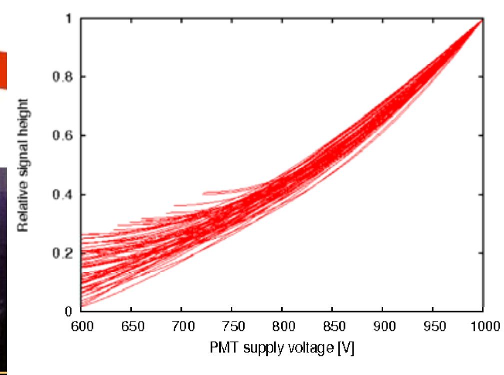
Automated source positioning: accuracy: 0.1 mm

144 Hamamatsu H7259K



32 cha

144 multianode PMTs calibrated



- Automated data aquisition, analysis, detector operation and source positioning
- ~ 10000 spectra measured and analyzed
- ~ 100 faulty channels identified
- 2300 discriminator thresholds determined

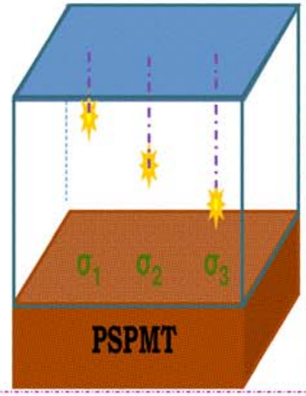
VI Montserrat Carles (ID53)

Performance results of a DOI-encoding small animal PET system with monolithic scintillators

INTRODUCTION : *DOI information to correct PARALLAX ERROR*

The **width of the light distribution scintillator** collected on the PMT entrance window depends on the **DOI**.

$\sigma = f(\mathrm{DOI})$ $\sigma_1 > \sigma_2 > \sigma_3$



Interaction point

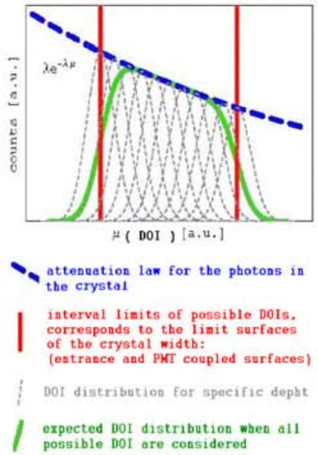
DOI: normal distance between the entrace surface of the crystal and the interaction point

σ width of the light distribution colected on the PMT entrance surface.

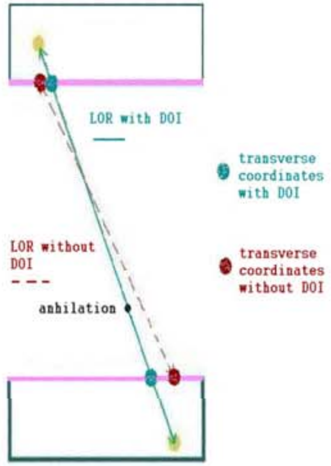
→ $\mathrm{DOI} = f^{-1}(\sigma)$ →

Enhanced CDR measures σ

We have a **DOI-encoding system**, where the **theoretical model for** the **DOI** distribution is the **Erf function.** →



The **DOI information** is included **in the LOR parameterization** to **correct the parallax error**.

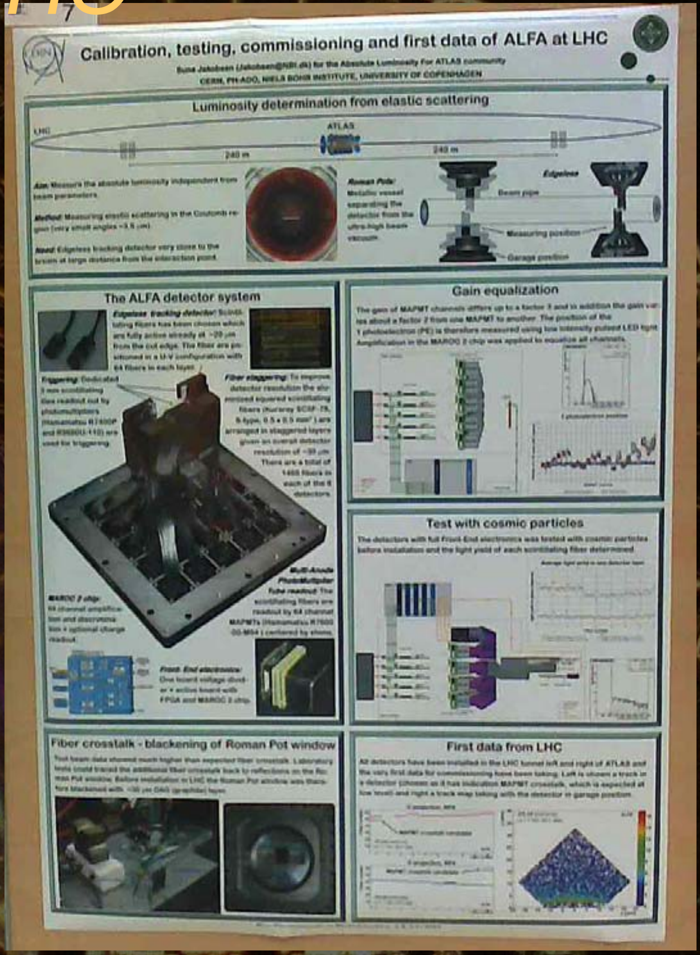


VII Sune Jakobsen (ID82)

Calibration, testing, commissioning and first data of ALPHA at LHC

Layers of scintillating fibers
read by PSPMT's (Hamamatsu R7600)
+ trigger tiles read by PMT's
 (R74000P and R9880-100)
via clear fibers

to measure LHC luminosity
for ATLAS experiment.



