

PhotoDet Workshop

28-30.May.2012 TYL workshop, Clermont-Ferrand, France

Isamu Nakamura/KEK

PhotoDet 2012 workshop

International Workshop on New Photon-detectors

PHOTODET 2012

June 13-15, 2012

LAL Orsay, France

Main Topics :

The workshop focuses on new development in photo-sensors. Various types of new photo-sensors and their applications are covered and Geiger-mode multi pixel photon devices is one of the main targets.

Photo-sensors : Geiger-mode multi pixel photon devices – Hybrid PMT – APD – MCP-PMT – new type of photo-sensors

Electronics : front-end and readout electronics

Applications : HEP, nuclear physics, cosmic ray physics, astronomy, cosmology, medical science

International Programming Committee :

M. Danilov (ITEP)
K. Kawagoe (Kyushu)
Y. Kudenko (INR)
T. Sumiyoshi (Tokyo-Metro)
T. Nakaya (Kyoto)
A. Para (FNAL)
F. Retiere (TRIUMF)
F. Sefkow (DESY)
T. Takeshita (Shinshu)
M. Teshima (Max-Planck)
J.C. Vanel (IPCM)
K. Yoshimura (KEK)

Local Organizing Committee :

P. Barrillon (LAL Orsay)
D. Breton (LAL Orsay)
V. Brouillard (LAL Orsay)
N. Dinu (LAL Orsay)
B. Genolini (IPN Orsay)
I. Nakamura (KEK)
V. Pulli (LAL Orsay)
T. Takeshita (Shinshu University)

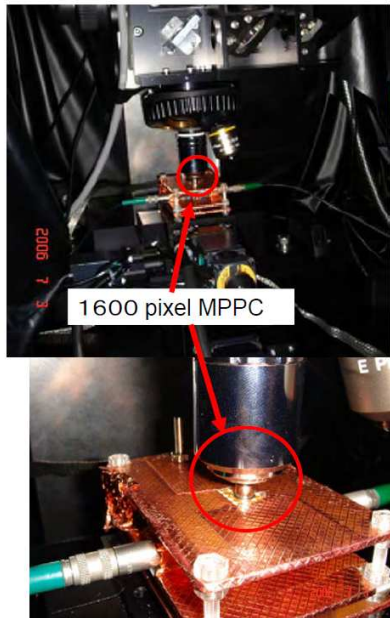
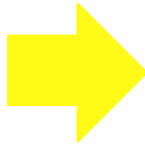


bit of History – KEKDTP and PD

- Situation in 2005
 - SiPM developed in Russia, HPK started its own version
 - T2K, ILC, Belle group started to investigate application of MPPC(HPK)
- Start up of RD-Photon Group KEKDTP project
 - August 2005, First meeting with KEK, T2K, ILC
 - September 2005, **Mini-workshop @ Kyoto University**
- RD-Photon Group activity started
 - Regular Meeting
 - Laser scan facility in KEK
 - Meeting with HPK
 - Collaboration with University activities and HPK
 - Radiation hardness test
- Workshops
 - **Two International**
 - Two Domestic

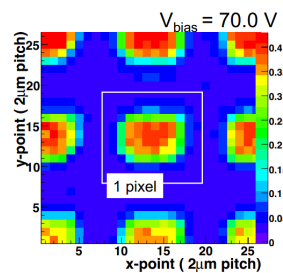
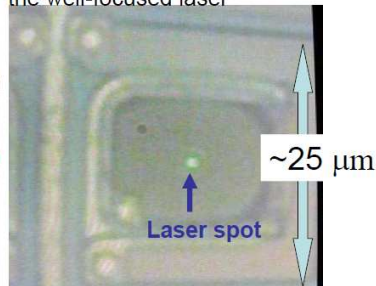
Outcome of RD-Photon Group Activities

