FCC Week 2023

Report of Contributions

https://indico.cern.ch/e/fccw2023

Contribution ID: **228** Type: **Poster (one author must be in person)**

Precision studies at FCC-hh with diboson production.

Thursday, 8 June 2023 17:04 (1 minute)

Diboson production processes constitute an interesting probe of New Physics related to the Higgs boson and the EW sector. We study the ⊠*h* and ⊠*h* production processes, with leptonically decaying gauge bosons and both $h \to b\bar{b}$ and $h \to \gamma\gamma$ decay channels. We study these processes in the SMEFT framework and derive bounds on six dimension-6 operators. The possibility of using the $h \to \gamma\gamma$ decay channel is exclusive to FCC-hh and is an example of new processes made available on this collider. On the other hand, the $h \to b\bar{b}$ channel is already available at LHC and offers a direct comparison between hadron colliders. We compare the reach and features of each channel at FCC-hh. Finally, we analyse and stress the complementarity of these measurements with EW precision measurements to be carried out at FCC-ee. Based on arXiv: 2004.06122, 2011.13941, and 2208.11134.

Primary author: ROSSIA, Alejo Nahuel (University of Manchester)

Co-authors: GROJEAN, Christophe (DESY (Hamburg) and Humboldt University (Berlin)); BISHARA, Fady (DESY); PANICO, Giuliano (University of Florence and INFN Florence); DELLE ROSE, Luigi (IFAE); MONTULL GARCIA, Marc (Deutsches Elektronen-Synchrotron DESY); ENGLERT, Philipp (DESY Hamburg); DE CURTIS, Stefania (Universita e INFN, Firenze (IT))

Presenter: ROSSIA, Alejo Nahuel (University of Manchester)

Session Classification: Poster session and Wine & cheese

Track Classification: PE&D posters

Contribution ID: **229** Type: **Poster (one author must be in person)**

Code development with real lattice and its initial application

Thursday, 8 June 2023 17:03 (1 minute)

Simulation study is more and more essential in the design and study of a modern e+e- collider. Existing tools often simplify the lattice model in beam-beam or collective effects study. GPU provide the feasibility to implement element-by-element tracking with large amount of particles and limited computing resources. New e+e- collider need more self-consistent simulation to predict the beam stability or machine performance quantitatively. We have developed a GPU-based parallel code (APES-T) which make it feasible to use 1 million macro-particles per bunch in element-by-element tracking besides beam-beam interaction and other effects. Some applications at superKEKB and BEPCII has started using the new codes. Very initial results will be presented.

Primary author: LI, Zhiyuan

Co-authors: OHMI, Kazuhito (KEK); ZHANG, Yuan (IHEP-CAS); ZHOU, Demin; WANG, Bin (中国科学院高能物理研究所)

Presenter: LI, Zhiyuan

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **230** Type: **Oral presention (by invitation only)**

Layout and design of positron and electron linacs up to 20 GeV

Thursday, 8 June 2023 08:50 (20 minutes)

Layout and design of positron and electron linacs up to 20 GeV will be presented and discussed including the baseline and alternative options.

Primary author: GRUDIEV, Alexej (CERN)

Presenter: GRUDIEV, Alexej (CERN)

Session Classification: FCC-ee injector

Track Classification: FCC-ee injector

Contribution ID: **231** Type: **Oral presention (by invitation only)**

Linac beam dynamics

Thursday, 8 June 2023 08:30 (20 minutes)

Several linacs will bring the beam energy up to the nominal initial booster energy of 20 GeV. This will be achieved in several sections. The electron linac, from the exit of the gun section at 200 MeV up to 1.54 GeV will increase the bunch energy to 6 GeV, the common linac, where both electrons and positrons will travel, from 1.54 GeV up to 6 GeV, and the high energy linac to the final 20 GeV. We considered several options to reach the target parameters requested by the booster in terms of energy spread, bunch length, and emittance growth as well. In this presentation we will show the different configurations that we investigated including some considerations on the energy compressor, realistically installed in the transverse line from the linac exit to the booster. We will finally show the configuration to be used as a baseline for the pre-injector, which allow satisfying all the booster requests with some margin and the possibility of independently tune the final parameters.

Primary author: BETTONI, Simona (Paul Scherrer Institut)

Co-authors: GRUDIEV, Alexej (CERN); LATINA, Andrea (CERN); CRAIEVICH, Paolo; ZENNARO, Riccardo

Presenter: BETTONI, Simona (Paul Scherrer Institut)

Session Classification: FCC-ee injector

Track Classification: FCC-ee injector

Contribution ID: **232** Type: **Poster (one author must be in person)**

Study status on CEPC MDI IR design

Thursday, 8 June 2023 17:02 (1 minute)

The machine-detector interface (MDI) issues are one of the most complicate and challenging topics at the Circular Electron Positron Collider (CEPC). Comprehensive understandings of the MDI issues are decisive for achieving the optimal overall performance of the accelerator and detector. The CEPC machine will operate at different beam energies, from 45.5 GeV up to 120 GeV, with an instantons luminosity increasing from $5\times10^{34}cm^{-2}s^{-1}$ for the highest energy to $1.9\times10^{36}cm^{-2}s^{-1}$ or even higher for the lowest energy.
A flexible interaction region design will be plausible to allow for the large beam energy range. However, the design has to provide high luminosity that is desirable for physics studies, but keep the radiation backgrounds tolerable to the detectors. This requires careful balance of the requirements from the accelerator and detector sides.
In this talk, the latest design of the CEPC MDI based on the design parameters showed in the CEPC Technical Design Report (TDR) will be presented, covering the following issues:
The design of the beam pipe, which would foresee several constraints: In the central region (z = ±12 cm), it should be placed as close as possible to the interaction point and with a minimal material budget to allow the precise determination of the track impact parameters. But it should still stay far away enough not to interfere with the beam backgrounds. The material and coolants must be carefully chosen based on the heat load calculation. In the forward region, the beam pipe must be made of proper materials to conduct away the deposited heat in the interaction region and shield the detectors from the beam backgrounds.
The estimation and mitigation of beam-induced backgrounds. The detailed simulation covering the main contributions from synchrotron radiation, pair production, and off-momentum beam particles has been performed. The suppering/mitigating schemes have also been studied.
The layout of the CEPC IR and the engineering efforts for several key components like the position of LumiCal/Lumi Monitor, the design of the Final Focusing system, and the Cryostat Chamber.

Primary author: SHI, Haoyu

Presenter: SHI, Haoyu

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **233** Type: **Oral presention (by invitation only)**

FCC-hh ring: overview of the new layout

Thursday, 8 June 2023 10:30 (25 minutes)

Since the publication of the CDR, much progress has been made on the layout of the FCC-hh ring. Driven by the recent result of the ring placement studies and updates of the FCC-ee layout, major changes have been implemented in the FCC-hh ring layout. In this talk, I review the main features of the new layout, and I also provide an outlook of future studies and activities.

Primary authors: ABRAMOV, Andrey (CERN); ZIMMERMANN, Frank (CERN); PEREZ SEGURANA, Gustavo (CERN); GEIGER, Kieran (CERN (Normal Conducting Magnets group, TE)); GIOVANNOZZI, Massimo (CERN); BENEDIKT, Michael (CERN); THONET, Pierre Alexandre (CERN); LOPEZ, Roberto (CERN); Dr BRUCE, Roderik (CERN); CALATRONI, Sergio (CERN); RISSELADA, Thys; BARTMANN, Wolfgang (CERN)

Presenter: GIOVANNOZZI, Massimo (CERN)

Session Classification: FCC-hh accelerator

Track Classification: FCC-hh accelerator

Contribution ID: **234** Type: **Oral presention (by invitation only)**

The challenges of collision-energy calibration above the Z pole

Thursday, 8 June 2023 08:52 (22 minutes)

Many key measurements at FCC-ee, such as the determination of the W-boson and top-quark mass and widths, require excellent knowledge of the collision energy. Resonant depolarisation, which will be the principal tool for calibration of the beam energy at the Z pole, will be much more demanding in the W+W- regime, and impossible at higher energies. Related challenges exist for the measurement of certain properties of the Higgs boson. These challenges are reviewed, and strategies proposed by which they may be overcome.

Primary author: WILKINSON, Guy (University of Oxford (GB))

Presenter: WILKINSON, Guy (University of Oxford (GB))

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: EPOL

Contribution ID: **235** Type: **Oral presention (by invitation only)**

New FCC-hh ring layout: arc and insertion optics

Thursday, 8 June 2023 10:55 (20 minutes)

We present the latest developments in the optics design of the FCC-hh particle collider. The main change with respect to previous designs is the change of the arc cells from 12 to a 16-dipole FODO scheme which makes full use of the available aperture and increases the dipole filling factor. The updated design of insertions is also discussed, adapting the changes in the layout requirements from the placement study and are made compatible with the new arcs and their dispersion suppressors.

Primary authors: PEREZ SEGURANA, Gustavo (CERN); GIOVANNOZZI, Massimo (CERN)

Presenter: PEREZ SEGURANA, Gustavo (CERN)

Session Classification: FCC-hh accelerator

Track Classification: FCC-hh accelerator

Contribution ID: **236** Type: **Oral presention (by invitation only)**

Combined function lattice with constant partition numbers for FCC-ee

Thursday, 8 June 2023 16:20 (20 minutes)

In order to explore potential improvements to the current lattice design for FCC-ee, this work looks at the use of Combined Function Magnets (CFM) within the short straight sections of the arc cells. The use of CFMs introduces a change in the damping partition numbers. To avoid this it is necessary to maintain the values of the Synchrotron Radiation Integrals (I2 and I4), which are used to describe the effects of Synchrotron Radiation (SR). New optics solutions are explored to achieve this. SR power could be reduced by 17%. The explored optical solutions could be applied both for normal conducting CFMs and High Temperature Superconductors (HTS).

Primary author: GARCIA, Cristobal (EPFL - Ecole Polytechnique Federale Lausanne (CH))

Presenter: GARCIA, Cristobal (EPFL - Ecole Polytechnique Federale Lausanne (CH))

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **237** Type: **Oral presention (by invitation only)**

Cooling & ventilation for RF systems, surface and klystron galleries

Tuesday, 6 June 2023 14:24 (18 minutes)

The FCC RF areas will be a major challenge from a cooling and ventilation point of view, as these points contain the highest concentration of thermal loads in the entire FCC complex. The total thermal load will depend primarily on the efficiency of the klystrons (currently being upgraded) and of the cryogenic systems. The location of the cryogenic systems will also determine the number and configuration of the cooling circuits. In addition, depending on the water circuit overall heat transfer coefficient, part of the heat load will be taken by the ventilation system. This presentation addresses these and other issues and serves as an in-depth look at the cooling and ventilation systems present at the RF points.

Primary author: MARTIN MELERO, Inigo (CERN)

Presenter: MARTIN MELERO, Inigo (CERN)

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **238** Type: **Oral presention (by invitation only)**

Electron cloud studies for the FCC-ee

Thursday, 8 June 2023 14:30 (15 minutes)

We investigate the effects of the updated beam and machine parameters on the electron cloud instability for the FCC-ee arc dipole & drift regions by considering 'ECLOUD'and 'Furman-Pivi' secondary emission yield models and realistic photoemission yield values.

Primary author: YAMAN, Fatih (Izmir Institute of Technology (IYTE))

Co-author: ZIMMERMANN, Frank (CERN)

Presenter: YAMAN, Fatih (Izmir Institute of Technology (IYTE))

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **239** Type: **Oral presention (by invitation only)**

Top-up injection baseline scenario

Tuesday, 6 June 2023 09:00 (30 minutes)

The FCC-ee collider requires continuous injection not only to maximize the average luminosity but also to ensure the stability of the beams by maintaining the charge of colliding bunches. The full energy booster will accelerate electron and positron beams to the collider energy which will then be injected into the collider ring.

Several schemes are being studied but a conventional top-up bumped injection scheme has been identified as the current baseline scenario. This contribution presents the status of that scheme and its integration into the present collider lattice. Potential hardware choices will also be presented to account for realistic operation scenario as well as possible failure cases and related machine protection considerations.

Primary author: DUTHEIL, Yann (CERN)

Co-authors: LECHNER, Anton (CERN); WIESNER, Christoph (CERN); ZIMMERMANN, Frank (CERN); Prof. BOLAND, Mark James (University of Saskatchewan (CA)); HOFER, Michael (CERN); HUNCHAK, Patrick; MARTINEK, Petr (FCC); RAMJIAWAN, Rebecca Louise (CERN); BARTMANN, Wolfgang (CERN)

Presenter: DUTHEIL, Yann (CERN)

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **240** Type: **Oral presention (by invitation only)**

Pre-injector baseline and options

Wednesday, 7 June 2023 10:50 (20 minutes)

In this contribution we will give an overview of the pre-injector complex by introducing the baseline and the different options studied in recent months.

Primary author: CRAIEVICH, Paolo

Presenter: CRAIEVICH, Paolo

Session Classification: FCC-ee injector

Track Classification: FCC-ee accelerator

Contribution ID: **241** Type: **Oral presention (by invitation only)**

Dynamic aperture and momentum acceptance for alternative optics

Thursday, 8 June 2023 16:00 (20 minutes)

An alternative lattice design for the FCC-ee collider ring has been proposed, which aims to provide large Dynamic Aperture and Momentum acceptance through the dedicated correction of higher order nonlinear terms excited by the chromaticity correction sextupoles.
A large acceptance of the machine is required to provide a sufficient beam lifetime and good injection efficiency, which are both key components in achieving the target luminosity.
Moreover, compared to the baseline lattice, the new lattice design also simplifies the powering scheme of the arc-sextupoles.
In this presentation, the results of the Dynamic aperture studies using this new lattice are presented and compared to the baseline lattice.