VIII Julien Chabaud, Paris (ID88)

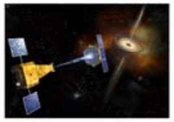
Studies of anticoincidence systems: application to Simbol-X and IXO/HXI

Simbol – X Concept

Hamamatsu H8711-100MOD MAPM
Kuraray Wavelength shifting optical fibers
BC-400 Plastic scintillator

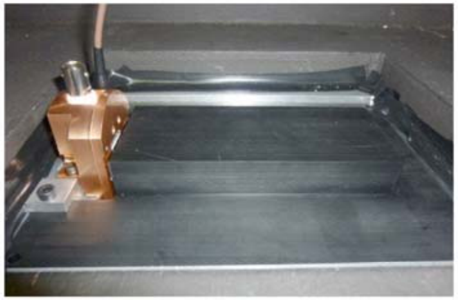
In the poster :

⇒ Experimental results
⇒ GEANT4 simulation results
⇒ Vibration tests



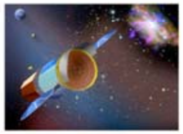
IXO/HXI Concept

Hamamatsu S664-1010 APD
St-Gobain BGO crystal



In the poster :

⇒ Experimental results
⇒ GEANT4/SLitrani simulation results



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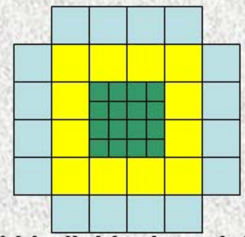
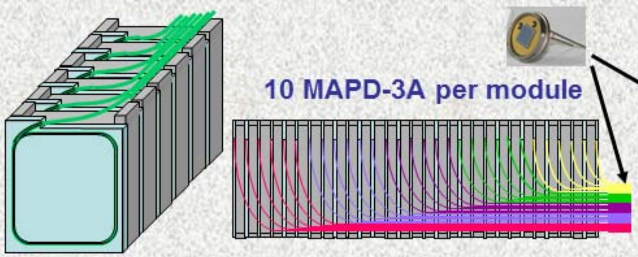
Yury Musienko, (ID15)

Hadron calorimeter with MAPD readout in the NA61/Shine experiment

Hadron calorimeter structure and readout



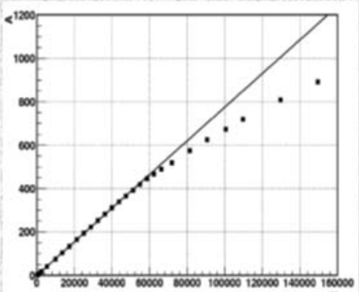
44 individual modules with longitudinal segmentation in 10 sections



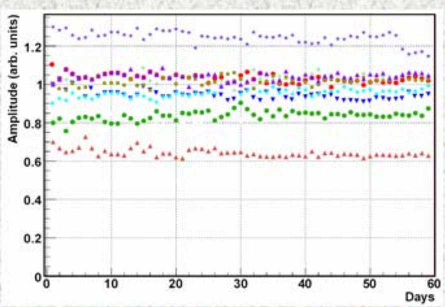
Each module consists of 60 lead-scintillator sandwiches with WLS-fibers

Rear side during assembling. 440 MAPD are used.

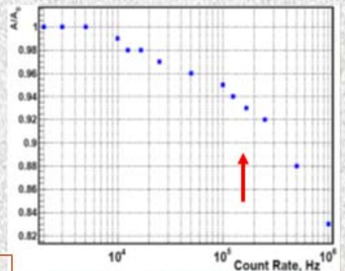
Some properties of MAPD-3A



Dependence of MAPD amplitude on the number of falling photons.



Long-term test: 10 MAPDs were illuminated by LED pulses with f=1 MHz and amplitude ~10^4 ph.e at T~30 ^{0}C during 2 months. No changes in gain and dark current were observed.



Dependence of MAPD amplitude on the frequency of ~2000 ph.e. signal

XII Raphael Falkenstein (ID71)

Extensive studies of MRS APD for plastic scintillator muon veto detector of cryogenic experiments

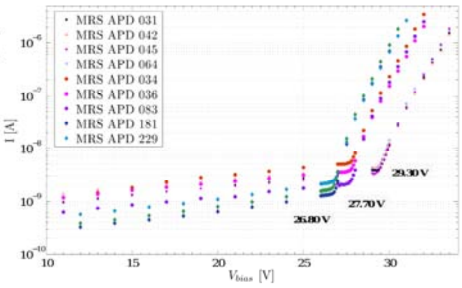
EBERHARD KARLS UNIVERSITÄT TÜBINGEN

EXTENSIVE STUDIES OF MRS APDs FOR PLASTIC SCINTILLATOR MUON VETO DETECTOR OF CRYOGENIC EXPERIMENTS

Characterization of MRS APDs

Extensive studies of the main parameters of MRS APDs have been performed:

- I-V Characteristics
  - Reverse I-V Characteristics
    - Determination of breakdown voltages.
    - Temperature dependency of V_{bd}.
    - Identification of damaged MRS APDs.
    - For some MRS APDs a strange dip in the I-V curve just preceeding the V_{bd} value has been observed.
  - Forward I-V Characteristics
    - Values of the quenching resistors.
    - Temperature dependencies of the quenching resistor.



