FCC-ee vertex detector R&D workshop

Report of Contributions

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

Mechanical study of the tilted vertex services integration

The baseline vertex detector as described in the Feasibility Study Report of FCC-ee will be presented, together with the integration with the beam pipe and support tube.

We will discuss a study of the cooling services for the inner vertex using air-based system, as well as the one for the middle and outer barrel, and disks. Particular emphasis will be given to the integration aspects and maintenance.

Session

Mechanics

Authors: MOGGI, Andrea (Istituto Nazionale di Fisica Nucleare); BOSI, Filippo (Istituto Nazionale di Fisica Nucleare); AMMIRABILE, Gherardo (Istituto Nazionale di Fisica Nucleare)

Presenter: BOSI, Filippo (Istituto Nazionale di Fisica Nucleare)

Session Classification: Mechanical development

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

Experimental verification of the Vertex detector Air Cooling system

We have developed a wind tunnel setup to experimentally study the cooling performance of a air flow cooling system for the inner vertex detector for FCC-ee. The staves of the vertex detector have been realised using a carbon fibre mechanical model with the same dimensions of the designed ones. The heat dissipation of the sensors is mimicked using kapton heaters. The setup can simulate about one sixth of the vertex detector.

Preliminary results and plans will be given.

Session

Mechanics

Authors: MOGGI, Andrea (Istituto Nazionale di Fisica Nucleare); AMMIRABILE, Gherardo (Istituto Nazionale di Fisica Nucleare)

Presenters: MOGGI, Andrea (Istituto Nazionale di Fisica Nucleare); AMMIRABILE, Gherardo (Istituto Nazionale di Fisica Nucleare)

Session Classification: Mechanical development

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

Pisa group presentation

Thursday 30 October 2025 09:25 (5 minutes)

Session

Institute presentation

Author: PALLA, Fabrizio (Istituto Nazionale di Fisica Nucleare)

Presenter: PALLA, Fabrizio (Istituto Nazionale di Fisica Nucleare)

Session Classification: Groups presentation

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

Current and future FCC-ee vertex detector layouts and their performance

This contribution presents the layouts and performance of the CLD and IDEA/ALLEGRO vertex detectors. Starting from this, more advanced layouts are explored:

- Ultra-light IDEA vertex detector concept using wafer-scale monolithic active pixel sensors (MAPS) stitched in two dimensions
- FCC-SEED vertex detector concept using MAPS stitched in one dimension
- A first look at a potential vertex detector with a reduced-thickness beam pipe, inspired by the ALICE3 vertex detector

Besides the layout comparison, the impact of the first layer position and of the sensor resolution is investigated. The contribution ends with a discussion on what other layouts should be studied and what the findings mean for future MAPS R&D.

Session

Layout and Simulation

Author: ILG, Armin (University of Zürich)

Presenter: ILG, Armin (University of Zürich)

Session Classification: Layout and simulation - II

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

Vertex detector R&D at UZH and PSI

Thursday 30 October 2025 09:35 (10 minutes)

Session

Institute presentation

Authors: MACCHIOLO, Anna (University of Zurich); ILG, Armin (University of Zürich); KILMINSTER, Ben (Universität Zürich); CANELLI, Florencia (University of Zurich)

Presenters: MACCHIOLO, Anna (University of Zurich); KILMINSTER, Ben (Universität Zürich); CANELLI, Florencia (University of Zurich)

Session Classification: Groups presentation

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

Status and plans of the ARCADIA project and LFoundry 110 nm

Give an overview of the Technology and ARCADIA submissions

Session

Sensors

Author: DA ROCHA ROLO, Manuel Dionisio (Istituto Nazionale di Fisica Nucleare)

Presenter: DA ROCHA ROLO, Manuel Dionisio (Istituto Nazionale di Fisica Nucleare)

Session Classification: Sensor R&D - I

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

Towards realistic digitization of silicon tracking detectors for the FCC

A detailed digitizer for the silicon-pixel tracking detector of the CLD concept at the FCC is under development within the Key4HEP software framework. The digitizer models the detector response starting from the interaction of charged particles with the silicon sensors, including charge deposition, charge transport in electric and magnetic fields, thermal diffusion, and the response of the front-end electronics. Compared to earlier simplified approaches, this new implementation aims to obtain more realistic studies of spatial resolutions (and temporal ones in the future), thereby providing a tool to investigate the impact of key detector parameters such as pixel/strip size, electric field configuration, and electronic characteristics. A first functional version is already available, and further developments in collaboration with R&D experts will refine its calibration and evaluate its impact on physics performance studies.