Primary author: HOFER, Michael (CERN)

Co-authors: ZIMMERMANN, Frank (CERN); OIDE, Katsunobu; Dr OIDE, Katsunobu (Universite de Geneve (CH)); Dr RAIMONDI, Pantaleo (SLAC National Accelerator Laboratory (US)); LIUZZO, Simone (ESRF)

Presenter: HOFER, Michael (CERN)

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **242** Type: **Oral presention (by invitation only)**

Mechanical integration of the IDEA detector in the FCC-ee interaction region

Tuesday, 6 June 2023 13:45 (20 minutes)

The Future Circular Collider FCC-ee aims at unprecedented luminosities to be obtained with the crab-waist collision scheme. In this talk we will describe the mechanical model of the interaction region layout including its assembly procedure.
After a discussion on the requirements and constraints, we will present the engineered design of the vacuum chamber with the cooling system, the bellows, the vertex and outer tracker detectors and their integration in a carbon-fibre lightweight structure that will support also the luminosity calorimeter.
The vacuum chamber consists of a central beam-pipe (18 cm long and 2 cm inner diameter, surrounded by a cooling manifold of 3.7 mm thickness) and a 1.1 meter long chamber that extends up to the bellows.
The vertex detector comprises three barrel layers between 13.7 and 34 mm radius, covering an angular acceptance of |cos(θ)|<0.99, made of a lightweight mechanical structure supporting MAPS Silicon detectors, air-cooled and is supported by the beam pipe.
The outer tracker, located at a larger radius , is composed of a barrel section and forward disks, made of DMAPS pixel detectors. It is cooled with distilled water pipes, and covers the same angular acceptance of the vertex detector.
The Luminosity calorimeter, placed at about 1 meter at either sides of the interaction point, is a multilayered active structure, in which 26 passive Tungsten circular disks, each of 3.5 mm thickness, are interleaved with 25 Silicon pad detectors, in a 1 mm housing. Its total weight is 65 kg per side. In order to measure the luminosity with an accuracy of the order of 10^(-4) the calorimeter has a stringent requirement on the knowledge of its boundaries.
We will present the detailed structural simulations and the assembly sequence of all elements.

Primary author: PALLA, Fabrizio (Universita & INFN Pisa (IT))

Co-authors: FRANSESINI, Francesco; BOSCOLO, Manuela (INFN e Laboratori Nazionali di Frascati (IT)); LAUCIANI, Stefano; BOSI, filippo (INFN Pisa)

Presenter: PALLA, Fabrizio (Universita & INFN Pisa (IT))

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: MDI (Machine Detector Interface)

Contribution ID: **243** Type: **Oral presention (by invitation only)**

MDI Overview

Tuesday, 6 June 2023 13:30 (15 minutes)

The design of the interaction region of the positron-electron future circular collider must comply with various important constraints, imposed by high beam energy, high luminosity, need for polarization, and crossing scheme. An overview of the MDI design will be presented with a picture of the recent updates in the layout and ongoing studies. The status of the MDI activity will be summarised with goals and milestones for the feasibility study.

Primary author: BOSCOLO, Manuela (INFN e Laboratori Nazionali di Frascati (IT))

Presenter: BOSCOLO, Manuela (INFN e Laboratori Nazionali di Frascati (IT))

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: MDI (Machine Detector Interface)

Contribution ID: **244** Type: **Oral presention (by invitation only)**

Review of MAD-X for FCC-ee studies

Thursday, 8 June 2023 14:15 (15 minutes)

The design of the electron-positron Future Circular Collider (FCC-ee) challenges the requirements on optics codes (like MAD-X) in terms of accuracy, consistency, and performance. This paper analyses MAD-X TWISS, TRACK and EMIT modules by comparing their mutual consistency, absolute accuracy and stability and will make improvement proposals.

Primary author: SIMON, Guillaume (Université Paris-Saclay (FR))

Co-authors: Dr FAUS-GOLFE, Angeles (IJClab IN2P3 CNRS-Université Paris-Saclay (FR)); DE MARIA, Riccardo (CERN)

Presenter: SIMON, Guillaume (Université Paris-Saclay (FR))

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **245** Type: **Oral presention (by invitation only)**

Beam lifetime due to radiative Bhabha scattering

Tuesday, 6 June 2023 09:30 (30 minutes)

A good understanding of radiative Bhabha scattering at high energy e+e- colliders is important as it might become the limiting factor for the beam lifetimes. In this talk, the impact of beam-size effects will be presented, in particular the strong suppression of the radiative Bhabha scattering due to small lateral beam sizes at the interaction points. The resulting beam lifetime limits will be discussed for all FCC-ee collision energies and as a function of collision parameters. In addition, the effects of the coherent radiative Bhabha scattering will be briefly described.

Primary author: PIOTRZKOWSKI, Krzysztof (AGH University of Science and Technology (PL))

Presenter: PIOTRZKOWSKI, Krzysztof (AGH University of Science and Technology (PL))

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **246** Type: **Oral presention (by invitation only)**

Beamstrahlung dump and radiation levels in the experiment IRs

Tuesday, 6 June 2023 16:45 (15 minutes)

This talk will provide an overview of the radiation environment and dose studies for the experimental Interaction Region (IR) of FCC-ee. In particular, first considerations and studies for the photon (Beamstrahlung) dump will be presented.

Primary authors: FRASCA, Alessandro (University of Liverpool (GB)); Dr LERNER, Giuseppe (CERN)

Presenters: FRASCA, Alessandro (University of Liverpool (GB)); Dr LERNER, Giuseppe (CERN)

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: MDI (Machine Detector Interface)

Contribution ID: **247** Type: **Oral presention (by invitation only)**

Challenges for the IR BPMs

Wednesday, 7 June 2023 14:45 (15 minutes)

The FCC-ee beam position monitors (BPM) is a non-invasive beam diagnostics system which consists out of ˜2000 BPM pickups in each of the two main rings, plus read-out electronics and infrastructure. While most BPM pickups are located in the arcs, rigidly fixed at the quadrupole magnets, 3+3 BPMs are located in each of the interaction regions (IR) with particular challenging real-estate, integration and alignment constraints. This contribution tries to highlight those points for further discussion and R&D, however, will also give a brief overview on the overall FCC-ee BPM system.

Primary author: WENDT, Manfred (CERN)

Co-author: HOWLING, Emily Rose

Presenter: WENDT, Manfred (CERN)

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: MDI (Machine Detector Interface)

Contribution ID: **248** Type: **Oral presention (by invitation only)**

Progress on the IDEA vertex detector implementation in key4hep full simulation

Tuesday, 6 June 2023 14:05 (20 minutes)

A plethora of measurements at the FCC-ee crucially depend on efficient flavour tagging and precise flight distance measurements. To achieve this, the innermost piece of the FCC-ee detectors, the vertex detector, has to precisely locate the collision vertices, while adding only a minimal amount of material to the detector to limit multiple scattering deteriorating the detector performance.

This contribution presents the progress of the implementation of the IDEA vertex detector in full simulation using the key4hep and DD4hep frameworks.

Next steps in the full simulation work considering alternative vertex detector designs and the related sensor R&D will be briefly discussed as well.

Primary author: ILG, Armin (University of Zurich)

Presenter: ILG, Armin (University of Zurich)

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: MDI (Machine Detector Interface)

Contribution ID: **249** Type: **Oral presention (by invitation only)**

Arc half-cell configuration and mock-up

Thursday, 8 June 2023 13:30 (20 minutes)

This talk will give a summary of the studies performed during the first year of the FCC-ee arc half-cell mock-up project. Details of the design of the interfaces between the main systems, their supporting and placement principles, will be described. The talk will also review the task timeline and milestones. Finally, the current status of the configuration of the half-cell mock-up will be showed.

Primary author: CARRA, Federico (CERN)

Presenter: CARRA, Federico (CERN)

Session Classification: Technology R&D

Track Classification: FCC-ee technologies R&D

Contribution ID: **250** Type: **Oral presention (by invitation only)**

Alignment systems propositions to face the FCC-ee MDI challenges

Wednesday, 7 June 2023 14:30 (15 minutes)

The FCC-ee will implement a crab-waist configuration, implying a very dense Machine Detector Interface (MDI), having accelerator components to be placed inside the detector. For the moment, a very elegant but complex design raises challenges, especially regarding the conditions near the components requiring alignment. Alignment sensors will need to be installed and operate in cryogenic temperature, radiations, and magnetic fields etc. while being very compact and accurate enough to fulfil the requirements. This presentation will underline propositions for alignment systems to be used in the MDI, including a new in-line multiplexed and distributed Frequency Scanning Interferometry (IMD-FSI), to monitor the shape of the assembly. Ongoing studies, developments and remaining challenges are also mentioned.

Primary author: Mr WATRELOT, Leonard (CNAM - Conservatoire National des Arts et Métiers (FR))

Presenter: Mr WATRELOT, Leonard (CNAM - Conservatoire National des Arts et Métiers (FR))

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: MDI (Machine Detector Interface)

Contribution ID: **251** Type: **Oral presention (by invitation only)**

The FCC-ee alignment: questions, answers and challenges

Thursday, 8 June 2023 15:30 (20 minutes)

The FCC-ee will be installed in a 91 km long tunnel at around 200 m underground. The size of the project, the tunnel configuration and stability, the number of components to align and the alignment tolerances raise unprecedented challenges. From the manufacturing of the components to the relative alignment of these components during technical shutdowns, all the alignment steps are impacted. This presentation will highlight the questions at stake for this alignment, covering the manufacturing control, fiducialization and assembly aspects, the first installation, the relative alignment, the maintenance of the alignment in the arcs, the LSSs and the MDIs. The proposed direction of research and ongoing studies are also mentioned.

Primary author: WATRELOT, Leonard (CNAM - Conservatoire National des Arts et Métiers (FR))

Presenter: WATRELOT, Leonard (CNAM - Conservatoire National des Arts et Métiers (FR))

Session Classification: Technology R&D

Track Classification: FCC-ee technologies R&D

Contribution ID: **252** Type: **Oral presention (by invitation only)**

Powering of RF systems –Power converters and infrastructure

Tuesday, 6 June 2023 14:06 (18 minutes)

The RF systems of the FCCee are expected to be the primary consumers of power and energy. Moreover, the staged approach, ranging from Z to TTbar, necessitates modifications in the RF production method involving klystrons and solid-state devices, posing challenges for the powering infrastructure.

This presentation will outline the RF powering requirements for each stage, including power levels, voltage levels, and system locations. Solutions will be discussed, including the location and general concepts of power converters, as well as power distribution aspects.

Specifically, a centralized and modular power converter solution for high voltage powering of klystrons will be presented, with smaller components installed in the klystron gallery to minimize overall capital expenditure (CAPEX) costs.

Primary author: AGUGLIA, Davide (CERN)

Co-authors: MARCEL, Charline (CERN); BLANQUEZ DELGADO, Francisco Rafael (CERN); COLMENERO MORATALLA, Manuel (Valencia Polytechnic University (ES)); Dr PITTET, Serge (CERN)

Presenter: AGUGLIA, Davide (CERN)

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **253** Type: **Oral presention (by invitation only)**

Powering of magnet concept and requirements

Thursday, 8 June 2023 09:42 (18 minutes)

The focus of this presentation is to address the challenge of evaluating the most effective powering solutions for the FCC-ee and FCC-hh. This involves selecting the optimal circuit configurations for the different magnet types, determining the best location for the power converters, and choosing the energy storage systems. To achieve this, we must consider various factors, such as the capital cost (e.g. impact on civil engineering), as well as the operational costs (e.g. power losses).

To assess these various factors, multiple models of the different systems, including infrastructure, magnets, power converters, cables, and losses, have been developed and interlinked.

The presentation will provide an overview of an optimisation tool that has been developed to allow for the easy testing of multiple circuit configurations, enabling a comparison of their effectiveness in minimising both total capital and operational costs.

Primary author: WICKI, Byamba (CERN)

Co-authors: AGUGLIA, Davide (CERN); BLANQUEZ DELGADO, Francisco Rafael (CERN); COLMENERO MORATALLA, Manuel (Valencia Polytechnic University (ES)); Dr PITTET, Serge (CERN)

Presenter: WICKI, Byamba (CERN)

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **254** Type: **Oral presention (by invitation only)**

Radiation protection studies for the FCC-ee

Thursday, 8 June 2023 11:00 (15 minutes)

The radiation protection study for the FCC-ee shall assure the FCC-ee design compatibility with radiation protection objectives and constraints and provides input to the radiological environmental impact study.

In this particular contribution it provides an evaluation of the relevant radiological parameters in the arc section of FCC-ee, covering its entire operational life, including the Z pole (45.6 GeV), WW threshold (80 GeV), HZ production peak (120 GeV), and tt threshold (182.5 GeV) modes.

During the operation of the facility, two distinct source terms, namely beam gas interaction and synchrotron radiation, may contribute to stray radiation and subsequent activation of materials in the machine tunnel. The residual dose rates resulting from this activation can significantly impact the maintenance scheduling and accessibility of the area, whereas the release of activated air may pose radiological risks to the environment.

The primary objective is to conduct a comprehensive assessment of the radiological parameters in the FCC-ee arc section by estimating the levels of prompt and residual radiation and activation to evaluate their impact on the operation and maintenance of the facility (operational objective) and ensure that the FCC-ee design aligns with the environmental objectives and constraints (environmental objective).

FLUKA Monte Carlo simulations are performed across multiple operational modes, along with the implementation of a ventilation model to analyse the impact of air activation during tunnel access and the release of activated air into the environment.

The operational objective is attained through the evaluation of the residual dose rate, inhalation dose and immersion dose during a beam stop scenario. The environmental objective is accomplished by estimating the activity released into the surrounding environment through the ventilation system and by comparing the activation levels of the accelerator materials to the established clearance limits.

Primary author: LAVEZZARI, Giacomo (CERN)

Co-author: WIDORSKI, Markus (CERN)

Presenter: LAVEZZARI, Giacomo (CERN)

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **255** Type: **Oral presention (by invitation only)**

DC Networks for the Powering of the FCC-ee and FCC-hh

Thursday, 8 June 2023 09:24 (18 minutes)

With the advent of power electronics in recent years, DC networks have become an interesting solution for the distribution of electrical energy due to their advantages in terms of efficiency, controllability, volume reduction, and integration of energy storage. Considering the particularities of the FCC, DC networks could be used to supply power to specific machine parts.
At a larger scale, DC networks could transfer power around the machine's circumference, reducing the required cable section and improving active and reactive power control. At the access point level, DC networks could reduce the number of conversion stages, increasing overall efficiency. Additionally, the use of high-frequency transformers and DC cables with lower voltage drops could contribute to reducing the required volume.
This presentation will showcase the available technologies for constructing such a network and the primary challenges that must be addressed to enable the grid's construction.