- Radiation Study
- Laser System

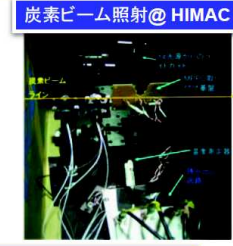


Measurement with Microscopic Laser System

- Introduced by KEK-Detector Technology Project
- YAG Laser, $\lambda = 532 \text{ nm}$ (green)
- Pulse width $\sim 2 \text{ nsec}$, rate $\sim 8 \text{ kHz}$
- Spot size $\sim 1 \mu\text{m}$
- Light yield $\sim 0.5 \text{ p.e.}$ (not calibrated)
- Can perform precise pinpoint scan with the well-focused laser

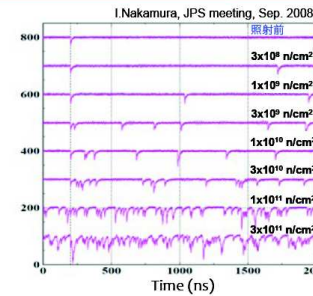


これまでの放射線耐性試験

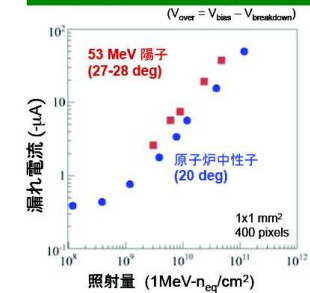


陽子/中性子照射の影響

典型的なダークパルス波形 (中性子照射後)



漏れ電流-照射量 ($V_{\text{over}} = 1.6 \text{ V}$)



• バルク損傷によりダークパルスが激増
→ 1光子分離能力の消失

T.Matsumura et al. NIM A603, 301 (2009)
I. Nakamura NIM A610, 110 (2009)

PD international workshop series

● Workshops

● PD07 June 2007 @ Kobe Univeristy

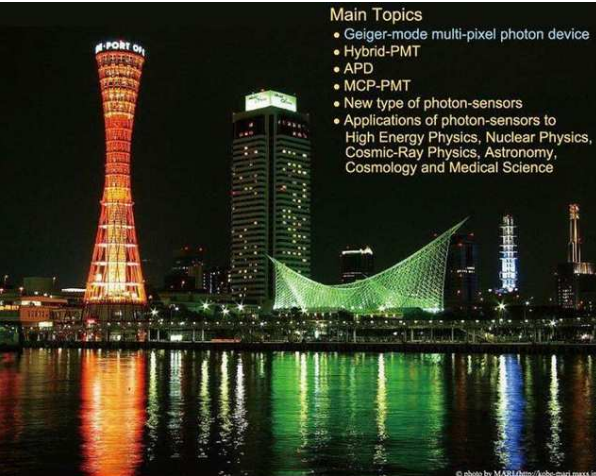
● PD09 June 2009 @ Shinshu University

● **PD12 June 2012 @ LAL Orsay**

● 3 days, ~100 Participants (10-15% from company), ~30 Talks + Posters

● PPD(MPPC) is main topic, but other Photodetectors included

● **None-particle-physics contribution** from nuclear physics, cosmic-ray, cosmology, astronomy, medical science and **Sensor Company**



Main Topics

- Geiger-mode multi-pixel photon device
- Hybrid-PMT
- APD
- MCP-PMT
- New type of photon-sensors
- Applications of photon-sensors to High Energy Physics, Nuclear Physics, Cosmic-Ray Physics, Astronomy, Cosmology and Medical Science

International Programing Committee


H. Aihara (Tokyo), M. Danilov (ITEP), M. Demarteau (FNAL), B. Dolgoshein (MEPhI, Moscow), J. Haba (KEK), T. Iijima (Nagoya), K. Kawagoe (Kobe), Y. Kudenko (INR), M. Kuze (Tokyo Tech), T. Nakadaira (KEK), T. Nakaya (Kyoto), A. Para (FNAL), F. Retiere (TRIUMF), F. Seikow (DESY), M. Shiozawa (ICRR), H. Shimizu (KEK), T. Takeshita (Shinshu), M. Teshima (Max-Planck), J. C. Vanel (LLR Ecole polytechnique)