Session

Layout and Simulation

Author: DANIEL, Jessy (IP2I)

Presenter: DANIEL, Jessy (IP2I)

Session Classification: Layout and simulation - II

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

Curved Mimosis as a preparation for FCC-SEED : status and plan.

The FCC-SEED is a new vertex detector concept that relies on high-granularity MAPS sensors, featuring low power consumption and a lightweight geometry. To achieve optimal performance with the smallest possible inner radius and minimal material budget, the FCC-SEED geometry is based on curved sensors.

As preparatory work to develop expertise in bending, connecting, and testing curved sensors, a mechanic&integration test program is currently underway at IPHC. This program uses Mimosis sensors to design and validate bending procedures. Following the testing of bending techniques, preparation of flex circuits, bonding, and the acquisition system, the goal is to characterise a single curved Mimosis sensor in a test beam, before progressing to the construction of a first ladder demonstrator.

After a short description of the FCCee-SEED geometry, the plan and status of the testing program discussed above will be presented.

Session

Mechanics

Author: ANDREA, Jeremy

Presenter: ANDREA, Jeremy

Session Classification: Mechanical development

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

Toward Next-Generation Monolithic Active Pixel Sensors: From Ultra-Low-Power Front-Ends, Event-Driven Readout to Electro-Photonic MAPS

Monolithic Active Pixel Sensors (MAPS) have become central to modern vertexing and tracking detectors, but forthcoming facilities such as the FCC-ee will demand unprecedented power efficiency, timing precision, and bandwidth. At Brookhaven National Laboratory we are advancing several complementary innovations that collectively define the next generation of MAPS.

At the front end, we have developed a 0.5 V charge-sensitive amplifier–discriminator chain using self-cascoded transistors with pole–zero cancellation. This approach multiplies the collected charge before voltage conversion, achieving sensitivities on the order of 1 mV/e^- while operating below 100 nA bias currents—an enabling feature for thin, small-footprint pixels .

To eliminate frame-based dead time and reduce dynamic power, we introduced EDWARD (Event-Driven With Access and Reset Decoder), a fully asynchronous, fair-arbitration binary tree that guarantees gap-free event delivery with sub-microsecond latency. Prototypes in 65 nm CMOS demonstrated sustained MHz-scale single-photon imaging while maintaining compatibility with synchronous DAQ .

For wafer-scale stitched MAPS, high-speed data movement is addressed by the Backbone Transmission Line Encoding (BTLE) driver, which employs digital duobinary coding and FIR-based pulse shaping to enable 160 Mb/s repeaterless transmission across 10 cm on-chip lines at figures of merit near 37 fJ/bit/mm .

Finally, the ElPho project integrates silicon photonics with MAPS via 3D stacking. Electro-absorption modulators, ring resonators, and WDM photonic fabrics target Tb/s throughput, optical power delivery, and near-sensor photonic preprocessing, paving the way for heterogeneous electro-photonic detectors .

Together, these advances illustrate a coherent roadmap: ultra-low-voltage front ends, dead-zone-free event-driven readout, repeaterless wafer-scale interconnects, and ultimately electro-photonic MAPS tailored for the extreme demands of the FCC-ee.

Session

Sensors

Author: Prof. DEPTUCH, Grzegorz (Brookhaven National Laboratory)

Presenter: Prof. DEPTUCH, Grzegorz (Brookhaven National Laboratory)

Session Classification: Sensor R&D II

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

The Belle II-VXD running experience and the mechanical integration of the DMAPS VTX-upgrade in the new I.R. design.