Primary author: COLMENERO MORATALLA, Manuel (Valencia Polytechnic University (ES))

Co-authors: AGUGLIA, Davide (CERN); BLANQUEZ DELGADO, Francisco Rafael (CERN)

Presenter: COLMENERO MORATALLA, Manuel (Valencia Polytechnic University (ES))

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **256** Type: **Oral presention (by invitation only)**

Geodesy and survey update

Thursday, 8 June 2023 11:30 (15 minutes)

Building the FCC tunnel, installing and aligning each component and experiment of the machine at the intended location will be a challenging task relying notably on the quality and accuracy of the geodetic infrastructure. A solid geodetic foundation for the planning, construction, alignment and operation of the FCC will be implemented to support the different levels of accuracy required, from the initial decametric coarse placement study to the final and perpetually refined submillimetric alignment. The geodetic infrastructure must be compatible with each phase of the project.
In collaboration with ETHZ, HEIG-VD, IGN and Swisstopo studies are ongoing to update the CERN geodetic infrastructure making it ready for the FCC.

The presentation will cover the status of the development of the CERN Geodetic Reference Frame focusing on the implementation of the primary surface geodetic network covering the FCC area and will give an overview of the remaining challenges requiring new developments like the geoid modelling, the coordinates transfer and the underground geodetic network.

Primary author: WEYER, Benjamin (CERN)

Presenter: WEYER, Benjamin (CERN)

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **257** Type: **Oral presention (by invitation only)**

Preliminary design study of interaction region crab sextupole for FCC-ee collider

Wednesday, 7 June 2023 14:10 (20 minutes)

The new Future Circular Colliders (FCC), including high-luminosity e^+e^- collider, exploits the crab waist interaction scheme at interaction region (IR) with a beam crossing angle of 30 mrad. The small values of the beta functions at the interaction point requires strong and thin crab sextupole pair for chromaticity correction. Their location between 250 m and 700 m from the interaction region, makes helium bath cooling impractical and dry conduction-cooled sextupole magnet could be an attractive alternative.
For the energy sawtooth and energy scan scenario beyond 182.5 GeV, the required maximum sextupole magnet bore field is 4.72 T at 35 mm radius or a strength of 3850 T/m2 over a magnetic length of 350 mm. Low and high temperature superconductor (LTS and HTS) magnets are viable potential options for such operating field.

The HTS option, operating at 10-20 K, requires a simpler conduction cooling setup, and lower power than LTS, operating at around 4 K. Over the last decade, HTS ReBCO coated tape conductors (CC) benefited from substantial price to performance and long lengths availability improvements. Therefore, they are increasingly attractive for building the next generation of energy-efficient high-field magnets that are conduction cooled.
The alternative design options of construction of the cryogen-free conduction-cooled IR crab sextupole will be presented. The preliminary design focuses on the magnetic cross section optimisation for both LTF and HTS conductors and the proposed mechanical structure based on ReBCO tape racetrack winding. A first coil quench protection scheme is proposed and assessed as function of the winding manufacture choices.

Index Terms—ReBCO, HTS, cryogen-free conduction cooling, cryocooler-cooled superconducting magnet, high magnetic field, reinforced racetrack coil.

Primary author: Dr FOUSSAT, Arnaud Pascal (CERN)

Presenter: Dr FOUSSAT, Arnaud Pascal (CERN)

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: MDI (Machine Detector Interface)

Contribution ID: **258** Type: **Poster (one author must be in person)**

Recent developments in surface conditioning measurements and vacuum simulations

Thursday, 8 June 2023 17:01 (1 minute)

We present recent developments and PSD data from the FCC-BESTEX experimental beamline at the KARA synchrotron at KIT on one FCC-hh beam screen, as well as future plans for measuring FCC-ee vacuum paper prototypes at the beamline. In addition, we demonstrate VacuumCOST, a new software tool that has been developed to enable more dynamic MolFlow simulations, including the pressure evolution in case of suddenly occurring leaks, the conditioning of vacuum chamber surfaces, and the propagation of NEG coating saturation.

Primary author: HENRIKSEN, Peter Lindquist (CERN)

Co-authors: ADY, Marton (CERN); KERSEVAN, Roberto (CERN)

Presenter: HENRIKSEN, Peter Lindquist (CERN)

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **260** Type: **Oral presention (by invitation only)**

Overview of safety systems and evacuation study in the FCC tunnel

Thursday, 8 June 2023 11:15 (15 minutes)

Within the framework of the FCC feasibility study, additional safety studies were developed to provide a quantitative assessment on the main risks identified during the CDR.
The safety systems initially proposed in the CDR were studied in detail and adjustments were made to the baseline proposals, namely with regards to the smoke and helium extraction, as well as for the size of the safe areas at the bottom of the shafts. The application of a performance-based design approach was adopted. These results would feed into the layout of the underground installations for a more accurate cost & feasibility analysis.
This presentation will provide a general overview of the current baseline regarding the safety systems proposed in the FCC tunnel, which will be presented at the mid-term review. In addition, the authors will present the methodology and results of the most recent evacuation study defining the required size (m2) to be reserved for the safe areas at the bottom of the shafts within the pressurized zones.

Primary authors: HENRIQUES, Andre (CERN); NERGIZ, Guven (CERN); Mr RIOS, Oriol (CERN); OTTO, Thomas (CERN)

Presenter: HENRIQUES, Andre (CERN)

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **261** Type: **Oral presention (by invitation only)**

Compton polarimeter

Wednesday, 7 June 2023 13:34 (21 minutes)

A status report of the Compton polarimeter will be provided along with relevant challenges.

Primary author: MARTENS, Aurelien (Université Paris-Saclay (FR))

Presenter: MARTENS, Aurelien (Université Paris-Saclay (FR))

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: EPOL

Contribution ID: **262** Type: **Oral presention (by invitation only)**

Digital twins: current activities in Mechanical and Materials Engineering group at CERN and perspectives for FCC-ee

Thursday, 8 June 2023 14:45 (15 minutes)

In the frame of FCC-ee, where the radiation level and the large scale of the facility impose remote activities and cost optimization, the deployment of dynamic models of physical mechanical systems has great potential.
Ability to provide real-time feedback on the system's state and to perform predictive modelling can contribute -among others- to diagnostic optimization, reduction of number of sensors and to effective predictive maintenance.
This contribution will present the ongoing effort by Mechanical and Materials Engineering group at CERN, to develop digital twins dedicated to mechanical components for particle accelerators. The current state of the project and initial trials will be discussed.

Primary author: BAUDIN, Lucie (CERN)

Co-authors: PEREZ FONTENLA, Ana Teresa (CERN); SMAKULSKA, Dorota (CERN); PAPAZOGLOU, Giannis (CERN); GARLASCHE, Marco (CERN); SACRISTAN DE FRUTOS, Oscar (CERN); ATIEH, Said (CERN)

Presenter: BAUDIN, Lucie (CERN)

Session Classification: Technology R&D

Track Classification: FCC-ee technologies R&D

Contribution ID: **263** Type: **Oral presention (by invitation only)**

Status of the FCC-ee booster and collider magnet developments

Wednesday, 7 June 2023 08:30 (40 minutes)

The inter-beam distance in the collider arcs has recently been increased to accommodate the latest design of the SR absorbers in the dipoles. This has led to a modification of the magnet designs, taking advantage of the larger distance between apertures to try minimizing both the aperture coupling in the quadrupoles, and the saturation in the sextupoles.
The presentation will summarize the status of the collider magnet designs, exploring also the possible benefits of reducing the apertures on the power consumption, as well as the status of the booster magnet designs, based on the latest specifications from the beam dynamics studies.

Primary author: BAUCHE, Jeremie (CERN)

Co-authors: JAERMYR ERIKSSON, Carl (CERN); SAEIDI, farhad (ILSF/IPM)

Presenters: JAERMYR ERIKSSON, Carl (CERN); BAUCHE, Jeremie (CERN); VON FREEDEN, Luke (CERN); SAEIDI, farhad (ILSF/IPM)

Session Classification: Technology R&D

Track Classification: FCC-ee technologies R&D

Contribution ID: **264** Type: **Oral presention (by invitation only)**

Final SWELL mock-up cooling test results

Thursday, 8 June 2023 11:06 (18 minutes)

The cooling concept of the SWELL prototype is based on a self-sustained convection loop (open thermosyphon) in He I saturated conditions. The estimated heat load for one quarter of the SWELL 1.3 GHz prototype is 17.5 W. The 30 mm-diameter cooling tube has a length of 131 mm, which corresponds to the length of the SWELL main copper body. In the vertical SRF test arrangement, a 10 mm x 8 mm centered stainless steel tube creates a ring-shaped space to the 30 mm Cu tube surface of the SWELL quarter block and functions as the supply of saturated liquid helium. The generated flow in this cooling loop is caused by the density changes of the helium itself (mostly convection or nucleate boiling in the ring-shaped space). Tests of the heat transfer performance from that copper mock-up structure to the He flow have been conducted at the CERN Cryolab in forced flow He I saturated conditions. Additionally the same setup showed an interesting and unstable boiling condition when operated in a He II saturated bath. Short bursts of helium gas blowouts are recorded in the 30 mm tube cross section for a heat flux of 2.5 W/cm2. The observed effects can be traced back to exceeding the critical heat flux in He II in the SWELL vertical cooling arrangement. The measured temperature gradients in the mock-up by nucleate boiling in He I and He II saturated conditions are compared and recommendations for possible cooling regimes of future SWELL cavities are made.

Primary author: Dr KOETTIG, Torsten (CERN)

Co-authors: Ms GIULIETTI, Ellie (CERN); Mr CONSTANTINOU, Haris (CERN)

Presenter: Dr KOETTIG, Torsten (CERN)

Session Classification: Technology R&D

Track Classification: SRF Programme

Contribution ID: **265** Type: **Poster (one author must be in person)**

Wakefields of the FCC-ee collimation system

Thursday, 8 June 2023 17:00 (1 minute)

The purpose of this paper is to calculate the longitudinal and transverse wakefields of the FCC collimators by using the electromagnetic codes ECHO3D and IW2D. We cross-checked our results using CST particle studio for long bunches, and found them to be in good agreement. The obtained results show that the collimators give one of the highest contributions to the overall FCC-ee wake potentials. Using the code PyHEADTAIL, we have found that the presence of the geometric wakefield of the collimators leads to the occurrence of transverse mode coupling instability (TMCI) at a significantly lower bunch population as compared to that of all other contributions and solutions to reduce this geometric term must be found.

Primary authors: Dr CARIDEO, Emanuela (Sapienza Universita e INFN, Roma I (IT)); Prof. MIGLIORATI, Mauro (Sapienza University of Rome and INFN, Roma I); Dr ZOBOV, Mikhail (INFN-LNF); Dr BEHTOUEI, Mostafa (INFN-LNF)

Presenter: Dr BEHTOUEI, Mostafa (INFN-LNF)

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **266** Type: **Oral presention (by invitation only)**

R&D towards an 800 MHz cryomodule

Wednesday, 7 June 2023 14:29 (18 minutes)

As FCC-ee reconfigures to reach higher and higher energies, many 800 MHz SRF cavity cryomodules are planned for installation in the tunnel. In this presentation, we discuss some R&D activities at Fermilab related to these cryomodules. We present relevant R&D towards achieving high Q0 in cavities in this frequency range and at operating gradients relevant for the FCC-ee specification, including treatment and testing of 800 MHz cavities built by Jefferson Lab. We also discuss cryomodule design, particularly in relation to PIP-II cryomodules with similar frequency. Finally, we discuss recent relevant SRF cryomodule production experience at Fermilab.

Primary author: POSEN, Sam

Co-authors: BOFFO, Cristian; BELOMESTNYKH, Sergey; KAZAKOV, Sergey (FNAL); ROGER, Vincent (Fermilab)

Presenter: POSEN, Sam

Session Classification: Technology R&D

Track Classification: SRF Programme

Contribution ID: **267** Type: **Oral presention (by invitation only)**

The availability challenge: targets, shortfalls and game-changing opportunities

Thursday, 8 June 2023 15:50 (20 minutes)

To reach integrated luminosity goals, the FCC-ee must be operational for minimum 80% of the scheduled 185 physics days each year. For comparison, the LHC achieved 77% in Run 2, 2016-2018. There are additional challenges in operation and maintenance of the FCC-ee due to its scale, complexity and ambitious technical objectives. Availability is therefore a significant risk to physics deliverables. This presentation deconstructs the availability challenge in the FCC-ee according to its top-level systems. Contributions are in three parts: (I) For the first time, availability requirements are defined for each system, scaled according to the complexity of delivery. The methodology also provides a platform to translate changes in system availability to that of the collider overall. (II) Following a blueprint to be repeated for each system, availability of the RF is projected in Monte Carlo simulation from existing colliders to the FCC-ee. Forecasts for the Z and W modes are highly inadequate, suggesting a radical change in operation and maintenance paradigm is required. (III) Solutions to the availability problem are proposed and exploratory simulations analysed for several potentially game-changing R&D opportunities.

Primary author: HERON, John W. (CERN)

Co-authors: WOLLMANN, Daniel (CERN); RODRIGUEZ MATEOS, Felix (CERN); UYTHOVEN, Jan (CERN); FELSBERGER, Lukas (CERN)

Presenter: HERON, John W. (CERN)

Session Classification: Technology R&D

Track Classification: FCC-ee technologies R&D

Contribution ID: **268** Type: **Oral presention (by invitation only)**

Beam instrumentation for FCC-ee

Wednesday, 7 June 2023 08:30 (25 minutes)

This talk will present an overview on the beam instrumentation for the FCCee accelerator complex. The specifications and main challenges for the FCCee beam instrumentation will be discussed. A status on the on-going R&D activities will be also reported, together with the plans for future studies.