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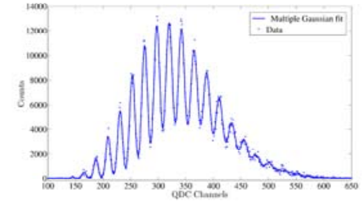
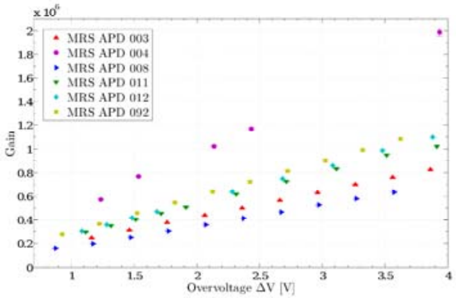
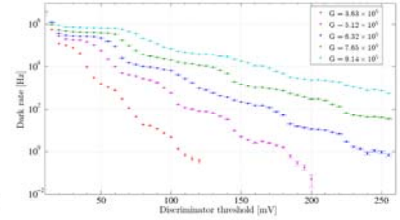
EBERHARD KARLS UNIVERSITÄT TÜBINGEN

EXTENSIVE STUDIES OF MRS APDs FOR PLASTIC SCINTILLATOR MUON VETO DETECTOR OF CRYOGENIC EXPERIMENTS

- Gain measurements
  - Dependency on the bias voltage.
  - Temperature dependency.
- Dark rate measurements







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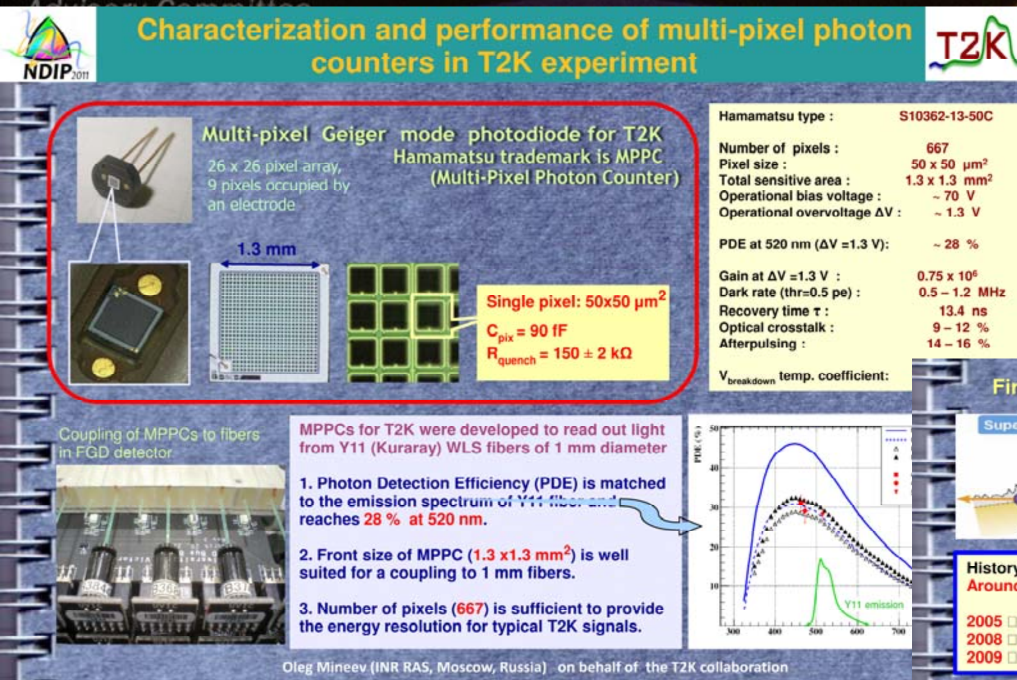
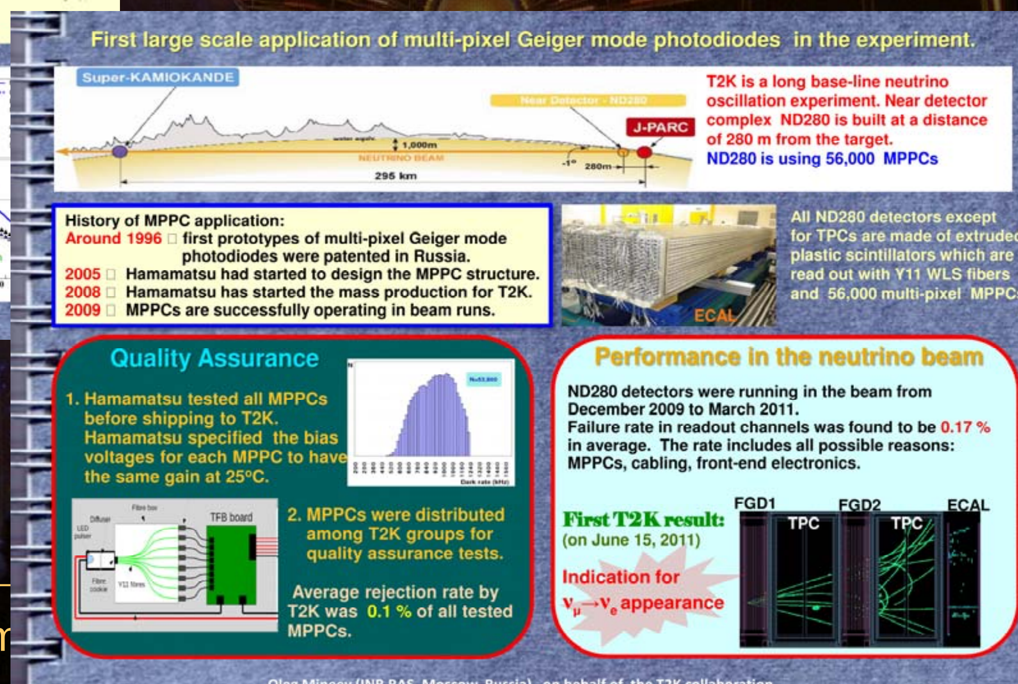
XIII Oleg Mineev (ID90)