Since 2019, the Belle II experiment at the SuperKEKB B-factory in Tsukuba, Japan has been collecting data from asymmetric-energy e−e+ collisions at the Y(4S) resonance, holding the world luminosity record of 5.1×10^34 cm^-2 s^−1, reached in 2024.
The Vertex Detector (VXD) provides a vertex resolution of approximately 10 μm, allowing highly precise tracking and vertex reconstruction, essential for time-dependent measurements.
The VXD is designed to achieve this performance through two complementary sub-systems: the Pixel Detector (PXD) closest to the interaction point (IP), consisting of two layers of thin DEpleted P-channel Field Effect Transistor (DEPFET)-based silicon sensors, and the Silicon Vertex Detector (SVD), consisting of four outer layers of double-sided silicon strip sensors (DSSD).
During Run 1 (2019-2022), a single layer of PXD and the full SVD were installed and matched the excellent performance which included high hit efficiency (> 99%).
We describe the challenges during the installation of the complete two-layer PXD (PXD2) in 2023, during the first long shutdown (LS1): PXD2 has now 40 modules, each consisting of DEPFET sensors with an array of 250 × 768 pixels, allowing an average material budget of 0.21% X0/layer.
Since February 2024, Belle II has resumed data-taking for Run 2, the VXD performed within specifications and we report our operational experience.
In May 2024 PXD2 was temporarily shut down to prevent further damage from uncontrolled beam losses and it will be powered-up again as soon as stable beam conditions are recovered.
To reach the target instantaneous luminosity of 6×10^35 cm^−2 s^−1, with the goal of collecting a data set 50
times larger than the previous B-factories, a redesign of the interacion region (IR) is needed.
The new QCS and the the backgroung shields are constraining further the detector envelope in the region of backward and forward polar angles, making the mechnaical integration quite challenging.
In such a luminosity range harsh beam backgrounds are expected leading to a maximal hit rate of up to 120 MHz/cm^2 for the inner detection layer, placed at a radius of 14 mm from the I.P. .
The radiation tolerance also reaches levels up to 5x10^14 (1MeV) n_eq/cm^2 and 1 MGy.
An intensive R&D program has been established to develop a new pixelated vertex detector (VTX) entirely made from a single type of depleted monolithic pixel detector (DMAPS), the OBELIX sensor, as a replacement of the Belle II vertex detector. The VTX strategy entails higher space-time granularity, lighter overall structure and services compared to the current operating vertex detector.
The baseline layout consists of two identical layers composing the inner part (iVTX) and four outer layers (oVTX), all arranged in a barrel-shaped geometry, with minimal material budget.
The ladder design is now being optimized considering the expected background hit rate and related power consumption at the target luminosity. With a power density in the range of 200-300 mW/cm2 depending on the hit rate, the ladder cooling is especially challenging. The system should maintain the sensor at room temperature to preserve the sensor functionality after irradiation, while minimising the material budget. The iVTX ladder concept is using a post-process redistribution layer (RDL) for distributing power and read out signals. Passive cooling using high-performance heat-drain material (TPG) over the ladder or, in alternative, active liquid cooling in thin aluminum pipes are currently under consideration. The oVTX design involves a ladder sup-

port structure inherited from the Alice-ITS2, with thin kapton cooling pipes integrated in a CF cooling plate hosting the chips, with a more traditional Aluminum flex for electrical connections. This new tracking system, designed to be more robust against background sources, will converge in the TDR of the upgraded Belle2 detector, scheduled for the beginning of 2027. A long shutdown is expected to start in 2032 and the installation of the new VTX will ensure high-performance vertexing for the Belle II experiment needed to improve its search for new physics at the intensity frontier.

Session

Mechanics

Author: BETTARINI, Stefano (Istituto Nazionale di Fisica Nucleare)

Presenter: BETTARINI, Stefano (Istituto Nazionale di Fisica Nucleare)

Session Classification: Layout and simulation - II

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

OCTOPUS: a R&D program towards a vertex detector for the future e+e- collider

The OCTOPUS project is a part of the CMOS working group of the solid state Detector Research and Development (DRD3). It involves 13 European institutes motivated by the R&D of fine-pitch pixel sensors, implemented in the TPSCo65 process to target key requirements of a vertex detector at a future lepton collider:

1. sensors thickness down to 50 micron;
2. fine pitch offering 3 um spatial resolution;
3. controlled power consumption below ~50mW/cm^2;
4. bandwidth of the order of 100 MHz/cm^2;
5. time resolution down to 5 ns as required by some of the future lepton collider proposals.

The project foresees an R&D program to develop a CMOS pixel sensor prototype (with the development of a fully adapted read-out architecture based on asynchronous read-out) in 3 steps, including simulations to optimize the sensing node, DAQ developments based on the CARIBOU system and tests of the prototypes to validate the performances.
We will present the organization and the status of the project, including the ongoing sensor development, simulations and test plans.