Primary author: LEFEVRE, Thibaut (CERN)

Presenter: LEFEVRE, Thibaut (CERN)

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **269** Type: **Oral presention (by invitation only)**

FCC subsurface investigations into areas of geological uncertainty

Wednesday, 7 June 2023 14:30 (30 minutes)

This presentation will give an update on the subsurface site investigations planned for 2024 and 2025 in the areas of highest geological uncertainty on the proposed future alignment of the FCC. Beginning briefly by presenting why having a robust 3D geological subsurface model is essential for civil engineering studies, it will go on to describe the level of detail and certainty in the current models as well as highlight where the most uncertainties lie. It will then introduce the types of subsurface investigations planned and present a summary of each of the eight individual sectors describing what CERN is hoping to achieve by carrying out investigations in these areas. The presentation will conclude by describing how results from the investigations will be incorporated into the civil engineering cost and schedule update and will briefly outline the next steps for subsequent future investigations.

Primary author: CUNNINGHAM, Roddy (CERN)

Co-author: Ms REW, Lucy (EGIS)

Presenters: Ms REW, Lucy (EGIS); CUNNINGHAM, Roddy (CERN)

Session Classification: Civil Engineering

Track Classification: Civil Engineering

Contribution ID: **270** Type: **Oral presention (by invitation only)**

Robotics for accelerator maintenance

Thursday, 8 June 2023 16:10 (20 minutes)

The fourth industrial revolution, the current trend of automation and data interconnection in industrial technologies, is becoming an essential tool to boost maintenance and availability for space applications, warehouse logistics, particle accelerators and for harsh environments in general. The main pillars of Industry 4.0 are Internet of Things (IoT), Wireless Sensors, Cloud Computing, Artificial Intelligence (AI), Machine Learning and Robotics. Core to success and future growth in this field is the use of robots to perform various tasks, particularly repetitive, unplanned or dangerous, which humans either prefer to avoid or are unable to carry out due to hazards, size constraints, or the extreme environments in which they take place. During the last years at CERN, robotic technologies have been developed and integrated within the accelerators to support maintenance tasks reducing human exposure to hazards and boosting machines availability. Extrapolating the state of robotic solutions by about two decades, the time when robotics solutions could be applied in the FCC tunnels, such systems will be able to handle most of the planned interventions, that are currently mainly conducted manually, and many of the unplanned or emergency situations. Additionally, most of the manually performed interventions in the LHC complex cannot be applied to the three times longer FCC tunnel, without either increasing efforts in workforce and costs or accepting longer machine down times. The work presents the current state of the art in industrial robotics and applied robotics in big science facilities, providing a future vision on how these technologies could fulfil maintenance tasks within the FCC accelerator complex, underlying current aspects that should be further developed to guarantee robust remote operations of future cybernetic systems for FCC.

Primary author: Dr DI CASTRO, Mario (CERN)

Co-authors: MASI, Alessandro (CERN); GAMPER, Hannes (Johannes Kepler University (AT))

Presenter: Dr DI CASTRO, Mario (CERN)

Session Classification: Technology R&D

Track Classification: FCC-ee technologies R&D

Contribution ID: **271** Type: **Oral presention (by invitation only)**

FCC underground civil engineering update

Wednesday, 7 June 2023 13:30 (30 minutes)

This talk will provide an update on the latest civil engineering design of the FCC feasibility study. It will cover a range of topics, including the latest sub-surface structures, the progress of the construction schedule and cost study, and the geotechnical site investigations that will be carried out to assess the feasibility of the project.

Primary authors: BROMILEY, Liam (CERN); Ms FLOREZ, Liliana (ILF)

Presenters: BROMILEY, Liam (CERN); Ms FLOREZ, Liliana (ILF)

Session Classification: Civil Engineering

Track Classification: Civil Engineering

Contribution ID: **272** Type: **Oral presention (by invitation only)**

Engineering developments toward seamless substrates

Thursday, 8 June 2023 09:24 (18 minutes)

The study and optimisation of manufacturing processes for copper substrates of Nb-coated cavities is a subject of renewed interest, due to the challenging demands on SRF performance for the Future Circular Collider (FCC).
This contribution will highlight related activities, currently being performed at CERN, namely on the R&D and optimization of welding processes, and on the production of seamless cavities; the latter with a focus on simulation of fabrication processes and corresponding studies in terms of material and failure characterization.

Primary authors: SWIESZEK, Joanna Sylwia; DEMAZIERE, Thomas

Presenters: SWIESZEK, Joanna Sylwia; DEMAZIERE, Thomas

Session Classification: Technology R&D

Track Classification: SRF Programme

Contribution ID: **273** Type: **Oral presention (by invitation only)**

The FCC-ee HTS4 project: study of superconducting short straight sections for FCC-ee

Wednesday, 7 June 2023 09:10 (25 minutes)

The FCC-ee HTS4 project studies the possibility of replacing all (warm) short straight sections of FCC-ee with superconducting ones. There are about 2900 short straight sections in the arcs of FCC-ee housing arc quadrupoles, sextupoles and various corrector magnets. In the conceptual design report design, all these magnets are normal-conducting with an important footprint in the overall electrical energy consumption of the accelerator. By replacing these magnets with state-of-the-art high-temperature superconducting ones we can reduce energy consumption for these systems by about 90% at top energies. We will also increase luminosity by about 7%, by increasing the packing factor of the accelerator, and reduce top energy RF voltage by a similar amount. It is envisaged to cool these short straight sections using a dry cryocooling system operating at around 40 K. A ground-breaking cold power supply is also studied with our sister project FCC-ee-CPES.

Primary author: KORATZINOS, m (Paul Scherrer Institute (CH))

Presenter: KORATZINOS, m (Paul Scherrer Institute (CH))

Session Classification: Technology R&D

Track Classification: FCC-ee technologies R&D

Contribution ID: **274** Type: **Oral presention (by invitation only)**

Preliminary layouts and designs for two of the FCC surface sites

Wednesday, 7 June 2023 14:00 (30 minutes)

This presentation will present the outcomes of the collaboration between CERN and Fermilab (US Department of Energy) for the design and preparation of 3D models for one experiment (Point A) and one technical (Point B) of the FCC surface sites. The presentation will discuss the various inputs considered to demonstrate the feasibility and adaptability of the two surface sites in accordance with technical, environmental, and urban constraints. It will also provide some thoughts for future studies on the FCC buildings.

Primary authors: DOCKERY, Damian (FNAL); FEDEROWICZ, Andrew (FNAL); RUBIK, Brian (FNAL)

Presenters: DOCKERY, Damian (FNAL); FEDEROWICZ, Andrew (FNAL); RUBIK, Brian (FNAL)

Session Classification: Civil Engineering

Track Classification: Civil Engineering

Contribution ID: **275** Type: **Oral presention (by invitation only)**

Brookhaven National Lab magnet capabilities and projects

Wednesday, 7 June 2023 09:35 (25 minutes)

From the time of the Brookhaven Summer Study in the summer of 1968 to the present day, Brookhaven National Laboratory's (BNL's) Magnet Division has developed advanced technology in support of science and US industry. Magnet Division is a world class magnet development facility which can provide full solutions from modeling, design, robust magnet engineering, and state of the art magnet prototyping and testing. Currently Magnet Division plays a significant role in the Electron Ion Collider (EIC) magnet design and the Accelerator Upgrade project. BNL's Magnet Division is utilizing its unique direct wind technology for the construction of many of the EIC interaction region (IR) magnets, a magnet design and fabrication technique that allows the production of highly precise field quality magnets and that enables the highly compact IR needed by the EIC. These unique capabilities may also play a critical role in the development of the IR for the future FCC-ee and other future colliders. This talk will give an overview of the many capabilities and magnet projects currently underway at BNL, and the potential synergies with the FCC.

Primary author: AMM, Kathleen

Co-authors: Dr PARKER, Brett (Brookhaven National Lab); Dr WITTE, Holger (Brookhaven National Lab); ANERELLA, Michael (Brookhaven National Lab); Dr JOSHI, Piyush (Brookhaven National Lab); Dr GUPTA, Ramesh (Brookhaven National Lab)

Presenter: AMM, Kathleen

Session Classification: Technology R&D

Track Classification: FCC-ee technologies R&D

Contribution ID: **277** Type: **Oral presention (by invitation only)**

Investigating next generation of accelerators : the KITTEN test facility for sustainable research infrastructures

Thursday, 8 June 2023 14:25 (20 minutes)

To efficiently and reliably enable the operation of future large-scale research facilities, it is indispensable to conduct multi-area and multi-disciplinary research, taking into account in the facility design not only scientific aspects, but also energy-related challenges. At the Karlsruhe Institute of Technology (KIT), the innovative research laboratory KITTEN has recently been developed, connecting two of the largest research infrastructures at KIT : the particle accelerator KARA, and the energy research facility Energy Lab 2.0. The goal of KITTEN is to study in a comprehensive and multi-disciplinary way novel solutions for improving the energy use in particle accelerators, and, in general, in any energy-intensive research infrastructure. The questions to be addressed in the joint research encompasses the impact of new grid architectures, the integration of various storage technologies, novel efficient hardware, control strategies, and the seamless integration of renewable energy sources. This presentation will introduce the KITTEN research infrastructure and will describe the current research activities at KIT, that have been developed in the direction of energy efficient and sustainable research infrastructure.

Primary author: Prof. DE CARNE, Giovanni (Karlsruhe Institute of Technology (KIT))

Presenter: Prof. DE CARNE, Giovanni (Karlsruhe Institute of Technology (KIT))

Session Classification: Technology R&D

Track Classification: FCC-ee technologies R&D

Contribution ID: **279** Type: **Oral presention (by invitation only)**

FCC-ee Collimation

Tuesday, 6 June 2023 10:30 (20 minutes)

Primary author: ABRAMOV, Andrey (CERN)

Presenter: ABRAMOV, Andrey (CERN)

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **280** Type: **Oral presention (by invitation only)**

Collective effects

Tuesday, 6 June 2023 11:10 (25 minutes)

Primary author: MIGLIORATI, Mauro

Presenter: MIGLIORATI, Mauro

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **281** Type: **Oral presention (by invitation only)**

Electron cloud studies

Tuesday, 6 June 2023 11:35 (15 minutes)

Primary author: SABATO, Luca (EPFL - Ecole Polytechnique Federale Lausanne (CH))

Presenter: SABATO, Luca (EPFL - Ecole Polytechnique Federale Lausanne (CH))

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **282** Type: **Oral presention (by invitation only)**

Mechanical model of the MDI

Tuesday, 6 June 2023 14:25 (20 minutes)

Primary author: FRANSESINI, Francesco

Presenter: FRANSESINI, Francesco

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: MDI (Machine Detector Interface)

Contribution ID: **283** Type: **Oral presention (by invitation only)**

Towards mechanics and optics evaluation of the vibrations effects for the FCC-ee MDI

Tuesday, 6 June 2023 14:45 (15 minutes)

Primary author: BRUNETTI, Laurent (Centre National de la Recherche Scientifique (FR))

Presenter: BRUNETTI, Laurent (Centre National de la Recherche Scientifique (FR))

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: MDI (Machine Detector Interface)

Contribution ID: **284** Type: **Oral presention (by invitation only)**

SuperKEKB MDI lessons

Tuesday, 6 June 2023 15:30 (20 minutes)

Primary author: NAKAYAMA, Hiroyuki

Presenter: NAKAYAMA, Hiroyuki

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: MDI (Machine Detector Interface)

Contribution ID: **285** Type: **Oral presention (by invitation only)**

Beam Losses in the MDI

Tuesday, 6 June 2023 15:50 (15 minutes)

Primary author: BROGGI, Giacomo (Sapienza Università di Roma e INFN Laboratori Nazionali di Frascati (IT))

Presenter: BROGGI, Giacomo (Sapienza Università di Roma e INFN Laboratori Nazionali di Frascati (IT))

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: MDI (Machine Detector Interface)

Contribution ID: **287** Type: **Oral presention (by invitation only)**

Detector background simulations

Tuesday, 6 June 2023 16:25 (20 minutes)

Primary author: CIARMA, Andrea (INFN e Laboratori Nazionali di Frascati (IT))

Presenter: CIARMA, Andrea (INFN e Laboratori Nazionali di Frascati (IT))

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: MDI (Machine Detector Interface)

Contribution ID: **288** Type: **Oral presention (by invitation only)**

Reference implementation scenario PA31

Tuesday, 6 June 2023 08:30 (30 minutes)

Primary author: GUTLEBER, Johannes (CERN)

Presenter: GUTLEBER, Johannes (CERN)

Session Classification: FCCIS WP3

Track Classification: FCCIS WP3 (Integrate Europe)

Contribution ID: **289** Type: **Oral presention (by invitation only)**

Evolution of the geophysical and geotechnical investigation locations

Tuesday, 6 June 2023 11:30 (30 minutes)

This presentation will give a brief description of the locations of subsurface investigations for FCC Feasibility Study and how it's being sharpened according to legal context and environmental concerns.