Local Organizing Committee

K. Hara (Nagoya), T. Iijima (Nagoya), K. Kawagoe (Kobe), M. Kuze (Tokyo Tech), K. Miyabayashi (Nara-WU), T. Matsumura (NDA), T. Nakaya (Kyoto), M. Yokoyama (Kyoto)

Detector Technology Project, IPNS, KEK
Faculty of Science, Kobe University

Supported by JSPS Grant-in-Aid for Creative Scientific Research, "Research and Development of a Novel Detector System for the International Linear Collider," and MEXT Grant-in-Aid for Scientific Research on Priority Areas, "New Development of Flavor Physics"



International Workshop on New Photon Detectors

PD09 June 24-26, 2009
Shinshu university JAPAN
<http://www-conf.kek.jp/PD09/>

Main Topics

The workshop focuses on recent development of new photon-sensors. Various types of new photon-sensors and the applications are covered, and Geiger-mode multi-pixel photon devices is one of the main targets this time.

Deadline of abstract submission: May 15, 2009

Photon-Sensors;

- Geiger-mode multi-pixel photon device, • Hybrid-PMT, • APD,
- MCP-PMT, • New type of photon-sensors

Applications of photon-Sensors to;

- High Energy Physics, • Nuclear Physics,
- Cosmic-Ray Physics, • Astronomy,
- Cosmology, • Medical Science



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K. Kawagoe (Kobe), K. Miyabayashi (Nara-WU), T. Matsumura (NDA), I. Nakamura (KEK), K. Kotera (Shinshu), T. Takeshita (Shinshu), M. Yokoyama (Kyoto), K. Yoshimura (KEK)

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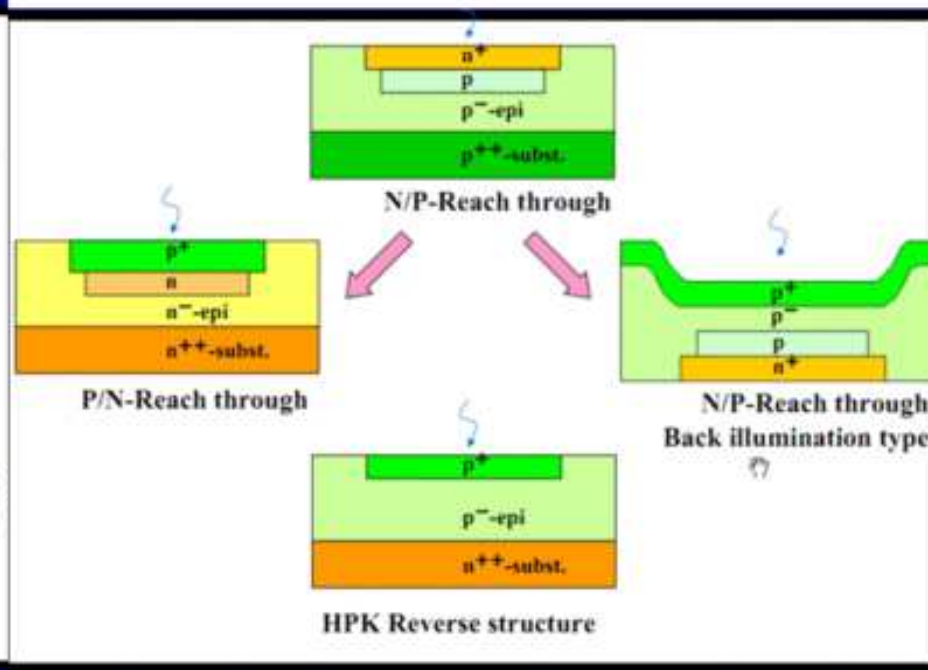
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Newly Developed Semiconductor Detectors