Session

Sensors

Author: Dr SENYUKOV, Serhiy (Institut Pluridisciplinaire Hubert Curien)

Presenter: Dr SENYUKOV, Serhiy (Institut Pluridisciplinaire Hubert Curien)

Session Classification: Sensor R&D - I

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

The ARCADIA Fully Depleted MAPS: laboratory characterization and particle tracking performance

The ARCADIA INFN collaboration developed a Fully Depleted Monolithic Active Pixel Sensor as a technology demonstrator, using the LFoundry 110nm CIS technology.
The whole high-resistivity substrate can be depleted, thanks to a custom backside process that allows a uniform electric field distribution inside the sensing volume. Several technology demonstrators have been developed with an overall active thickness of 50, 100 and 200
$upmu$m, which makes them suitable for both charged particles and X-rays detection.
The pixel array has an area of 1.3 $\times$ 1.3 cm^2, with a 25 μm pixel pitch.
The pixel output is digital, the readout architecture is event-driven and it can handle a rate up to 100 MHz/cm^2. The chip design has been optimized for very low power consumption (10-30 mW/cm^2, depending on the event rate). These features make it suitable for experiments at future colliders, such as the FCC (Future Circular Collider), as well as space and medical applications.

The characterization of the ARCADIA Main Demonstrator (MD3) with 200 μm active thickness has been carried out with table-top experimental setups built at the Physics and Astronomy Department of the University of Padova, including both a ^{55}Fe reference radioactive source and truly monochromatic X-rays from fluorescence emission processes and at Fermilab with a narrow spot infrared laser setup.

During July 2024, the first test beam on the ARCADIA MD3 was performed with a 120 GeV proton beam at the Fermilab Test Beam Facility, using a custom-made telescope constituted by two ARCADIA tracking planes and one ARCADIA Device Under Test (DUT).

This contribution is an overview of the ARCADIA R\&D with main focus on the MD3 chip.
Thanks to the table-top setup, it is possible to obtain a calibration of the thresholds in the energy range of the fluorescence X-rays (4-8 keV) and a in-pixel map of the charge collection efficiency from the laser measurements. The testbeam results show a tracking efficiency above 99\% for the whole threshold scan range and a resolution around 5 μm.

Session

Sensors

Authors: ZINGARETTI, Alessandra (Istituto Nazionale di Fisica Nucleare); APRESYAN, Artur (Fermilab); PANTOUVAKIS, Caterina (Istituto Nazionale di Fisica Nucleare); BONINI, Chiara (Istituto Nazionale di Fisica Nucleare); CHIAPPARA, Davide (Istituto Nazionale di Fisica Nucleare); PANTANO, Devis (Istituto Nazionale di Fisica Nucleare); WYSS, Jeffery (Istituto Nazionale di Fisica Nucleare); RIGNANESE, Michele (Istituto Nazionale di Fisica Nucleare); BACCHETTA, Nicola (Istituto Nazionale di Fisica Nucleare); AZZI, Patrizia (Istituto Nazionale di Fisica Nucleare); GIUBILATO, Piero (Istituto Nazionale di Fisica Nucleare); TURRISI, Rosario (INFN-PD); CIARLANTINI, Sabrina (Istituto Nazionale di Fisica Nucleare); MATTIAZZO, Serena (Università di Padova e INFN PD); ZENGER, Todd (Cern)

Presenter: CIARLANTINI, Sabrina (Istituto Nazionale di Fisica Nucleare)

Session Classification: Sensor R&D II

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

Status and plans for sensor developments at Fermilab

We will report on the status and plans for MAPS and 3D-integrated sensor developed at Fermilab. We will also present the status of our developments and simulation work towards production of MAPS detectors with a commercial
foundry in the US.