Primary author: MAYOUX, Antoine (CERN)

Presenter: MAYOUX, Antoine (CERN)

Session Classification: FCCIS WP3

Track Classification: FCCIS WP3 (Integrate Europe)

Contribution ID: **290** Type: **Oral presention (by invitation only)**

The value estimation of a collaborative platform in a global project

Tuesday, 6 June 2023 13:55 (25 minutes)

Primary author: CRESPO GARRIDO, Irene Del Rosario (Universidade de Santiago de Compostela (ES))

Presenter: CRESPO GARRIDO, Irene Del Rosario (Universidade de Santiago de Compostela (ES))

Session Classification: FCCIS WP4

Track Classification: FCCIS WP4 (Impact & sustainability)

Contribution ID: **291** Type: **Oral presention (by invitation only)**

The value estimation of an open scientific data and documentation platform in a global project

Tuesday, 6 June 2023 14:20 (25 minutes)

Primary author: CRESPO GARRIDO, Irene Del Rosario (Universidade de Santiago de Compostela (ES))

Presenter: CRESPO GARRIDO, Irene Del Rosario (Universidade de Santiago de Compostela (ES))

Session Classification: FCCIS WP4

Track Classification: FCCIS WP4 (Impact & sustainability)

Contribution ID: **292** Type: **Oral presention (by invitation only)**

Tolerances & BBA strategy

Wednesday, 7 June 2023 08:55 (15 minutes)

Primary author: RAUBENHEIMER, Tor (SLAC National Accelerator Laboratory (US))

Presenter: RAUBENHEIMER, Tor (SLAC National Accelerator Laboratory (US))

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **293** Type: **Oral presention (by invitation only)**

Optics measurements & BB alignment

Wednesday, 7 June 2023 09:25 (20 minutes)

Primary author: KEINTZEL, Jacqueline (CERN)

Presenter: KEINTZEL, Jacqueline (CERN)

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **294** Type: **Oral presention (by invitation only)**

Introduction to EPOL WG and overview

Wednesday, 7 June 2023 13:30 (4 minutes)

Primary author: KEINTZEL, Jacqueline (CERN)

Presenter: KEINTZEL, Jacqueline (CERN)

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: EPOL

Contribution ID: **295** Type: **Oral presention (by invitation only)**

Polarisation studies

Wednesday, 7 June 2023 13:55 (21 minutes)

Primary author: WU, Yi (EPFL - Ecole Polytechnique Federale Lausanne (CH))

Presenter: WU, Yi (EPFL - Ecole Polytechnique Federale Lausanne (CH))

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: EPOL

Contribution ID: **297** Type: **Oral presention (by invitation only)**

The roadmap to the final report

Thursday, 8 June 2023 09:36 (22 minutes)

Primary author: KEINTZEL, Jacqueline (CERN)

Presenter: KEINTZEL, Jacqueline (CERN)

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: EPOL

Contribution ID: **298** Type: **Oral presention (by invitation only)**

Magnet design for beamstrahlung photons extraction line

Wednesday, 7 June 2023 13:50 (20 minutes)

Primary author: JAERMYR ERIKSSON, Carl (CERN)

Presenter: JAERMYR ERIKSSON, Carl (CERN)

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: MDI (Machine Detector Interface)

Contribution ID: **299** Type: **Oral presention (by invitation only)**

SPS pre-booster option

Thursday, 8 June 2023 09:10 (20 minutes)

Primary author: BARTOSIK, Hannes (CERN)

Presenter: BARTOSIK, Hannes (CERN)

Session Classification: FCC-ee injector

Track Classification: FCC-ee injector

Contribution ID: **300** Type: **Oral presention (by invitation only)**

Siting and transfer lines

Thursday, 8 June 2023 09:30 (20 minutes)

Primary author: BARTMANN, Wolfgang (CERN)

Presenter: BARTMANN, Wolfgang (CERN)

Session Classification: FCC-ee injector

Track Classification: FCC-ee injector

Contribution ID: **301** Type: **Oral presention (by invitation only)**

Collimation in FCC-hh

Thursday, 8 June 2023 11:15 (20 minutes)

Primary author: Dr BRUCE, Roderik (CERN)

Presenter: Dr BRUCE, Roderik (CERN)

Session Classification: FCC-hh accelerator

Track Classification: FCC-hh accelerator

Contribution ID: **302** Type: **Oral presention (by invitation only)**

Transfer lines for injection from LHC or scSPS, and comparison of injector options

Thursday, 8 June 2023 11:35 (25 minutes)

Primary author: BARTMANN, Wolfgang (CERN)

Presenter: BARTMANN, Wolfgang (CERN)

Session Classification: FCC-hh accelerator

Track Classification: FCC-hh accelerator

Contribution ID: **304** Type: **Oral presention (by invitation only)**

Accelerating Beam Dynamic Simulations

Thursday, 8 June 2023 13:50 (5 minutes)

Primary author: DI CROCE, Davide (EPFL - Ecole Polytechnique Federale Lausanne (CH))

Presenter: DI CROCE, Davide (EPFL - Ecole Polytechnique Federale Lausanne (CH))

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **305** Type: **not specified**

Beam-beam code progress

Thursday, 8 June 2023 13:55 (20 minutes)

Primary author: KICSINY, Peter (EPFL)

Presenter: KICSINY, Peter (EPFL)

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **306** Type: **Oral presention (by invitation only)**

VACI-suite status and examples

Thursday, 8 June 2023 14:45 (15 minutes)

Primary author: RAJABI, Ali

Presenter: RAJABI, Ali

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **307** Type: **Oral presention (by invitation only)**

Alternative HFD/DFD optics

Thursday, 8 June 2023 15:30 (30 minutes)

Primary author: Dr RAIMONDI, Pantaleo (SLAC National Accelerator Laboratory (US))

Presenter: Dr RAIMONDI, Pantaleo (SLAC National Accelerator Laboratory (US))

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **309** Type: **Oral presention (by invitation only)**

The FCC-ee SRF system, machine layouts and cryomodules

Thursday, 8 June 2023 11:24 (18 minutes)

In the past year, infrastructure and integration studies have led to a new choice of the two straight sections dedicated to the FCC-ee SRF system. Point H is now entirely dedicated to the collider while Point L integrates the booster. This new configuration offers a more convenient arrangement of the cryomodules which are now all placed at ground level for the collider and at a higher level for the booster for integration compatibility with the arcs. Meanwhile, the SRF requirements have evolved to comply with updated physics parameters and cavity operational parameters. Cavity numbers, types and RF designs have evolved and provide now a stable basis for the layout studies. The baseline architecture of the machines features standalone cryomodules individually cooled via cryogenic distribution lines. This configuration, which is the most effective in terms of tunnel installation for staged energy upgrades and offers the best operational flexibility, is now being challenged by continuous cryostat architectures which are more cost-effective and energy efficient. Tunnel integration
needs for these new architectures will be compared with the present baseline and future work will be outlined.

Primary author: PARMA, Vittorio (CERN)

Presenter: PARMA, Vittorio (CERN)

Session Classification: Technology R&D

Track Classification: SRF Programme

Contribution ID: **312** Type: **Oral presention (by invitation only)**

Synchrotron radiation background for an alternative FCC-ee optics

Thursday, 8 June 2023 16:40 (20 minutes)

An alternative lattice and beam optics have been developed for the FCC-ee which aim to provide large dynamic aperture and momentum acceptance via the correction of high order nonlinearities. In this presentation, the synchrotron radiation sources have been evaluated and a synchrotron radiation collimation scheme has been developed to protect the central beam pipe within the particle detector as well as the superconducting quadrupoles closest to the interaction point. Besides, the collimation scheme performances are compared against the baseline lattice.

Primary author: ANDRE, Kevin Daniel Joel (CERN)

Co-author: Dr RAIMONDI, Pantaleo (SLAC National Accelerator Laboratory (US))

Presenter: ANDRE, Kevin Daniel Joel (CERN)

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **313** Type: **Oral presention (by invitation only)**

RF string or continous cryomodule, impact on infrastructure and recory time

Tuesday, 6 June 2023 14:42 (18 minutes)

Presenter: PARMA, Vittorio (CERN)

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **316** Type: **Oral presention (by invitation only)**

Synchrotron radiation background studies

Tuesday, 6 June 2023 16:05 (20 minutes)

The FCC-ee is a high-luminosity circular electron-positron which will have beam energies ranging from 45.6 (Z mode) to 182.5 GeV ($\mathrm{t\bar{t}}$ mode). In this presentation, the synchrotron radiation sources associated to each operating energy are described. The performances of the synchrotron radiation collimation scheme are detailed including the contribution from particles in the tails of the transverse beam distribution. Finally, an estimation of the synchrotron radiation background due to off-axis injection is also provided.

Primary author: ANDRE, Kevin Daniel Joel (CERN)

Presenter: ANDRE, Kevin Daniel Joel (CERN)

Session Classification: Joint FCC-ee Accelerator and PED

Track Classification: MDI (Machine Detector Interface)

Contribution ID: **317** Type: **Oral presention (by invitation only)**

General layout and update of cooling and ventilation systems for arcs

Tuesday, 6 June 2023 16:15 (22 minutes)

Presenter: PEON, Guillermo (CERN)

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **318** Type: **Oral presention (by invitation only)**

Heat recovery perspectives

Tuesday, 6 June 2023 16:37 (22 minutes)

Primary author: PEON, Guillermo (CERN)

Presenter: PEON, Guillermo (CERN)

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **319** Type: **Oral presention (by invitation only)**

The SRF system options for FCC-ee

Wednesday, 7 June 2023 13:30 (5 minutes)

Presenter: PEAUGER, Franck (CERN)

Session Classification: Technology R&D

Track Classification: SRF Programme

Contribution ID: **320** Type: **Oral presention (by invitation only)**

SRF perspectives in UK

Wednesday, 7 June 2023 13:35 (18 minutes)

Presenter: Dr MALYSHEV, Oleg (UKRI/STFC Daresbury Laboratory)

Session Classification: Technology R&D

Track Classification: SRF Programme

Contribution ID: **321** Type: **Oral presention (by invitation only)**

SRF studies at JLAB

Wednesday, 7 June 2023 13:53 (18 minutes)

Presenter: VALENTE-FELICIANO, Anne-Marie

Session Classification: Technology R&D

Track Classification: SRF Programme

Contribution ID: **322** Type: **Oral presention (by invitation only)**

New SRF Facility at CERN

Thursday, 8 June 2023 11:42 (18 minutes)

RF requirements for projects such as FCC impose to keep the manufacturing of SRF objects under extremely strict process control to prevent any performance degradation due to surface contamination.
In this regard, thin film on copper technology is particularly demanding.

Current SRF facilities at CERN cannot meet these requirements, increasing the risk of defects and of high rejection rates.

A new SRF facility, that is currently being designed, will regroup surface chemistry, thin film deposition and cleanrooms operating under a fully controlled environment.
This facility will house a series of interconnected ISO 4 class cleanrooms dedicated to the preparation of superconducting cavities, adjacent to a large ISO 8 clean hall for the assembly of cryomodules.
The facility will be able to process large multi-cell sputtered cavities and sustain a high throughput even during extended periods of cryomodule assembly, maintenance or repair.

The new SRF infrastructure is expected to be operational by 2029.

Primary author: SMEKENS, David (CERN)

Presenter: SMEKENS, David (CERN)

Session Classification: Technology R&D

Track Classification: SRF Programme

Contribution ID: **323** Type: **Oral presention (by invitation only)**

Review of cavities developments towards FCC

Wednesday, 7 June 2023 14:11 (18 minutes)

Presenter: MIYAZAKI, Akira (Uppsala University (SE))

Session Classification: Technology R&D

Track Classification: SRF Programme

Contribution ID: **324** Type: **Oral presention (by invitation only)**

Future HFM R&D directions

Wednesday, 7 June 2023 10:30 (30 minutes)

Presenter: AUCHMANN, Bernhard (PSI/CERN)

Session Classification: Future magnet developments

Track Classification: FCC-ee technologies R&D

Contribution ID: **325** Type: **Oral presention (by invitation only)**

US high-field magnet program

Wednesday, 7 June 2023 11:00 (30 minutes)

Presenter: PRESTEMON, Soren

Session Classification: Future magnet developments

Track Classification: FCC-ee technologies R&D

Contribution ID: **326** Type: **Oral presention (by invitation only)**

HTS developments

Wednesday, 7 June 2023 11:30 (30 minutes)

Presenter: Dr BALLARINO, Amalia (CERN)

Session Classification: Future magnet developments

Track Classification: FCC-ee technologies R&D

Contribution ID: **327** Type: **Oral presention (by invitation only)**

Code development status

Thursday, 8 June 2023 13:30 (20 minutes)

With the increasing complexity of colliders, it is crucial to consider many physical phenomena in accelerator simulation studies, including complex effects such as radiation, beam-beam, and impedance. However, existing simulation tools are often outdated or focus on a single aspect. To address this challenge, the CHART collaboration is developing a software framework that integrates different existing tools and actively contributes to the development of new modern simulation tools in collaboration with external colleagues. These tools can also be included in the framework. The tools enable studies of beam stability, luminosity, and lifetime, incorporating multiple effects simultaneously. This talk will provide an overview of the collaboration's work on simulation tools and present first beam dynamics studies obtained using these tools.

Primary author: VAN RIESEN-HAUPT, Leon (EPFL - Ecole Polytechnique Federale Lausanne (CH))

Co-authors: IADAROLA, Giovanni (CERN); KICSINY, Peter (EPFL); DE MARIA, Riccardo (CERN); Dr PIELONI, Tatiana (EPF Lausanne)

Presenter: VAN RIESEN-HAUPT, Leon (EPFL - Ecole Polytechnique Federale Lausanne (CH))

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **329** Type: **Oral presention (by invitation only)**

Simulations of IR tuning

Wednesday, 7 June 2023 09:45 (15 minutes)

n this talk, we will discuss the critical role of insertion region (IR) tuning tools in the successful simulation and operation of the FCC. Due to the complex design and challenging nature of the FCC, these tools are essential for achieving sufficient luminosity and machine stability. Collaboration with experts in the field is important for designing effective IR tuning tools that meet the requirements of the FCC. The talk will provide an overview of the current status of IR tuning studies.