Characterization and performance of multi-pixel photon counters in T2K experiment





XV Véronique Puill (ID118)

Single photoelectron timing resolution of SiPM in function of the wavelength and the temperature

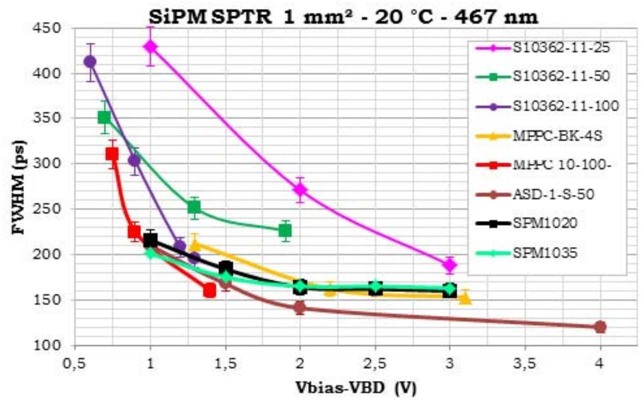
SPTR of SiPMs in function of the voltage, the wavelength and the temperature

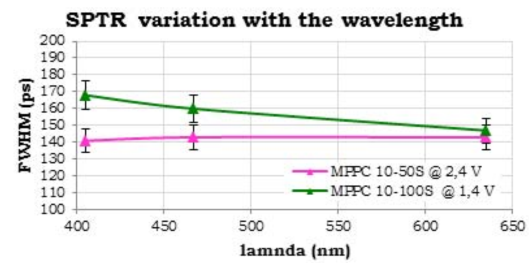
Véronique PUILL, CNRS-IN2P3-LAL

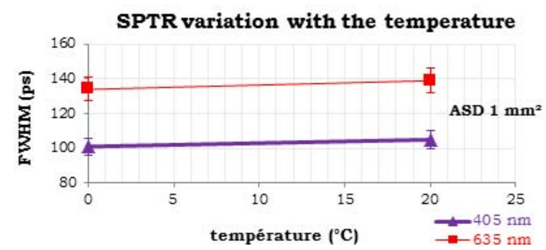
Study of the **SiPM Single Photoelectron Timing Resolution** variations with:

- ❖ the bias voltage
- ❖ the wavelength of the pulsed incident light : 405 – 467 - 635 nm
- ❖ the temperature : 0°C to 20 °C

13 devices from: AdvanSiD, sensL, HAMAMATSU (PHOTON IS OUR BUSINESS)







- ▪ best SPTR with high overvoltage
- ▪ small impact of the temperature on the timing resolution
- ▪ variation of the SPTR with the wavelength (dependant on the detector)

Giulia Hull (ID93)

$LaBr_3$ and phoswiches $LaBr_3$+NaI or CsI for PARIS calorimeter at GANIL

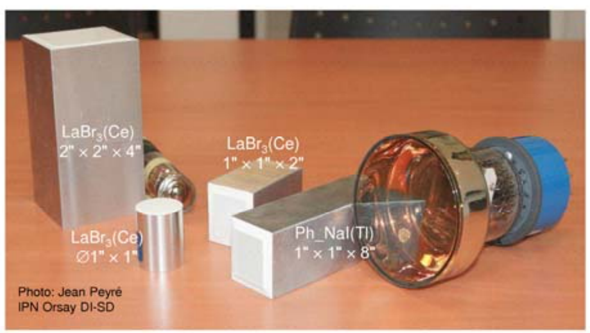
Energy resolution of $LaBr_3$:Ce in a Phoswich configuration with CsI:Na and NaI:Tl scintillator crystals

G. Hull, B. Genolini, M. Josselin, I. Matea, J. Peyré, J. Pouthas, T. Zerguerras
Institut de Physique Nucléaire d'Orsay - IN2P3-CNRS - Université Paris Sud 11
CNRS IN2P3 Les deux infinis — Université Paris-Sud 11 — IPN Institut de Physique Nucléaire Orsay

$LaBr_3$(Ce) bright and fast scintillator but really expensive → PHOSWICH SOLUTION to reduce the price without compromise the performances