Session

Sensors

Authors: APRESYAN, Artur; PENA, Cristian (Fermilab); BACCHETTA, Nicola (Istituto Nazionale di Fisica Nucleare); LIPTON, Ron (Fermilab); XIE, Si (Fermilab/Caltech)

Presenter: APRESYAN, Artur

Session Classification: Sensor R&D - I

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

R&D on flexible and low mass packaging for high-frequency communication of future MAPS detectors

Minimizing the detector material budget to ⊠ 0.3% of a radiation length X0 is one of the key challenges in building future experiments such as FCC-ee. A major obstacle to achieving this goal often lies not in the sensor itself, but in the FPC and the associated mechanical supports.
Another critical requirement for future experiments is the transmission of high data rates, driven by the advent of the new 65 nm MAPS sensors, where digital communication speeds of up to 10 Gbps are expected. The need for ultra-thin FPCs becomes even more pressing when considering complex, bent sensor geometries to enable hermetic coverage of the beam pipe, as in the ALICE IT3 now under construction.
Balancing the requirements of FPC design - high data rate transmission, low material budget and high mechanical flexibility - is a challenge.
Ensuring signal integrity for high-speed communication typically requires thick FPCs to achieve proper impedance matching, which directly conflicts with material budget constraints. Standard FPC-based interconnects are therefore incompatible with the stringent requirements of inner tracking systems.
To address this, Fondazione Bruno Kessler (FBK) initiated a dedicated technological platform a few years ago, focusing on the microfabrication of low-material-budget flexible FPCs for integrating next-generation MAPS detectors into future vertex detectors. The basic idea of the presented approach stands on leveraging advanced microfabrication methods inherited from FBK silicon detector production ensuring precise feature control and, consequently, excellent signal integrity.
In this work, we present a prototype integrating an ALPIDE chip on a two-layer flexible FPC made of kapton-aluminum as substrate, with a total material budget of ~0.1% of X0 (about 0.05% sensor + 0.05% FPC). The prototype demonstrates both feasibility and reliable signal transmission along differential lines.
The complete workflow - from material selection, design and microfabrication, to bonding and characterization - has been developed at FBK and will be described in detail. We also discuss the broader applicability of this technology in detector design, including compatibility with key techniques such as different sensor bonding, passive component integration, and FPC vias.

Session

Interfaces

Author: Dr NOVEL, David (Fondazione Bruno Kessler)

Co-authors: Dr LEGA, Alessandro (Fondazione Bruno Kessler); BELLUTTI, Pierluigi (FBK-TIFPA); IUPPA, Roberto (Istituto Nazionale di Fisica Nucleare); BEOLE', Stefania (Istituto Nazionale di Fisica Nucleare); FACCHINELLI, Tiziano

Presenter: Dr NOVEL, David (Fondazione Bruno Kessler)

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

NAPA-p1: A Nanosecond MAPS Prototype for Future e^+e^- Colliders

NAPA-p1 is a Monolithic Active Pixel Sensor (MAPS) prototype developed in 65 nm CMOS imaging technology to meet the fast-timing and low-mass tracking requirements of future e^+e^- colliders. The chip features a 1.5 × 1.5 mm^2 active area with a 25 μm pixel pitch, targeting nanosecond-level time resolution and a power density below 20 mW/cm^2.
Simulations predict a timing resolution of 350 ps-rms and an Equivalent Noise Charge (ENC) of 12 e^- rms under nominal operating conditions. Here we present the result of the front-end characterization to study the response behavior, threshold performance, and pixel uniformity. A 1080 nm pulsed laser setup is being prepared for future testing of the timing and efficiency performance. Further testing at the LESA test beam facility at SLAC, expected to be available in 2027, will enable beam-based validation of the NAPA as well as future MAPS developments for FCC. These results will guide further NAPA developments toward large-area stitched sensors for precision tracking in next-generation collider detectors.

Session

Sensors

Authors: VERNIERI, Caterina (SLAC); VASSILEV, Mirella (SLAC)

Presenter: VASSILEV, Mirella (SLAC)

Session Classification: Sensor R&D II

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

Characterisation of the CE-65v2 MAPS Test Structure towards High-Resolution Vertexing at the FCC-ee

In the context of the ALICE ITS3 collaboration, a set of MAPS small-scale test structures were developed in the 65 nm TPSCo CMOS process with the validation of the process for future vertexing applications as its primary focus.
One such sensor, the Circuit Exploratoire 65nm (CE-65), and its evolution the CE-65v2, were developed to explore charge collection properties for varying configurations including collection layer process (standard, blanket, modified with gap), pixel pitch (15, 18, 22.5 µm), and matrix geometry (square vs hexagonal/staggered).