Primary author: VAN RIESEN-HAUPT, Leon (EPFL - Ecole Polytechnique Federale Lausanne (CH))

Presenter: VAN RIESEN-HAUPT, Leon (EPFL - Ecole Polytechnique Federale Lausanne (CH))

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **330** Type: **Oral presention (by invitation only)**

Update of the power demand and energy consumption, gird connection

Thursday, 8 June 2023 08:30 (18 minutes)

The FCC-ee will be the largest accelerator ever built and it requires to be connected to the European grid for electricity supply. The power demand is a key parameter to define the grid connection. The identification of the main loads was performed and presented in 2022 as well as the energy consumption depending on the machine configurations. The studies for grid connection were launched based on these numbers and the results will be presented. Last changes and optimisation of the machine parameters will be presented with their impact on the grid connection

Presenter: BURNET, Jean-Paul (CERN)

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **334** Type: **Oral presention (by invitation only)**

Update on vacuum technologies R&D

Thursday, 8 June 2023 13:50 (20 minutes)

Presenter: RORISON, Sam (CERN)

Session Classification: Technology R&D

Track Classification: FCC-ee technologies R&D

Contribution ID: **335** Type: **Oral presention (by invitation only)**

X-ray beam profile monitor

Thursday, 8 June 2023 14:10 (15 minutes)

Primary author: SIANO, Mirko (Università degli Studi di Milano)

Presenter: SIANO, Mirko (Università degli Studi di Milano)

Session Classification: Technology R&D

Track Classification: FCC-ee technologies R&D

Contribution ID: **336** Type: **Oral presention (by invitation only)**

Common RF system for the ZH option + RF frequ. consideration

Thursday, 8 June 2023 08:30 (18 minutes)

Presenter: VANEL, Alice Lucie (CERN)

Session Classification: Technology R&D

Track Classification: SRF Programme

Contribution ID: **337** Type: **Oral presention (by invitation only)**

1-cell and 2-cell 400 MHz cavity RF designs for FCC_ee

Thursday, 8 June 2023 08:48 (18 minutes)

Presenter: GORGI ZADEH, Shahnam (CERN)

Session Classification: Technology R&D

Track Classification: SRF Programme

Contribution ID: **338** Type: **Oral presention (by invitation only)**

Alternative 800 MHz cavity RF design for FCC_ee

Thursday, 8 June 2023 09:06 (18 minutes)

Presenter: Mr UDONGWO, Sosoho-Abasi (UROS)

Session Classification: Technology R&D

Track Classification: SRF Programme

Contribution ID: **339** Type: **Oral presention (by invitation only)**

Nb coatings, from 1.3GHz to 400MHz

Thursday, 8 June 2023 09:42 (18 minutes)

CERN developed significant know-how in the design and fabrication of niobium-coated copper superconducting radiofrequency (SRF) cavities for accelerators, from LEP to the LHC and HIE-ISOLDE. While 400MHz Nb-coated Cu cavities are being considered for the leptonic machine variants of the FCC, further optimization is required to comply with the established performance targets.
The work presented will focus on recent R&D efforts performed at CERN on the Nb thin film-coatings to ultimately raise the performance of the Nb/Cu cavities, as they constitute key elements to achieve running-feasibility for the FCC. Fundamental studies performed on samples and 1.3 GHz test cavities will be summarized. Recent advances and planned activities on the 400 MHz Nb/Cu coatings program at CERN will also be presented.

Primary author: PEREIRA CARLOS, Carlota (Universite de Geneve (CH))

Presenter: PEREIRA CARLOS, Carlota (Universite de Geneve (CH))

Session Classification: Technology R&D

Track Classification: SRF Programme

Contribution ID: **342** Type: **Poster (one author must be in person)**

Preliminary study of the passive machine protection for CEPC

Thursday, 8 June 2023 17:06 (1 minute)

The energy stored in Circular Electron and Positron Collider (CEPC) is in the order of MJ, which will make the beam pipe and other equipment broken once the beam loses control. Avoiding damage to accelerator is the first priority for machine protection. There are two kinds of protection schemes. One is active protection in which an action should be triggered when a failure signal is detected, such as extracting a beam to dumps. The other is passive protections in which there is no action so response time is not considered, for example, the collimators and shields. CEPC will operate in different operation scenarios: t𝒳t , Higgs, W and Z. In this study, beam loss for Higgs mode is investigated. Some fast beam loss can be observed from the SAD simulation, which requires passive protection. The global arrangement of collimator is preliminarily investigated to achieve the passive protection.

Primary author: WANGYUTING, 王欲听 (IHEP, CAS)

Presenter: WANGYUTING, 王欲听 (IHEP, CAS)

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **343** Type: **Oral presention (by invitation only)**

Design of the FCC-ee positron source target: current status & challenges

Wednesday, 7 June 2023 11:25 (15 minutes)

The FCC-ee positron source target is the device in charge of generating particles (i.e. positrons) by colliding a high intensity primary electron beam on it, which produces gamma rays and triggers the pair production mechanism.

At a design level, the positron target presents two main challenges: i) a high-energy deposition density due partly to a small incident beam size and ii) the integration of equipment to accelerate and capture the produced positrons in a limited space. The following talk will focus on the first challenge. To this end, the selected material for the target is tungsten, due to its high Z number and its remarkable thermomechanical properties at high temperatures. However, a specific cooling circuit must be included in the design to properly dissipate the thermal power produced by the beam impact. Once the resulting thermal field is calculated, the associated thermo-mechanical stresses are obtained, which must be within the safety limits of the material.

To sum up, an overview of the positron source target's status will be provided together with the following R&D steps to continue the project.

Primary author: MENA ANDRADE, Ramiro Francisco

Co-authors: HUMANN, Barbara (Vienna University of Technology (AT)); GRENARD, Jean-Louis (CERN); LECHNER, Anton (CERN); PERILLO MARCONE, Antonio (CERN)

Presenter: MENA ANDRADE, Ramiro Francisco

Session Classification: FCC-ee injector

Track Classification: FCC-ee injector

Contribution ID: **344** Type: **Poster (one author must be in person)**

FCC as a Tera-Z-plus flavor factory

Thursday, 8 June 2023 17:05 (1 minute)

Recent studies reveal the potential of the Tera-Z phase of the Future Circular Collider (FCC) for advancing our understanding of flavor physics. By operating at the Z-pole, the FCC enables the production of vast amounts of heavy flavor final states, making it an ideal platform to study Standard Model (SM) and Beyond Standard Model (BSM) physics. With a high integrated luminosity and large cross-sections for heavy flavor production, the FCC will generate an abundance of b, c, and tau pairs. The surplus of energy from Z decays allows for the creation of various hadrons, including rare and exotic species, and facilitates the investigation of extremely rare decay modes. Additionally, unexpected discoveries may arise from phases beyond the Z-pole run, such as the WW-threshold or Higgs factory phases.

Primary author: LI, LINGFENG (Brown U.)

Presenter: LI, LINGFENG (Brown U.)

Session Classification: Poster session and Wine & cheese

Track Classification: PE&D posters

Contribution ID: **345** Type: **Oral presention (by invitation only)**

SWELL progress and status

Thursday, 8 June 2023 10:48 (18 minutes)

The Slotted Waveguide ELLiptical (SWELL) cavity is a novel concept of superconducting cavity proposed as an alternative option for the FCCee RF system. The presentation will give an update on the fabrication of the 1.3 GHz SWELL prototype used as a first step of the feasibility demonstration. The mechanical design, the precise machining results and the blank assembly tests of the cavity quadrants in clean room will be presented. Accurate RF measurements (resonant frequency and Q0 factor) of the cavity at room temperature will be also be reported, together with the plans for future steps towards the surface preparation and the test at cold temperature.

Primary authors: PEAUGER, Franck (CERN); TIMMINS, Marc (CERN)

Presenters: PEAUGER, Franck (CERN); TIMMINS, Marc (CERN)

Session Classification: Technology R&D

Track Classification: SRF Programme

Contribution ID: **346** Type: **Oral presention (by invitation only)**

Technical challenges and required studies for FCC-ee BIDs

Tuesday, 6 June 2023 10:50 (20 minutes)

Primary author: PERILLO MARCONE, Antonio (CERN)

Presenter: PERILLO MARCONE, Antonio (CERN)

Session Classification: FCC-ee accelerator (FCCIS WP2)

Track Classification: FCC-ee accelerator

Contribution ID: **347** Type: **Poster (one author must be in person)**

The CEPC radiation protection issues

Thursday, 8 June 2023 17:11 (1 minute)

My poster has three topics: the dump designs for the CPEC collider and linac, the synchrotron radiation shielding for magnet insulations, and the estimation for radioactivity production in the surrounding materials.

A design for the collider dump including a dilution system is updated. The material of the dump core is made of graphite while this core is surrounded with iron. The maximum temperature rises in the collider dump are obtained for Z pole, WW, Higgs, and ttbar operations. These maximum temperature rises are lower than the graphite melting point. The Linac dump designs are also finished. The dimensions of the collider dump and Linac dumps are optimized so that the dose equivalent next to the dumps surfaces are lower than 5.5mSv/h. The response time of the collider dump is about 1 ms, which means if the beam loss happens in a time scale less than 1 ms, the collider dump cannot respond in time. So collimators are needed.

The second part shows synchrotron radiation simulation and shielding design for magnet insulations. The FLUKA simulations are performed for Z pole, WW threshold, Higgs, and ttbar operations. Lead shielding can reduce the absorbed doses to insulations. We optimize the thickness of the lead shielding according to the upper limit of the absorbed dose to the insulations. The dose distribution in the collider tunnel is also obtained.

The third part shows radioactivity production in the tunnel's air, cooling water, and rocks surrounding the tunnel. The major element compositions of rocks are used in our simulations. We shall work more carefully to make sure these results meet the requirement of the mandatory Chinese standards.

Primary authors: Dr TANG, Guangyi (Institute of High Energy Physics, Chinese Academy of Science); Dr SHI, Haoyu (IHEP, CAS); Dr LIU, Qiongyao (IHEP, CAS); Dr MA, Zhongjian (IHEP, CAS)

Presenter: Dr TANG, Guangyi (Institute of High Energy Physics, Chinese Academy of Science)

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **348** Type: **Oral presention (by invitation only)**

QCD & parton showers

Tuesday, 6 June 2023 09:00 (30 minutes)

Presenter: MONNI, Pier Francesco (CERN)

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **349** Type: **Oral presention (by invitation only)**

Higgs physics

Tuesday, 6 June 2023 10:30 (30 minutes)

Presenter: DE BLAS, Jorge (Universidad de Granada (ES))

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **350** Type: **Oral presention (by invitation only)**

Calorimetry R&D for FCC-ee and FCC-hh

Thursday, 8 June 2023 10:35 (22 minutes)

Primary author: GAUDIO, Gabriella (INFN-Pavia)

Presenter: GAUDIO, Gabriella (INFN-Pavia)

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **351** Type: **Oral presention (by invitation only)**

Si tracking and vertexing R&D for FCC

Thursday, 8 June 2023 10:57 (22 minutes)

Primary author: Prof. BORTOLETTO, Daniela (University of Oxford (GB))

Presenter: Prof. BORTOLETTO, Daniela (University of Oxford (GB))

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **352** Type: **Oral presention (by invitation only)**

General Higgs performance overview

Wednesday, 7 June 2023 08:30 (15 minutes)

Presenter: EYSERMANS, Jan (Massachusetts Inst. of Technology (US))

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **353** Type: **Oral presention (by invitation only)**

Gaseous detector R&D for FCC

Thursday, 8 June 2023 11:41 (22 minutes)

Primary author: Dr TITOV, Maksym (IRFU, CEA Saclay, Université Paris-Saclay (FR))

Presenter: Dr TITOV, Maksym (IRFU, CEA Saclay, Université Paris-Saclay (FR))

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **354** Type: **Oral presention (by invitation only)**

Status of software for detector studies

Thursday, 8 June 2023 13:30 (25 minutes)

Primary author: FRANCOIS, Brieuc (CERN)

Presenter: FRANCOIS, Brieuc (CERN)

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **355** Type: **not specified**

Higgs mass, sigma(ZH) and self-coupling

Wednesday, 7 June 2023 08:45 (15 minutes)

Presenter: PORTALES, Louis (CNRS/IN2P3 - LLR, École Polytechnique)

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **356** Type: **Oral presention (by invitation only)**

IDEA vertex detector in Key4hep

Thursday, 8 June 2023 13:55 (15 minutes)

Primary author: ILG, Armin (University of Zurich)

Presenter: ILG, Armin (University of Zurich)

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **357** Type: **Oral presention (by invitation only)**

RICH full sim implementation in Key4hep

Thursday, 8 June 2023 14:10 (20 minutes)

Primary author: TOLOSA DELGADO, Alvaro (CERN)

Presenter: TOLOSA DELGADO, Alvaro (CERN)

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **358** Type: **not specified**

Higgs hadronic couplings and Higgs to invisible

Wednesday, 7 June 2023 09:00 (15 minutes)

Presenter: GOUSKOS, Loukas (CERN)

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **359** Type: **Oral presention (by invitation only)**

IDEA Dual readout calorimeter in Key4hep

Thursday, 8 June 2023 14:30 (15 minutes)

Primary author: KO, Sang Hyun (Seoul National University (KR))

Presenter: KO, Sang Hyun (Seoul National University (KR))

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **360** Type: **Oral presention (by invitation only)**

FCC-ee TileCal simulation and reconstruction

Thursday, 8 June 2023 14:45 (15 minutes)

Primary author: MLYNARIKOVA, Michaela (CERN)

Presenter: MLYNARIKOVA, Michaela (CERN)

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **361** Type: **Oral presention (by invitation only)**

In-situ determination of acceptances

Wednesday, 7 June 2023 09:15 (22 minutes)

Presenter: JANOT, Patrick (CERN)

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **362** Type: **Oral presention (by invitation only)**

Tracking system requirements ALICE-3 versus FCC-ee

Thursday, 8 June 2023 15:30 (30 minutes)

Primary author: CONTARDO, Didier Claude (Centre National de la Recherche Scientifique (FR))

Presenter: CONTARDO, Didier Claude (Centre National de la Recherche Scientifique (FR))

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **363** Type: **Oral presention (by invitation only)**

Si detector development for ALICE ITS3 and ALICE 3

Thursday, 8 June 2023 16:00 (30 minutes)

Primary author: MAGER, Magnus (CERN)

Presenter: MAGER, Magnus (CERN)

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **364** Type: **Oral presention (by invitation only)**

Heavy quark electroweak measurements

Wednesday, 7 June 2023 09:37 (22 minutes)

Presenter: ROHRIG, Lars (Technische Universitaet Dortmund (DE))