We studied the performance of the $LaBr_3$(Ce) scintillator when optically coupled to NaI(Tl) and CsI(Na) for the R&D of the gamma ray calorimeter PARIS at SPIRAL2

Light yield and energy resolution measurements under γ excitation were performed by coupling the phoswiches with various photomultiplier tubes



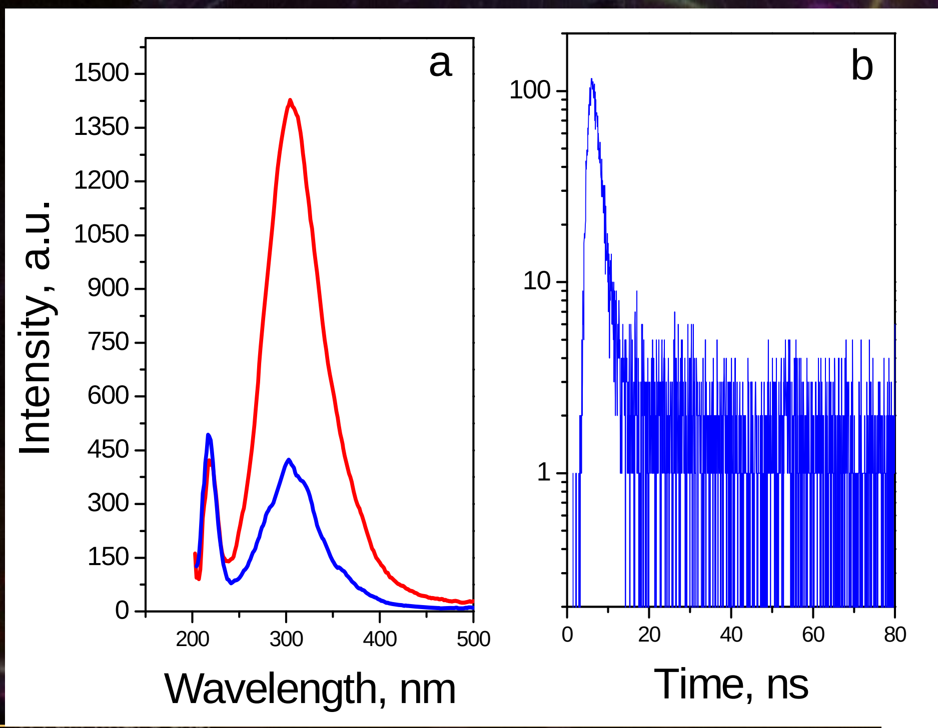
Crystals	
$LaBr_3$(Ce)	1" × 1" × 2"
$LaBr_3$(Ce)	2" × 2" × 4"
$LaBr_3$(Ce)	∅ 1" × 1"
Ph_(1")NaI(Tl)	1" × 1" × 2" $LaBr_3$(Ce) 1" × 1" × 6" NaI(Tl)
Ph_(2")NaI(Tl)	2" × 2" × 2" $LaBr_3$(Ce) 2" × 2" × 6" NaI(Tl)
Ph_CsI(Na)	1" × 1" × 2" $LaBr_3$(Ce) 1" × 1" × 6"CsI(Na)

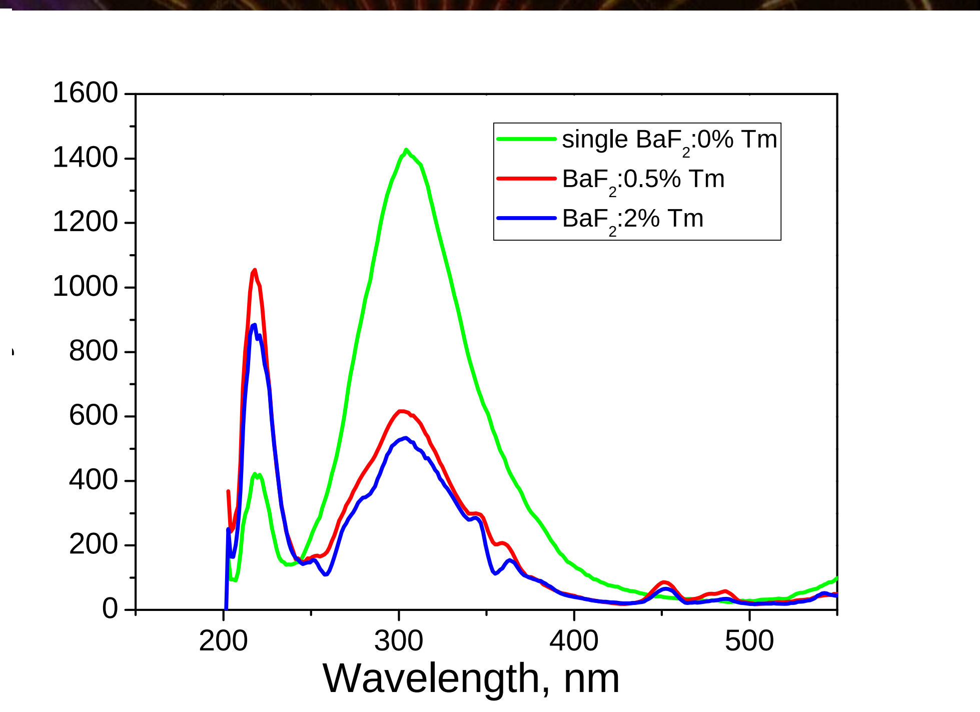
We are interested in investigating the possible degradation of the scintillation light produced by the $LaBr_3$(Ce) due to the fact that it has to pass through all the coupled crystal, before being detected at the PMT's the photocathode.