In this contribution the characterisation of the CE-65v2 chip, based on Fe-55 lab measurements and test beams at CERN and DESY will be presented.
Focus will be given to the study of charge collection properties, pixel input capacitance, and pixel-by-pixel gain variations observed in lab tests.
Subsequently, the position resolution, hit-detection efficiencies, and charge sharing properties of the different chip configurations will be detailed, as well as their dependence on process modifications, pixel pitch, and matrix geometry.
These studies highlight that a sub-3 µm spatial resolution is achievable in a fine-pitch Modified with Gap design coupled with a binary readout, or a coarser-pitch Standard process sensor with a charge-sensitive readout, offering two promising avenues to satisfy the multifaceted requirements of a vertex detector at the FCC-ee.

Session

Sensors

Author: PLOERER, Eduardo (UZH/VUB)

Co-authors: KUMAR, Ajit (IPHC Strasbourg); KLUGE, Alexander (CERN); DOROKHOV, Andrei; KOSTINA, Anhelina; MACCHIOLO, Anna (University of Zurich); ILG, Armin (University of Zürich); BESSON, Auguste (iphc Strasbourg); HU-GUO, Christine; COLLEDANI, Claude; SHIBATA, Daito; REIDT, Felix (CERN); SHAMAS, Hasan; BABA, Hitoshi; VALIN, Isabelle; PARK, Jonghan; JAASKELAINEN, Kimmo; TOMASEK, Lukas (Institute of Physics of the Czech Academy of Sciences, Prague); MAGER, Magnus (CERN); GOFFE, Mathieu; SULJIK, Miljenko; Dr SENYUKOV, Serhiy (Institut Pluridisciplinaire Hubert Curien); SAKAI, Shingo; BUGIEL, Szymon; GUNJI, Taku; CHUJO, Tatsuya; KATSUNO, Towa; SNOEYS, Walter Snoeys (CERN); YAMAGUCHI, Yorito; EL BITAR, Ziad (Institut Pluridisciplinaire Hubert Curien); BAUDOT, jerome (IPHC - Strasbourg)

Presenter: PLOERER, Eduardo (UZH/VUB)

Session Classification: Sensor R&D II

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

Milano/Edinburgh group presentation

Thursday 30 October 2025 09:15 (5 minutes)

Session

Institute presentation

Author: ANDREAZZA, Attilio (Istituto Nazionale di Fisica Nucleare)

Presenter: ANDREAZZA, Attilio (Istituto Nazionale di Fisica Nucleare)

Session Classification: Groups presentation

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

FCC-ee Beam induced backgrounds

Thursday 30 October 2025 10:35 (15 minutes)

Session

Presenter: BOSCOLO, Manuela (Istituto Nazionale di Fisica Nucleare)

Session Classification: Constraints and requirements

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

FCC-ee detector Beam-pipe

Friday 31 October 2025 08:45 (15 minutes)

Session

Presenter: BOSCOLO, Manuela (Istituto Nazionale di Fisica Nucleare)

Session Classification: Mechanical development

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

Physics requirements

Thursday 30 October 2025 10:15 (15 minutes)

Session

Presenter: AZZI, Patrizia (Istituto Nazionale di Fisica Nucleare)

Session Classification: Constraints and requirements

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

IPC backgrounds (TBC)

Session Classification: Constraints and requirements

Contribution ID: **24** Type: **not specified**

The Belle II-VXD running experience and the mechanical integration of the DMAPS VTX-upgrade in the new I.R. design.

Thursday 30 October 2025 12:10 (20 minutes)

Presenter: BETTARINI, Stefano (Istituto Nazionale di Fisica Nucleare)

Session Classification: Layout and simulation - II

Contribution ID: **25** Type: **not specified**

Current and future FCC-ee vertex detector layouts and their performance

Thursday 30 October 2025 11:25 (20 minutes)

Presenter: ILG, Armin (University of Zürich)

Session Classification: Layout and simulation - II

Contribution ID: **26** Type: **not specified**

Towards realistic digitization of silicon tracking detectors for the FCC

Thursday 30 October 2025 14:20 (15 minutes)

Presenter: DANIEL, Jessy (IP2I)

Session Classification: Layout and simulation - II

Contribution ID: **27** Type: **not specified**

FCC-ee detector beam-pipe

The design of the FCC-ee detector beam pipe will be presented, together with the ongoing R&D activities carried out at INFN Frascati. Particular emphasis will be given to the thermal performance studies and cooling measurements of the beam pipe prototypes. The limitations of the current design will be discussed, as well as possible optimisations and plans for future improvements.

