Phose2023 - Workshop on "Photodetectors and sensors for particle identification and new physics searches"

Report of Contributions

Contribution ID: **1**   Type: **not specified**

Recent progress in organic semiconductor/polymer blend films for OFETs

Wednesday 22 November 2023 16:20 (25 minutes)

Primary author: COLANTONI, Elisabetta

Co-authors: FABBRI, Andrea; BRANCHINI, Paolo (Universita e INFN Roma Tre (IT))

Presenters: FABBRI, Andrea; COLANTONI, Elisabetta; BRANCHINI, Paolo (Universita e INFN Roma Tre (IT))

Contribution ID: **2**   Type: **not specified**

Characterisation of SiPM at cryogenic temperatures

Wednesday 22 November 2023 12:00 (25 minutes)

Primary author: GUARISE, Marco (University of Ferrara and INFN - National Institute for Nuclear Physics)

Co-author: CALABRESE, Roberto (INFN Ferrara)

Presenters: GUARISE, Marco (University of Ferrara and INFN - National Institute for Nuclear Physics); CALABRESE, Roberto (INFN Ferrara)

Contribution ID: **3**   Type: **not specified**

NUV-Sensitive radiation hardness silicon photomultiplier technologies developed at FBK

Wednesday 22 November 2023 11:35 (25 minutes)

Presenter: GOLA, Alberto (Fondazione Bruno Kessler)

Contribution ID: **4**   Type: **not specified**

Characterization of irradiated SiPM for the TOP detector at the Belle II experiment

Wednesday 22 November 2023 15:10 (25 minutes)

Co-authors: KANDRA, Jakub; STROILI, Roberto (Università degli Studi di Padova & INFN); TORASSA, Ezio (Universita e INFN, Padova (IT))

Presenters: KANDRA, Jakub; STROILI, Roberto (Università degli Studi di Padova & INFN); TORASSA, Ezio (Universita e INFN, Padova (IT))

Contribution ID: **5**　　　　　　　　　　　　　　　　Type: **not specified**

SiPM studies for the ECL calorimeter of the Belle II detector

Wednesday 22 November 2023 16:45 (25 minutes)

Primary authors:　MONETA, Stefano;　CECCHI, Claudia (Universita e INFN, Perugia (IT))

Presenters:　MONETA, Stefano;　CECCHI, Claudia (Universita e INFN, Perugia (IT))

Contribution ID: 6　　　　　　　　　　　　　　　　　　　Type: **not specified**

MCP-PMT R&D and quantum efficiency lifetime measurements

Wednesday 22 November 2023 09:10 (25 minutes)

Presenter:　INAMI, Kenji

Contribution ID: **7**   Type: **not specified**

MCP-PMT developments for PANDA

Wednesday 22 November 2023 08:45 (25 minutes)

Presenter: LEHMANN, Albert Alwin (Friedrich Alexander Univ. Erlangen (DE))

Contribution ID: **8**   Type: **not specified**

SiPMs test for the dual RICH detector at the at the future Electron-Ion Collider

Wednesday 22 November 2023 12:50 (25 minutes)

Presenters: PREGHENELLA, Roberto (INFN, Bologna (IT)); ANTONIOLI, Pietro (Universita e INFN, Bologna (IT)); RIGNANESE, Luigi Pio (Universita e INFN, Bologna (IT))

Contribution ID: **9**　　　　　　　　　　　　　　　　　　　Type: **not specified**

Development of integrated housing for SiPM for future RICH detectors

Wednesday 22 November 2023 12:25 (25 minutes)

Presenter:　CARDINALE, Roberta (INFN e Universita Genova (IT))

Contribution ID: **10**　　　　　　　　　　　　　　　　Type: **not specified**

R&D for a TOF-like KLM in Belle II upgrade and a muon detector of CEPC based on SiPM and scintillator

Wednesday 22 November 2023 15:35 (25 minutes)

Presenter:　Dr XIAOLONG, Wang (Virginia Tech)

Contribution ID: **11**
Type: **not specified**

Any additional session

Contribution ID: **12**　　　　　　　　　　　　　　　　　　Type: **not specified**

Photosensors for the Hyper-Kamiokande experiment OD system

Wednesday 22 November 2023 10:25 (25 minutes)

Presenter:　DI LODOVICO, Francesca (University of London (GB))

Contribution ID: **13**   Type: **not specified**

Quantum sensors for particle identification at HEP

Wednesday 22 November 2023 17:35 (25 minutes)

Presenter: DOSER, Michael (CERN)

Contribution ID: **14**   Type: **not specified**

Performance of sensor module prototypes for the CMS Barrel Timing Layer

Wednesday 22 November 2023 18:00 (25 minutes)

Presenter: MALBERTI, Martina (INFN, Milano-Bicocca (IT))

Contribution ID: **15**   Type: **not specified**

Silicon Photomultipliers for calorimetric applications

Wednesday 22 November 2023 17:10 (25 minutes)

Primary author: FALCONE, Andrea (Universita e INFN, Milano Bicocca(IT))

Co-author: TERRANOVA, Francesco (Universita & INFN, Milano-Bicocca (IT))

Presenters: FALCONE, Andrea (Universita e INFN, Milano Bicocca(IT));   TERRANOVA, Francesco (Universita & INFN, Milano-Bicocca (IT))

Contribution ID: 16   Type: **not specified**

3" PMTs for Hyper-Kamiokande mPMTs

Wednesday 22 November 2023 11:10 (25 minutes)