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **365** Type: **Oral presention (by invitation only)**

Detector activities and plans in the US

Thursday, 8 June 2023 16:30 (30 minutes)

Primary author: RAJAGOPALAN, Srini (Brookhaven National Laboratory (US))

Presenter: RAJAGOPALAN, Srini (Brookhaven National Laboratory (US))

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **366** Type: **Oral presention (by invitation only)**

Detector requirements from B to K* tau tau

Wednesday, 7 June 2023 10:30 (15 minutes)

Presenter: MIRALLES, Tristan (Université Clermont Auvergne (FR))

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **367** Type: **Oral presention (by invitation only)**

Prospects for b to snunu and requirements on the detector

Wednesday, 7 June 2023 10:45 (15 minutes)

Presenter: KENZIE, Matthew William (University of Warwick (GB))

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **368** Type: **Oral presention (by invitation only)**

Detector requirements from Tau physics

Wednesday, 7 June 2023 11:00 (15 minutes)

Presenter: LUSIANI, Alberto (Scuola Normale Superiore and INFN, sezione di Pisa)

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **369** Type: **Oral presention (by invitation only)**

Detector requirements from BSM: long-lived signatures

Wednesday, 7 June 2023 11:15 (22 minutes)

Presenter: WILLIAMS, Sarah Louise (University of Cambridge (GB))

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **370** Type: **Oral presention (by invitation only)**

Physics case

Monday, 5 June 2023 16:00 (20 minutes)

Primary author: MCCULLOUGH, Matthew Philip (CERN)

Presenter: MCCULLOUGH, Matthew Philip (CERN)

Session Classification: Monday plenaries

Track Classification: Physics, Experiments & Detectors

Contribution ID: **371** Type: **Oral presention (by invitation only)**

Theoretical calculation strategy

Monday, 5 June 2023 16:20 (20 minutes)

Primary author: GLUZA, Janusz (University of Silesia (PL))

Presenter: GLUZA, Janusz (University of Silesia (PL))

Session Classification: Monday plenaries

Contribution ID: **372** Type: **Oral presention (by invitation only)**

Detector requirements from BSM: prompt signatures

Wednesday, 7 June 2023 11:37 (22 minutes)

Presenter: VALLE, Nicolo (INFN Sezione di Pavia (IT))

Session Classification: PE&D

Track Classification: Physics, Experiments & Detectors

Contribution ID: **373** Type: **Oral presention (by invitation only)**

Detector requirements from physics

Monday, 5 June 2023 16:40 (20 minutes)

Primary author: SELVAGGI, Michele (CERN)

Presenter: SELVAGGI, Michele (CERN)

Session Classification: Monday plenaries

Contribution ID: **374** Type: **Oral presention (by invitation only)**

Spin based beam energy measurements

Wednesday, 7 June 2023 14:16 (21 minutes)

The Future Circular electron-positron collider, FCC-ee, will require precise measurement of its beam energy. The proposed method of resonant depolarization has been successfully used at the Karlsruhe Research Accelerator (KARA) at the Karlsruhe Institute of Technology (KIT) for a long time. With a high amount of available machine physics days, short polarization times and flexible beam conditions, KARA provides a unique opportunity for in-depth systematic studies of the characteristics of this measurement technique. This presentation summarizes the resonant spin polarization efforts at KARA and discusses possible areas for future studies.

Primary author: BLOMLEY, Edmund

Co-author: HAERER, Bastian

Presenters: HAERER, Bastian; BLOMLEY, Edmund

Session Classification: Joint FCC-ee Accelerator and PED

Contribution ID: **375** Type: **Oral presention (by invitation only)**

Center-of-mass energy shifts

Wednesday, 7 June 2023 14:37 (21 minutes)

Primary author: BLONDEL, Alain (Universite de Geneve (CH))

Presenter: BLONDEL, Alain (Universite de Geneve (CH))

Session Classification: Joint FCC-ee Accelerator and PED

Contribution ID: **376** Type: **Oral presention (by invitation only)**

Depolarizer for the FCC-ee

Thursday, 8 June 2023 08:30 (22 minutes)

Primary author: KOOP, Ivan (Budker Institute of Nuclear Physics (RU))

Presenter: KOOP, Ivan (Budker Institute of Nuclear Physics (RU))

Session Classification: Joint FCC-ee Accelerator and PED

Contribution ID: **377** Type: **Oral presention (by invitation only)**

Monochromatisation optics for FCC-ee lattices

Thursday, 8 June 2023 09:14 (22 minutes)

Primary author: ZHANG, Zhandong (Université Paris-Saclay (FR))

Presenter: ZHANG, Zhandong (Université Paris-Saclay (FR))

Session Classification: Joint FCC-ee Accelerator and PED

Contribution ID: **378** Type: **Oral presention (by invitation only)**

Precision electroweak

Tuesday, 6 June 2023 08:30 (30 minutes)

Presenter: PAUS, Christoph (Massachusetts Inst. of Technology (US))

Session Classification: PE&D

Contribution ID: **379** Type: **not specified**

Overview of the FCC socio-economic impacts

Tuesday, 6 June 2023 16:30 (30 minutes)

This presentation provides an update on the results of the socio-economic impact analysis of the FCC-ee infrastructure. It draws from extensive research conducted between March 2020 and April 2023 by a collaboration of economists, data scientists, engineers, and policy analysts. The benefits expected to be generated during the FCC project construction and operation phases are identified and quantified to shove the long-term contribution to society of FCC-ee.

Primary author: GUTLEBER, Johannes (CERN)

Co-author: Dr SIRTORI, Emanuela (CSIL)

Presenters: Dr SIRTORI, Emanuela (CSIL); GUTLEBER, Johannes (CERN)

Session Classification: FCCIS WP4

Track Classification: FCCIS WP4 (Impact & sustainability)

Contribution ID: **381** Type: **Oral presention (by invitation only)**

BSM & physics case

Tuesday, 6 June 2023 09:30 (30 minutes)

Presenter: RENNER, Sophie Alice (University of Glasgow (GB))

Session Classification: PE&D

Contribution ID: **382** Type: **Oral presention (by invitation only)**

Flavour physics

Tuesday, 6 June 2023 11:00 (30 minutes)

Primary author: F. KAMENIK, Jernej

Presenter: F. KAMENIK, Jernej

Session Classification: PE&D

Contribution ID: **383** Type: **Oral presention (by invitation only)**

Latest developments in FCC Analysis

Tuesday, 6 June 2023 11:30 (30 minutes)

Presenter: SMIESKO, Juraj (CERN)

Session Classification: PE&D

Contribution ID: **385** Type: **Oral presention (by invitation only)**

Particle ID and Photodetector R&D for FCC

Thursday, 8 June 2023 11:19 (22 minutes)

Presenter: FORTY, Roger (CERN)

Session Classification: PE&D

Contribution ID: **386** Type: **Oral presention (by invitation only)**

Highway access study results

Tuesday, 6 June 2023 09:00 (30 minutes)

Primary author: Mr BOILLON, Pierre (Cerema)

Co-author: LAIDOUNI, Patrycja (CERN)

Presenters: LAIDOUNI, Patrycja (CERN); BOILLON, Pierre; Mr BOILLON, Pierre (Cerema)

Session Classification: FCCIS WP3

Contribution ID: **387** Type: **Oral presention (by invitation only)**

Railway access study preliminary results

Tuesday, 6 June 2023 09:30 (30 minutes)

Primary authors: Mr BARRE, Charles (EGIS); Mr HALLE, Tristan (EGIS)

Presenters: Mr BARRE, Charles (EGIS); Mr HALLE, Tristan (EGIS)

Session Classification: FCCIS WP3

Contribution ID: **388** Type: **Oral presention (by invitation only)**

Excavation materials management strategy

Tuesday, 6 June 2023 10:30 (30 minutes)

Primary author: ULRICI, Luisa (CERN)

Presenter: ULRICI, Luisa (CERN)

Session Classification: FCCIS WP3

Contribution ID: **389** Type: **Oral presention (by invitation only)**

First results from the environmental aspects analysis

Tuesday, 6 June 2023 11:00 (30 minutes)

In the context of the feasibility study of the future FCC, the objectives are:

- To investigate the current environmental conditions for the temporary use of the soil for drilling boreholes and to investiguate seismic lines.
- To investigate the current environmental conditions of future surface sites.

All preliminary results will be presented, including stakes for birds, frogs and plants. Remarkable species will be highlighted.

Primary authors: PAILLEX, Amael Damien (ECOTEC ENVIRONNEMENT SA); Mr PAILLEX, Amael (Ecotec)

Presenters: PAILLEX, Amael Damien (ECOTEC ENVIRONNEMENT SA); Mr PAILLEX, Amael (Ecotec)

Session Classification: FCCIS WP3

Contribution ID: **390** Type: **Oral presention (by invitation only)**

Results of the regional impact pathways in relation to high-tech procurement activities

Tuesday, 6 June 2023 15:30 (30 minutes)

Primary author: PIAZZA, Gabriele

Presenter: PIAZZA, Gabriele

Session Classification: FCCIS WP4

Contribution ID: **391** Type: **Oral presention (by invitation only)**

The public good value of FCC

Tuesday, 6 June 2023 16:00 (30 minutes)

Primary authors: Dr SIRTORI, Emanuela (CSIL); GIFFONI, Francesco

Presenter: GIFFONI, Francesco

Session Classification: FCCIS WP4

Contribution ID: **392** Type: **Oral presention (by invitation only)**

Electrical distribution concept and layout

Thursday, 8 June 2023 09:06 (18 minutes)

Starting from the baseline presented during the FCC week of 2022 and from the studies for the grid connection, the study of the electrical distribution network has been updated and developed.
The load forecast is being detailed per zone for the most relevant consumers, this allows now to have a better load mapping to assess the electrical needs and the required infrastructure per point and per facility.
The voltage levels for internal distribution are under analysis and are being assessed based on CAPEX criteria and on voltage requirements of the most relevant equipment such as the RF converters.
The concept of underground transmission substation has also been studied, to allow an optimization of the surface footprint of each point and to bring the power at high voltage the closest to the highest loads.
The aim of this presentation is to show the progress of the studies on FCC electrical network since 2022, and to provide an overview on the general concepts and schemes of the electrical distribution.

Primary author: MARCEL, Charline (CERN)

Co-author: PARODI, Mario (CERN)

Presenter: MARCEL, Charline (CERN)

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **393** Type: **Oral presention (by invitation only)**

Alcoves requirement and integration, cabling concept

Tuesday, 6 June 2023 15:52 (22 minutes)

The present base line features a 91 km circumference tunnel with eight access points. There will be a number of alcoves distributed around the ring, used to host equipment that needs to be shielded from radiation (e.g. racks, power supplies ⋯) and aimed to deserve a part of FCC tunnel.
In 2022 the known requirements of the systems expected to be installed in the alcoves have been identified and allowed to determine their surface and the recurrence. The analysis of the cabling from the alcoves along the tunnel has been approached as well.
The aim of this presentation is to provide a feedback on the outcome of the studies of the alcoves, and to present the preliminary evaluation of the impact of cabling on the tunnel in terms of space occupancy.

Primary author: MARCEL, Charline (CERN)

Co-authors: AGUGLIA, Davide (CERN); BURNET, Jean-Paul (CERN); PARODI, Mario (CERN)

Presenter: MARCEL, Charline (CERN)

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **394** Type: **Poster (one author must be in person)**

A positron source demonstrator for future colliders

Thursday, 8 June 2023 17:13 (1 minute)

Regarding high current e+ sources, the almost universal usage of target-based production schemes combined with conventional capture technology has led to poor transmission efficiencies. This long-standing difficulty to handle the extreme e+ transverse emittance and energy spread has been a major impediment for future, high luminosity lepton collider designs. The PSI Positron Production (P-cubed or P^3) experiment, framed in the FCC-ee study, is a demonstrator for a e+ capture system with potential to improve the state-of-the-art e+ yield by an order of magnitude. The experiment will be hosted at the SwissFEL facility at PSI as of 2025, where installation works are ongoing. This paper is an overview of P^3, with a particular focus on the novel capture system and its effects on the beam dynamics. A concept for the experiment diagnostics is also introduced.

Primary author: VALLIS, Nicolas (PSI/EPFL)

Co-author: CRAIEVICH, Paolo

Presenter: CRAIEVICH, Paolo

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **396** Type: **Oral presention (by invitation only)**

Layout, optics, parameters

Tuesday, 6 June 2023 08:30 (30 minutes)

Primary author: Dr OIDE, Katsunobu (Universite de Geneve (CH))

Presenter: Dr OIDE, Katsunobu (Universite de Geneve (CH))

Session Classification: FCC-ee accelerator (FCCIS WP2)

Contribution ID: **397** Type: **Oral presention (by invitation only)**

Full-energy booster

Wednesday, 7 June 2023 10:30 (20 minutes)

Primary author: Dr CHANCE, Antoine (CEA Irfu)

Presenter: Dr CHANCE, Antoine (CEA Irfu)

Session Classification: FCC-ee injector

Contribution ID: **398** Type: **Oral presention (by invitation only)**

Damping ring and transfer lines for the FCC-ee pre-injector complex

Wednesday, 7 June 2023 11:40 (15 minutes)

The Future Circular Collider project is built around two main pillars: the construction of 100 km lepton collider running at increasing energies from the Z-pole to the t-tbar threshold (FCC-ee) followed by a hadron collider in the same tunnel (FCC-hh) to explore unprecedented energy frontier. The realization of FCC-ee relies on a very challenging injector complex that should provide the highest ever realized source of positrons, which will serve the first phase of the collider operations (Z-pole). In this contribution the relevant aspects related to the damping of the high-emittance beam coming from the positron source and the transport of the damped beam within the different LINACs of the injector complex are presented and discussed.