XVIII Dmitry Seliverstov (ID156)

New fast scintillators on the base of BaF_2 crystals with increased light yield of 0.9 ns luminescence for TOF PET

enhancement of fast/slow ratio
in ceramics and Tm-doped barium fuoride crystals



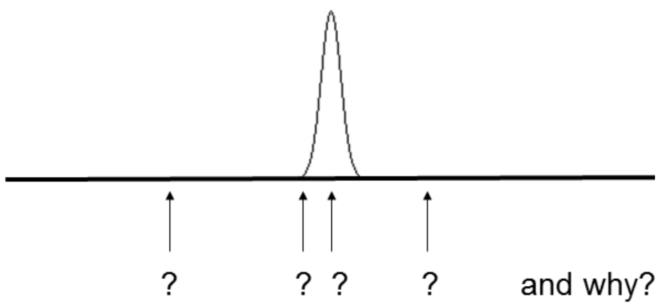


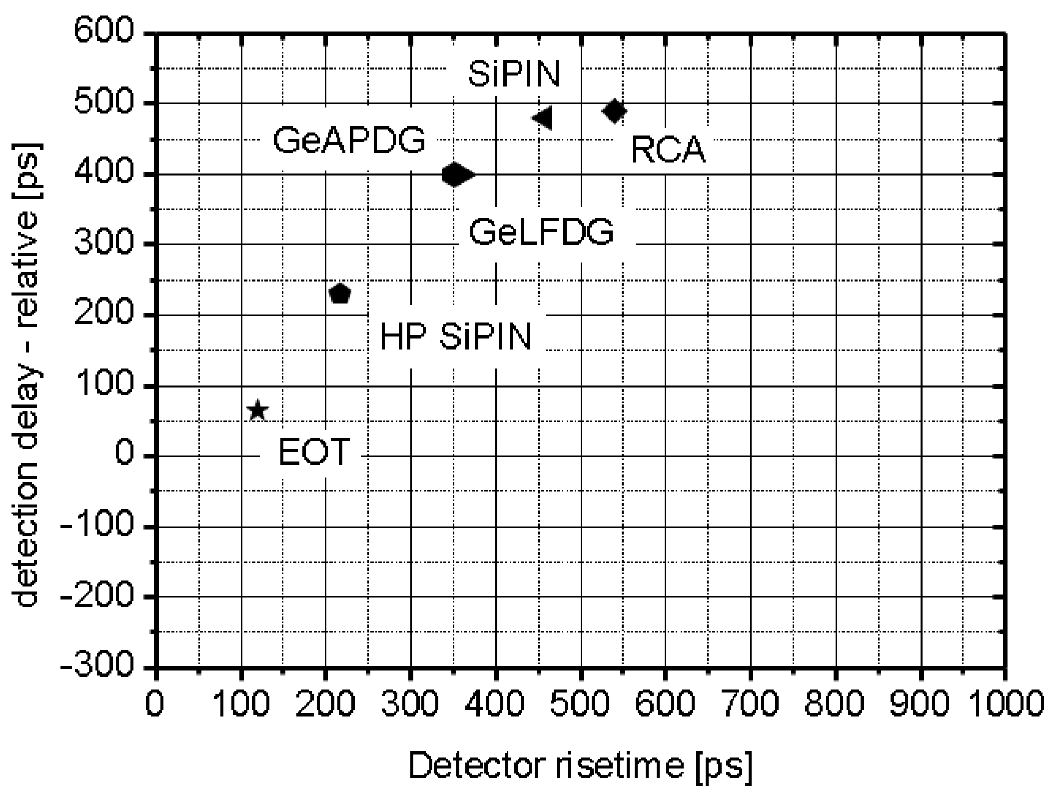
XIX Joseph Blazej (ID136)

Photodiode optical to electrical signal delay

In the most measurements the delay of electrical signal generated by photodetector (photodiode in linear mode has been investigated) is determined only as relative

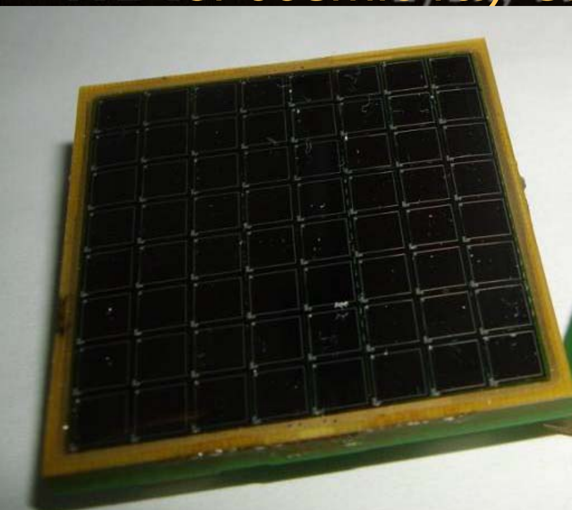
But what is the time position of electrical output with respect to time position of detected optical signal? (when the transient delay in cables and circuit structure is subtracted)