Session

Mechanics

Author: BOSCOLO, Manuela (Istituto Nazionale di Fisica Nucleare)

Presenter: BOSCOLO, Manuela (Istituto Nazionale di Fisica Nucleare)

Session Classification: Mechanical development

Contribution ID: **28** Type: **not specified**

FCC-ee Beam induced backgrounds

This talk will provide an overview of the beam-induced backgrounds at FCC-ee and the workflow established to study their impact on the detectors. The main background processes will be reviewed, together with the corresponding mitigation strategies. The current status of the studies on their impact on the detector performance will also be presented.

Session

Physics Requirements

Author: BOSCOLO, Manuela (Istituto Nazionale di Fisica Nucleare)

Presenter: BOSCOLO, Manuela (Istituto Nazionale di Fisica Nucleare)

Session Classification: Constraints and requirements

Contribution ID: **29** Type: **not specified**

Alternative vertex layouts studies

Thursday 30 October 2025 11:50 (15 minutes)

Session

Presenter: D'ALFONSO, Mariarosaria (MIT)

Session Classification: Layout and simulation - II

Contribution ID: **30** Type: **not specified**

IPC background hits rejection

Thursday 30 October 2025 14:00 (15 minutes)

Session

Presenter: FORRESTEL, Emmet

Session Classification: Layout and simulation - II

Contribution ID: **31** Type: **not specified**

IPC backgrounds (TBC)

Presenter: EYSERMANS, Jan (Benemérita Universidad Autónoma de Puebla)

Session Classification: Layout and simulation - II

Contribution ID: **32** Type: **not specified**

Status and plans of the ARCADIA project and LFoundry 110 nm

Thursday 30 October 2025 15:40 (15 minutes)

Presenter: DA ROCHA ROLO, Manuel Dionisio (Istituto Nazionale di Fisica Nucleare)

Session Classification: Sensor R&D - I

Contribution ID: **33** Type: **not specified**

Status and plans for sensor developments at Fermilab

Thursday 30 October 2025 15:00 (15 minutes)

Session

Presenter: APRESYAN, Artur (Fermilab)

Session Classification: Sensor R&D - I

Contribution ID: **34** Type: **not specified**

Toward Next-Generation Monolithic Active Pixel Sensors: From Ultra-Low-Power Front-Ends, Event-Driven Readout to Electro-Photonic MAPS

Thursday 30 October 2025 16:15 (15 minutes)

CANCELLED

Session

Presenter: Prof. DEPTUCH, Grzegorz (Brookhaven National Laboratory)

Session Classification: Sensor R&D II

Contribution ID: **35** Type: **not specified**

OCTOPUS: a R&D program towards a vertex detector for the future e+e- collider

Thursday 30 October 2025 15:20 (15 minutes)

Presenter: Dr SENYUKOV, Serhiy (Institut Pluridisciplinaire Hubert Curien)

Session Classification: Sensor R&D - I

Contribution ID: **36** Type: **not specified**

The ARCADIA Fully Depleted MAPS: laboratory characterization and particle tracking performance

Thursday 30 October 2025 16:55 (15 minutes)

Presenter: CIARLANTINI, Sabrina (Istituto Nazionale di Fisica Nucleare)

Session Classification: Sensor R&D II

Contribution ID: **37** Type: **not specified**

Characterisation of the CE-65v2 MAPS Test Structure towards High-Resolution Vertexing at the FCC-ee

Thursday 30 October 2025 17:15 (15 minutes)

Presenter: PLOERER, Eduardo (UZH/VUB)

Session Classification: Sensor R&D II

Contribution ID: **38** Type: **not specified**

NAPA-p1: A Nanosecond MAPS Prototype for Future e^+e^- Colliders

Thursday 30 October 2025 16:35 (15 minutes)

Presenter: VASSILEV, Mirella (SLAC)

Session Classification: Sensor R&D II

Contribution ID: **39** Type: **not specified**

Mechanical study of the tilted vertex services integration

Friday 31 October 2025 09:05 (15 minutes)

Session

Co-author: AMMIRABILE, Gherardo (Istituto Nazionale di Fisica Nucleare)

Presenter: MOGGI, Andrea (Istituto Nazionale di Fisica Nucleare)

Session Classification: Mechanical development

Contribution ID: **40** Type: **not specified**

Curved Mimosis as a preparation for FCC-SEED : status and plan.