• Multi-Pixel Photon Counter (MPPC)

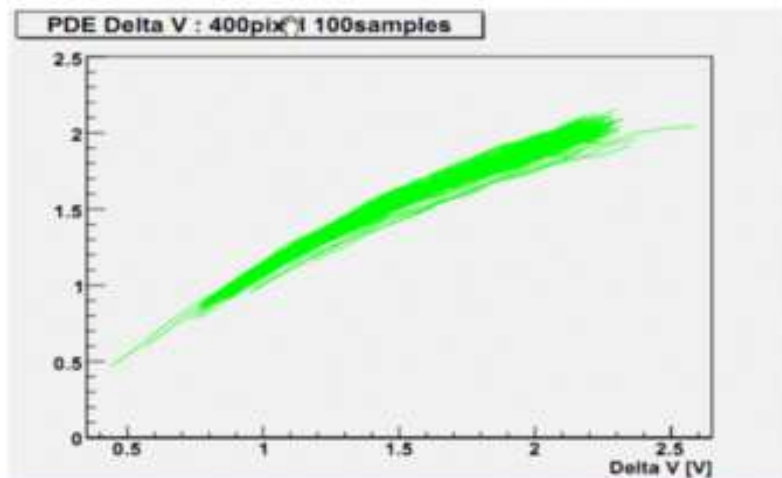
HAMAMATSU PHOTONICS K.K.
Koei Yamamoto
PD07 Kobe June 27th 2007



HAMAMATSU

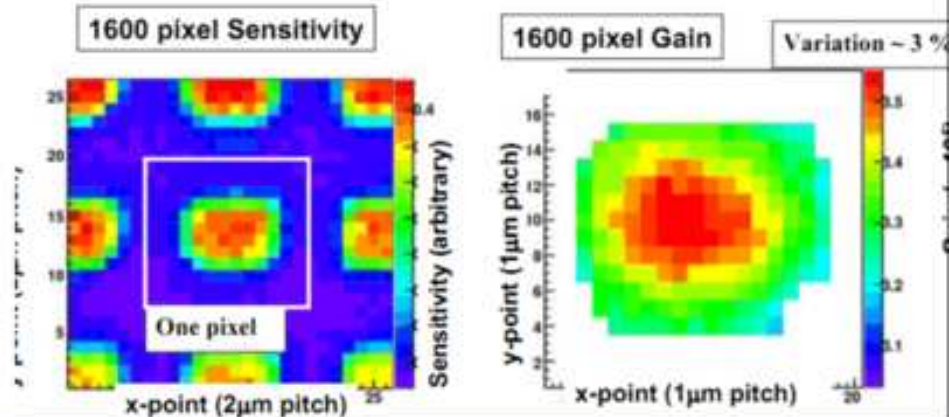
PDE uniformity

(400 pixel, 100samples)



Laser Scan in One Pixel

- Pin-point scan : YAG laser ($\lambda = 532 \text{ nm}$) with spot size $\sim 1 \mu\text{m}$.
- Variation of photon sensitivity and gain in one pixel are evaluated.
- Observed variation is 2 ~ 5 % in a sensitive area for the 100 / 400 / 1600 pixel MPPCs.



at PD09 @ Shinshu

- strong demand to have workshop outside Japan

Y.Kudenko Summary Talk in PD09

Meeting of the PD09 IPC and LOC

Next (3rd) PD Workshop **in 2012**
 France or Russia
 Final decision by December 2009

4th Workshop **in 2015**
 Japan



at Izakaya Place

- decided to have 3rd workshop in France

LAL \Leftrightarrow KEK, RD-photon, and PD

- LAL is producing ASIC for PPD
 - SPIROC to ILC calorimeter
 - EASIROC for general purpose
- EASIROC development under LAL-KEK collaboration (K.Yoshimura)
 - 32ch Readout board with EASIROC
 - 10 users/20 boards produced
 - EASIROC user meeting @ Tohoku with LAL EASIROC expert