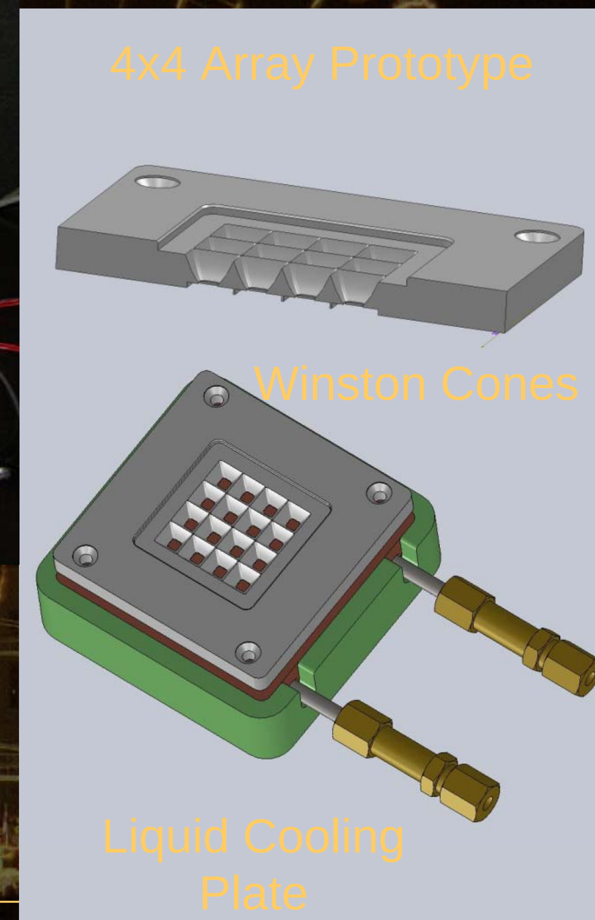




XX Pedro Rodrigues (ID154)

R&D in photosensors and data acquisition systems for the new generation of cosmic ray Cherenkov and fluorescence imaging focal plane

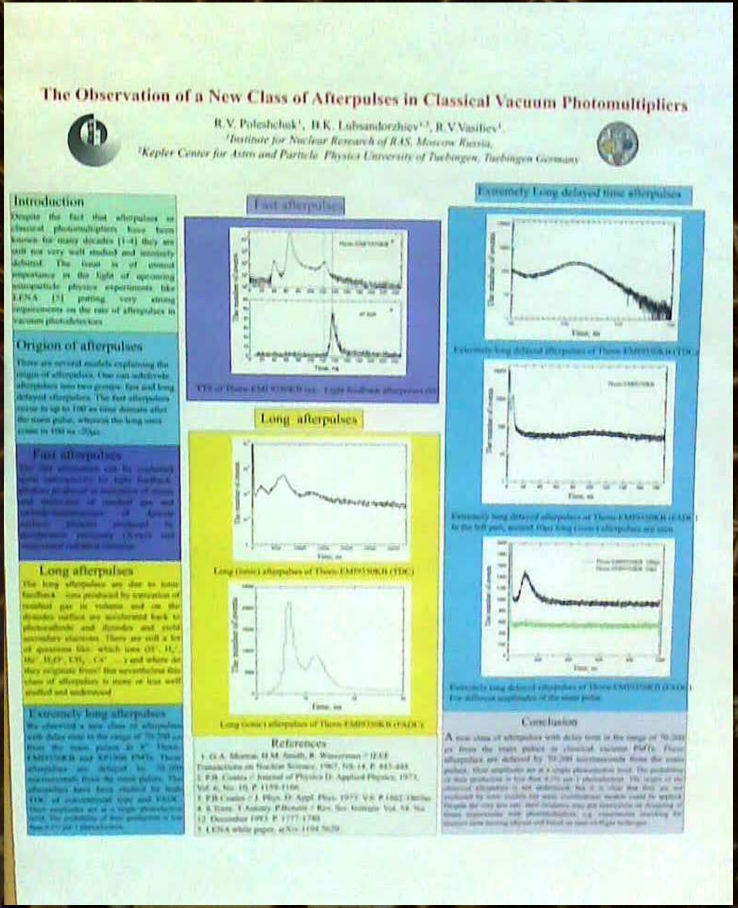




IX Roman Poleshchuk (ID142)