Friday 31 October 2025 09:25 (15 minutes)

Presenter: ANDREA, Jeremy

Session Classification: Mechanical development

Contribution ID: **41** Type: **not specified**

Experimental verification of the Vertex detector Air Cooling system

Friday 31 October 2025 09:45 (15 minutes)

Session

Co-author: MOGGI, Andrea (Istituto Nazionale di Fisica Nucleare)

Presenter: AMMIRABILE, Gherardo (Istituto Nazionale di Fisica Nucleare)

Session Classification: Mechanical development

Contribution ID: **42** Type: **not specified**

Talk

Session Classification: Mechanical development

Contribution ID: **43** Type: **not specified**

R&D on flexible and low mass packaging for high-frequency communication of future MAPS detectors

Friday 31 October 2025 11:35 (15 minutes)

Presenter: Dr NOVEL, David (Fondazione Bruno Kessler)

Session Classification: System readout and electronics

Contribution ID: **44** Type: **not specified**

Serial power and flex circuits experience and R&D

Friday 31 October 2025 11:10 (20 minutes)

Session

Presenter: ANDREAZZA, Attilio (Istituto Nazionale di Fisica Nucleare)

Session Classification: System readout and electronics

Contribution ID: **45** Type: **not specified**

EIC experience on power distribution (serial power 'price')

Friday 31 October 2025 10:30 (15 minutes)

CANCELLED

Session

Presenter: Prof. DEPTUCH, Grzegorz (Brookhaven National Laboratory)

Session Classification: System readout and electronics

Contribution ID: **46** Type: **not specified**

Wireless readout

Friday 31 October 2025 11:55 (15 minutes)

Session

Presenter: MACCHIOLO, Anna (University of Zurich)

Session Classification: System readout and electronics

Contribution ID: **47** Type: **not specified**

Trigger/triggerless impact

Friday 31 October 2025 12:15 (15 minutes)

Presenter: PAUS, Christoph (MIT)

Session Classification: System readout and electronics

Contribution ID: **48** Type: **not specified**

Talk

Session Classification: Constraints and requirements

Contribution ID: **49** Type: **not specified**

Getting serious with powering - The "current" solution for the HL-LHC Pixel detectors

Friday 31 October 2025 10:10 (15 minutes)

Presenter: HEIM, Timon (LBL)

Session Classification: System readout and electronics

Contribution ID: **50** Type: **not specified**

Status and prospects for TPSCo technology (titleTBC)

Thursday 30 October 2025 14:40 (15 minutes)

Presenter: SNOEYS, Walter Snoeys (CERN)

Session Classification: Sensor R&D - I

Contribution ID: **52** Type: **not specified**

ETH Zurich group presentation

Thursday 30 October 2025 09:45 (5 minutes)

Session

Institute presentation

Authors: RISTIC, Branislav (ETH Zurich (CH)); BACKHAUS, Malte (ETH Zurich (CH)); FRANKS, Matt (ETH Zurich (CH)); WALLNY, Rainer (ETH Zurich (CH))

Presenter: FRANKS, Matt (ETH Zurich (CH))

Session Classification: Groups presentation

Contribution ID: **53** Type: **not specified**

Strasbourg group presentation

Thursday 30 October 2025 09:50 (5 minutes)

Presenters: ANDREA, Jeremy (IPHC, CNRS); ANDREA, Jeremy

Session Classification: Groups presentation

Contribution ID: **54** Type: **not specified**

Torino group presentation

Thursday 30 October 2025 09:30 (5 minutes)

Presenter: DA ROCHA ROLO, Manuel Dionisio (Istituto Nazionale di Fisica Nucleare)

Session Classification: Groups presentation

Contribution ID: **55** Type: **not specified**

Padova group presentation

Thursday 30 October 2025 09:20 (5 minutes)

Presenters: BACCHETTA, Nicola (Istituto Nazionale di Fisica Nucleare); BACCHETTA, nicola (padova)

Session Classification: Groups presentation

Contribution ID: **56** Type: **not specified**

US groups presentation

Thursday 30 October 2025 09:55 (15 minutes)

Presenters: HABER, Carl (Lawrence Berkeley National Laboratory); PAUS, Christoph (MIT)

Session Classification: Groups presentation