Presenter: LANGELLA, Aurora (Universita e INFN sezione di Napoli (IT))

Contribution ID: **17** Type: **not specified**

SiPMs for Belle II ARICH

Wednesday 22 November 2023 14:45 (25 minutes)

Presenter: CONSUEGRA RODRÍGUEZ, Dania (J. Stefan Institute)

Contribution ID: 18   Type: **not specified**

Characterisation of LAPPDs for RICH applications

Wednesday 22 November 2023 10:00 (25 minutes)

Presenter: PESTOTNIK, Rok (Jozef Stefan Institute (SI))

Contribution ID: **19**   Type: **not specified**

Development of hybrid single-photon detector based on microchannel plates and the Timepix4 ASIC

We present the development of a single-photon detector based on a vacuum tube equipped with transmission photocathode, microchannel plate and a CMOS pixelated active read-out anode. The Timepix4 ASIC, developed by the Medipix4 Collaboration, is used as anode, and consists in an array of 512x448 pixels, 55 μm x 55 μm each, that can timestamp individual hits with a resolution better than 100 ps. In data-driven mode the chip can handle a maximum rate of 2.5 Ghits/s corresponding to a data rate up to 160 Gb/s, that will be handled by a high-throughput FPGA-based external electronics with flexible design. The very low noise of the electronics will allow to operate the MCP at low gain, leading to a longer detector lifetime. The ASIC encapsulated inside the vacuum tube allows for on-detector signal processing and digitization with a very-high channel density (about 230 thousand channels) reducing the number of external interconnections (about 200).

Recent timing resolution measurements of the Timepix4 ASIC, bump bonded to a silicon sensor, using a pulsed picosecond laser will also be presented. A measurement of the time resolution of 60 ps for the Time-to-Digital Converter itself has been obtained, which required frequency mapping and calibration over the whole matrix. Considering the contributions from signal generation in the silicon sensor and the electronics front-end we obtained a resolution of about 110 ps for a single pixel, reaching 50 ps for a cluster of pixels thanks to multiple sampling.

These performances will enable significant advances in particle physics, life sciences, quantum optics or other emerging fields where the detection of single photons with excellent timing and position resolutions are simultaneously required.

Primary author: FIORINI, Massimiliano (Universita e INFN, Ferrara (IT))

Presenter: FIORINI, Massimiliano (Universita e INFN, Ferrara (IT))

Session Classification: Vacuum detectors

Contribution ID: **20**   Type: **not specified**

Single-photon Cameras for Quantum Imaging Applications

Wednesday 22 November 2023 14:20 (25 minutes)

Presenter: Prof. CHARBON, Edoardo (EPFL)

Contribution ID: **21**   Type: **not specified**

Development of hybrid single-photon detector based on microchannel plates and the Timepix4 ASIC

Wednesday 22 November 2023 09:35 (25 minutes)

Presenter: FIORINI, Massimiliano (Universita e INFN, Ferrara (IT))

Contribution ID: **22**　　　　　　　　　　　　　　　　　Type: **not specified**

Welcome and information

Wednesday 22 November 2023 08:40 (5 minutes)

Presenters:　TORASSA, Ezio (Universita e INFN, Padova (IT));　DI LODOVICO, Francesca (University of London (GB));　ALTINBILEK, Yasemin (CERN)

Contribution ID: **23**   Type: **not specified**

SiPMs for Belle II ARICH

Detectors used in high energy physics experiments will need to keep sufficient performance during a few years of data-taking, despite the accumulation of radiation damage, which, for example, in the planned upgrades of the LHCb and Belle II experiments, is estimated at about 10^{13} 1-MeV neutron equivalent/cm^2 by detector end-of-life. In this work, 6 NUV-HD-RH silicon photomultiplier (SiPM) samples developed by the Fondazione Bruno Kessler (FBK) with the purpose of improving the SiPM radiation hardness were characterized before and after irradiation. Each sample has 3 wire-bonded 1x1 mm^2 15 µm pitch SiPMs with different structures. In total, **18 SiPMs**, 6 SiPMs of the same structure, were characterized **before irradiation**. 5 of the samples were irradiated at the JSI TRIGA reactor with different fluencies: **10^9 neq/cm^2**, **10^{10} neq/cm^2**, **10^{11} neq/cm^2**, **10^{12} neq/cm^2** and **10^{13} neq/cm^2**, while leaving one of the samples non-irradiated for crosscheck. In total, **15 SiPMs**, 5 SiPMs of the same structure, were re-characterized **after irradiation**. The sample irradiated at **10^9 neq/cm^2** was annealed at room temperature and its **3 SiPMs** (one per structure) re-characterized after **1 month of annealing**. For the SiPM characterization in all the cases, I-V curve measurements, threshold scan, and waveform analysis, including single photon time resolution, were carried out at room temperature and at different controlled temperature steps down to liquid nitrogen temperature.

Primary author: CONSUEGRA RODRÍGUEZ, Dania (J. Stefan Institute)

Co-authors: SELJAK, Andrej; KRIZAN, Peter; DOLENEC, Rok (Jozef Stefan Institute (SI)); PESTOTNIK, Rok (Jozef Stefan Institute (SI)); KORPAR, Samo

Presenter: CONSUEGRA RODRÍGUEZ, Dania (J. Stefan Institute)

Session Classification: Additional taks