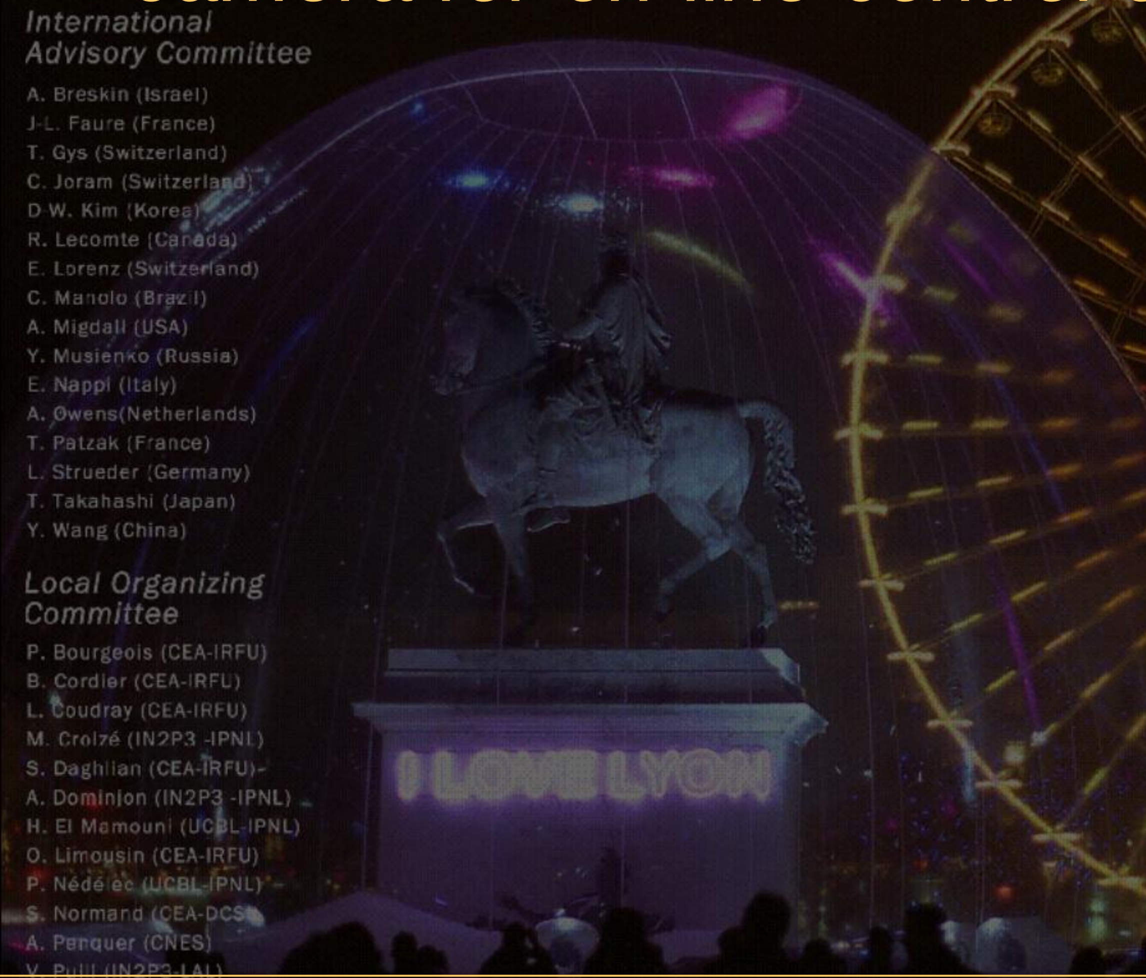
The observation of a new class of afterpulses in classical vacuum photomultipliers

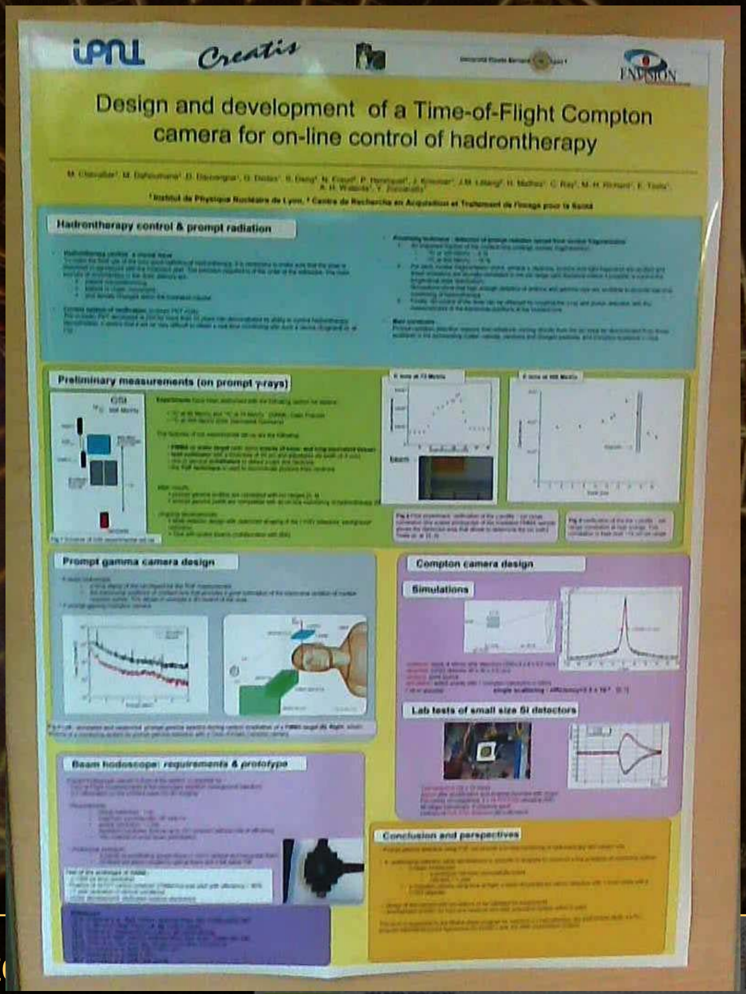
- New class of after pulses
- 70 to 200 μs delay
- Amplitude is 1 pe
- Probablility is < 0.1%



XVII Denis Dauvergne (ID206)

Design and development of a TOF Compton camera for on-line control of hadron therapy





Poster session III begins

<u>now</u>

in the exihibition hall.

Coffee will be served at 16:00