PD07 Presentation

The image shows the cover of a presentation document. At the top right, there are logos for CALICE (Calorimeter for ILC) and the European Union. The title is 'Integrated electronic for SiPM' in a large, bold font. Below the title, it says 'KOBE - 29 June '07'. There is a large graphic of a city skyline with a prominent tower, likely Kobe. Below the skyline, there is a list of 'Main Topics' including: Geiger-mode multi-pixel photon device, Hybrid-PMT, APD, MCP-PIAT, New type of photon-sensors, and Applications of photon-sensors to High Energy Physics, Nuclear Physics, Cosmic-Ray Physics, Astronomy, Cosmology and Medical Science. At the bottom, there is a list of 'International Programming Committee' members and 'Local Organizing Committee' members. The LAL logo is prominently displayed in the center. At the bottom left, it says 'LAL Orsay IN2P3-CNRS - Université Paris-Sud - B.P. 34 91898 Orsay cedex - France'. At the bottom right, there is a logo for the Detector Technology Project, IPNS, KEK Faculty of Science, Kobe University.



PhotoDet 2012 Workshop

- will be Held in LAL Orsay on 13-15 June 2012.
- Involvement of France/Japanese members
 - IPC members
T.Danilov(ITEP), **K.Kawagoe (Kyushu)**, Y.Kudenko(INR)
T.Sumiyoshi(Tokyo-Metro), **T.Nakaya (Kyoto)**, A.Para (FNAL), F.Retiere (TRIUMF), F.Sefkow (DESY) **T.Takeshita (Shinshu)**, **M.Teshima(MPI)**, J.C. Vanel(IPCM), **K.Yoshimura(KEK)**
 - LOC
P.Barrillon(LAL), **D.Breton (LAL)**, V.Brouillard(LAL), **N.Dinu (LAL)**, **B. Genolini (IPN)**, **中村(KEK)**, **V.Puill(LAL)**, **T.Takeshita(Shinshu)**
 - To keep tradition of past workshop T.Takeshita and 中村 included in LOC
- KEK Involvement
 - 中村, K.Yoshimra as organizer and Editor of proceedings
 - Financial Support for proceedings in PoS

Budget Request

- At least 3 travels to France (incl. this trip)

Funding From France				
Description	Euro/Unit	# Unit	Total (Euro)	Requested to
Total				
Funding From KEK				
Description	kYen/Unit	# Unit	Total (kYen)	Requested to
Travel	150	3 travel	450	KEK
Visit to France	20/day	25 days	500	KEK
Travel + per diem	300	3	900	KEK
Total			1850	

Additional Funding

From France			From Japan		
Requested to	Type	Euro	Requested to	Type	kYen
IN2P3	Student Salary	15000	JSPS	travel	200
			Shinshu Univ.	travel	200
Total		15000	Total		400

纏め

- PhotoDet Workshop 2012 will be held in Orsay France in June
- Two previous workshops in Japan were very successful.
- Having 3rd in France is the result of France/Japan Collaboration

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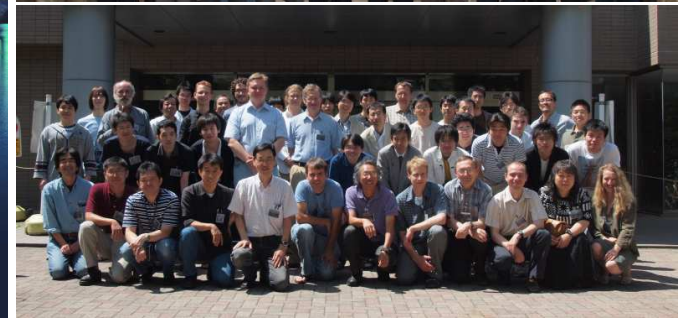
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- we'd like to have 3 travels Japan \Leftrightarrow France

終わり