Primary author: MILARDI, Catia (Istituto Nazionale di Fisica Nucleare (INFN))

Co-authors: DE SANTIS, Antonio (INFN - LNF); MILARDI, Catia (INFN e Laboratori Nazionali di Frascati (IT)); ETISKEN, Ozgur (Ankara University (TR)); RAMJIAWAN, Rebecca Louise (CERN); SPAMPINATI, Simone (INFN LNF); DUTHEIL, Yann (CERN)

Presenter: MILARDI, Catia (Istituto Nazionale di Fisica Nucleare (INFN))

Session Classification: FCC-ee injector

Contribution ID: **399** Type: **Oral presention (by invitation only)**

SC IR magnets system

Wednesday, 7 June 2023 13:30 (20 minutes)

Primary author: PARKER, Brett (Brookhaven National Laboratory (US))

Presenter: PARKER, Brett (Brookhaven National Laboratory (US))

Session Classification: Joint FCC-ee Accelerator and PED

Contribution ID: **400** Type: **Oral presention (by invitation only)**

WOW cavity progress and status

Thursday, 8 June 2023 10:30 (18 minutes)

Primary author: MANKE, Fabian (CERN)

Presenter: MANKE, Fabian (CERN)

Session Classification: Technology R&D

Contribution ID: **401** Type: **Oral presention (by invitation only)**

Beam-beam code progress

The understanding of beam-beam effects, drivers of the FCC-ee parameter design in several aspects, require sophisticated and high-performance numerical simulations. The self-consistent study of the interplay of several nonlinear dynamical phenomena resulting from collisions in the machine is key to accurately assess its potential performance. Although current simulation frameworks can address specific aspects of the dynamics separately, they are difficult to interface with each other for more complex studies. To address this challenge, xsuite, a new general purpose software framework for beam dynamics simulations, is currently under development. We discuss first results using the beam-beam interaction model in this new toolkit, including benchmarks and the combination with an element by element lattice model.

Primary author: KICSINY, Peter (EPFL)

Co-authors: SCHULTE, Daniel (CERN); IADAROLA, Giovanni (CERN); SEIDEL, Mike; Dr PIELONI, Tatiana (EPFL); BUFFAT, Xavier (CERN)

Presenter: KICSINY, Peter (EPFL)

Session Classification: Technology R&D

Track Classification: SRF Programme

Contribution ID: **402** Type: **Poster (one author must be in person)**

Prototype design of an electro-optical diagnostic for longitudinal bunch profile measurements at FCC-ee

Thursday, 8 June 2023 17:12 (1 minute)

The operation of the Future Circular Electron Positron Collider (FCC-ee) necessitates a robust longitudinal bunch diagnostics system for precise beam energy calibration and efficient top-up injection monitoring. As part of the FCC Innovation Study (FCCIS), an electro-optical (EO) bunch profile monitor is developed, based on the developments of the EO near-field monitor at the Karlsruhe Institute of Technology (KIT). The monitor at the Karlsruhe Research Accelerator (KARA) is used for turn-by-turn single shot bunch profile measurements with bunch lengths around 10 ps at a repetition rate of 2.7 MHz and studies are ongoing towards higher repetition rates. A new adapted design for FCC-ee is being developed to cope with the specific beam parameters at FCC-ee, such as bunch lengths of up to about 40 ps, higher charge density and the requirement to measure every individual bunch. In this contribution, the design of a first prototype of an EO near-field monitor for FCC-ee beam conditions is presented, which aims to address these challenges and serves as a proof-of-principle.

Primary author: REISSIG, Micha

Co-authors: Dr BRÜNDERMANN, Erik; HAERER, Bastian; NIEHUES, Gudrun (Karlsruhe Institute of Technology); Dr RUPRECHT, Robert (KIT); SCHOTT, Steffen (KIT-IBPT); MUELLER, Anke-Susanne (Max Planck Society (DE))

Presenter: REISSIG, Micha

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **403** Type: **Oral presention (by invitation only)**

Square Kilometre Array Observatory

Wednesday, 7 June 2023 15:30 (30 minutes)

Primary author: Prof. SCAIFE, Anna (University of Manchester)

Presenter: Prof. SCAIFE, Anna (University of Manchester)

Session Classification: UK session

Contribution ID: **404** Type: **Oral presention (by invitation only)**

Riverlane

Wednesday, 7 June 2023 16:30 (30 minutes)

Primary author: Dr GHIBAUDI, Marco (Riverlane)

Presenter: Dr GHIBAUDI, Marco (Riverlane)

Session Classification: UK session

Contribution ID: **405** Type: **Oral presention (by invitation only)**

EPAC at RAL

Wednesday, 7 June 2023 16:00 (30 minutes)

Primary author: Dr SYMES, Dan (STFC)

Presenter: Dr SYMES, Dan (STFC)

Session Classification: UK session

Contribution ID: **406** Type: **Oral presention (by invitation only)**

Update of transport concept for personnel and material

Thursday, 8 June 2023 10:30 (15 minutes)

The presentation will provide the status of the design of the vehicles that will be used for the underground transport of personnel and material.
A specific concept vehicle has been developed for the transport and installation of the material, in particular the collider and the booster components; the talk will cover the constraints to be respected, the vehicle characteristics, the most important design features and the procedure for the installation of the several accelerator parts.
The vehicle for the personnel transport will be based instead on the customization of existing concepts currently available on the market; the second part of the presentation will show the assessment done to identify the best solution and the vehicle characteristics which fulfill the needs during the different construction and the operation phases, both in normal and in emergency conditions.

Primary authors: COLLOCA, Cristiana (CERN); RINALDESI, Roberto (CERN)

Presenter: RINALDESI, Roberto (CERN)

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **407** Type: **Oral presention (by invitation only)**

Update on material logistic concept

Thursday, 8 June 2023 10:45 (15 minutes)

After collecting all the requirements from the different users, a preliminary logistic study has been conducted with the purpose of simulating the material flow and the installation operations for the magnets of the collider ring and booster ring in the underground tunnel; the study analysed several scenarios based on different boundary conditions such as the number of shafts available for the transfer of magnets and the number of transport vehicles.
For each scenario, the simulation tool provided key performance indicators such as the overall installation time and process bottlenecks which will be of crucial importance for the definition of the overall project schedule.
The presentation will give an overview of the simulation model used, the scenarios that have been assessed and the related results.
For the future it is planned to expand the simulation to include other materials of the technical infrastructure.

Primary author: MÜLLER, Benedikt Oliver

Presenter: MÜLLER, Benedikt Oliver

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **409** Type: **Oral presention (by invitation only)**

FCC cryogenics status, layout, and implementation studies

Tuesday, 6 June 2023 13:48 (18 minutes)

Having reached the middle of its 5-year duration, the FCC Feasibility Study is now heading towards its mid-term review, which will take place in Fall'23. The aim of this study is to propose a concrete design for the accelerator, serving as input for the next ESPP Update in 2026/2027. The major layout update of early 2022, which reduced the overall length of the machine as well as its total number of access points from 12 to 8, induced a significant revision of the RF architecture layout, and its related cryogenic design. As a result, a new optimised layout was presented during the subsequent RF review at CERN in Fall'22. Finally, and more recently, the latest of the accelerator placement, presented in January'23, required a refinement of the previous proposal to cope with the newly received geographical constraints at the RF access points for the -ee machine.

This presentation will cover the three main areas of the study that have been investigated since early 2022, with placement, energy and cryogens usage optimization as main drivers. First, a significant effort has been made to provide the associated civil engineering studies with the cryogenic requirements in terms of above- and under- ground surface requirements, with an emphasis on the service caverns and the tunnel alcoves. The proposed update of the cryogenic infrastructure, layout, implementation and process will then be addressed (including first cryogenic process study for the RF modules), taking into consideration the most recent update of the accelerator placement and inherent geometry of the RF access points. The related cryogenic needs in terms of electrical power supply and water cooling will be covered. Tentative timeline and upcoming objectives for the end of the feasibility study will be presented.

Primary author: NAYDENOV POPOV, Boyan-Kaloyanov (CERN)

Presenter: NAYDENOV POPOV, Boyan-Kaloyanov (CERN)

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **410** Type: **Poster (one author must be in person)**

First high power testing of conductive ceramic windows for the SRF cavity couplers

Thursday, 8 June 2023 17:08 (1 minute)

Euclid Techlabs LLC, in collaboration with JLab and Fermilab, has developed a new ceramic material with a finite DC electrical conductivity combined with a low RF loss tangent for use in high power coupler windows. The goal of the project was to develop windows with a loss tangent not exceeding that of alumina but with significantly increased DC conductivity for effective electrical discharge. Several SRF coupler windows operating in the 650 MHz and 1.5 GHz frequency ranges were fabricated and successfully tested at high power.
Euclid developed magnesium titanate ceramic elements with relative dielectric constant ε=15.2, a figure of merit, Q×f, in the range of 60,000–125,000 GHz, providing tan δ ˜5.2×10-6 - 2.1×10-5 at 650 MHz, and increased conductivity from 10-12 S/m to 10-9 S/m correspondingly. This ability to tune the conductivity will allow the selection of the ideal combination of loss tangent and conductivity required to allow a window to effectively discharge any deposited charge.
Two 1.5 GHz waveguide window assemblies were fabricated using a tin-silver-titanium-magnesium active solder produced by S-Bond. Both were successfully tested at high power in vacuum up to 12 kW CW power, which was the limit of the klystron in travelling wave mode. The maximum temperature recorded on Window 1 was approximately 92℃, and on Window 2 was approximately 78℃. There was no evidence of multipacting or sparking during the high power test of the waveguide windows, or inspection afterward.
A 650 Mhz coaxial window assembly was fabricated using the same active solder as the waveguide window assemblies. The conductive ceramic coupler assembly was tested at Fermilab in conjunction with a spare alumina window coupler assembly. A 4.6 kV bias was applied to both uncoated windows during testing to suppress multipacting. Four field configurations were tested; a CW power of 30 kW was achieved with a stable window temperature for each. For three of the configurations, 50 kW CW was achieved, and 80 kW CW was reached for two configurations. The temperature of the conductive ceramic window as measured with an IR camera did not exceed 61℃ for any configuration. For the configuration in which 30 kW CW was the limit, the alumina window flange temperature reached 39℃ while the conductive ceramic window flange temperature was only 26℃. Residual gas analysis scans collected at the maximum conductive ceramic window operating temperature revealed no presence of any solder material components.

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Primary author: KANAREYKIN, Alexei (Euclid Techlabs LLC)

Co-authors: Dr FREEMIRE, Ben (Euclid Techlabs); Dr JING, Chunguang (Euclid Techlabs); Dr GUO, Jiquan (Thomas Jefferson National laboratory); Dr SOLYAK, Nikolay (Fermi Nationl Accelerator Laboratory); Dr RIMMER, Robert (Thomas Jefferson National laboratory); Dr KAZAKOV, Sergey (Fermi Nationl Accelerator Laboratory); Dr YAKOVLEV, Vyacheslav (Fermi Nationl Accelerator Laboratory)

Presenter: KANAREYKIN, Alexei (Euclid Techlabs LLC)

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **411** Type: **Poster (one author must be in person)**

Modeling beam-beam effects for the FCC-ee with Xsuite

Thursday, 8 June 2023 17:07 (1 minute)

The understanding of beam-beam effects, drivers of the FCC-ee parameter design in several aspects, require sophisticated and high-performance numerical simulations. The self-consistent study of the interplay of several nonlinear dynamical phenomena resulting from collisions in the machine is key to accurately assess its potential performance. Although current simulation frameworks can address specific aspects of the dynamics separately, they are difficult to interface with each other for more complex studies. To address this challenge, Xsuite, a new general purpose software framework for beam dynamics simulations, is currently under development. This poster aims to discuss first results using the beam-beam interaction model in this new toolkit, including benchmarks and the combination with an element by element lattice model.

Primary author: KICSINY, Peter (EPFL)

Presenter: KICSINY, Peter (EPFL)

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **412** Type: **Poster (one author must be in person)**

Higgs studies at the FCC-ee

Thursday, 8 June 2023 17:10 (1 minute)

The study of the Higgs boson self-coupling at the e^+e^- Future Circular Collider (FCC-ee) is extremely challenging due to the small di-Higgs production cross section. This is however a crucial property, which may have far-reaching implications in our understanding of particle physics. It will be studied at the HL-LHC but with an expected sensitivity limited by the foreseen data statistics. An alternative experimental path to this search is the study of loop-induced corrections to the single-Higgs production cross section. We investigate the kinematics of $e^+e^- \longrightarrow e^+e^-H$ with Higgs decaying into a b-quark pair at two centre of mass energies, of $\sqrt{s} = 240$ and 365 GeV, seeking to achieve experimental sensitivity to the Higgs boson self-coupling at the FCC-ee collider.

Primary author: CASALINHO, Francisco Gameiro

Co-authors: VELOSO, Filipe (LIP - Laboratorio de Instrumentação e Física Experimental de Partículas (PT)); MORAIS SILVA GONCALO, Ricardo Jose (LIP - Laboratorio de Instrumentação e Física Experimental de Partículas (PT))

Presenter: CASALINHO, Francisco Gameiro

Session Classification: Poster session and Wine & cheese

Track Classification: PE&D posters

Contribution ID: **413** Type: **Oral presention (by invitation only)**

Design and optimisation of the ep (and possibility joint ep/pp) Interaction Region

Thursday, 8 June 2023 14:15 (15 minutes)

The Future Circular Collider for electron-hadron collisions (FCC-eh) is a design study, that investigates colliding one of the hadron beams of the FCC with an intense, high energy electron beam. The e-p collisions for deep inelastic scattering physics (DIS) would take place in one of the FCC interaction regions, concurrently to the on-going p-p collisions in the other interaction points. Since only one of the two proton beams from the FCC collides with the electron beam, the second proton beam needs to be guided around this interaction point, as to enable p-p collisions in the remaining interaction points.
The electrons would be accelerated in an energy recovery linear accelerator (ERL) adjacent to the FCC, to a final energy of 60 GeV. After the e-p collisions, the electron beam is guided back into the ERL in counter phase, so that the beam is decelerated and its energy recovered. The impact of the electron bending and focusing scheme on the proton beam dynamics has been investigated and a separation scheme for the two proton beams in the e-p interaction region has been designed with MAD-X.

Primary author: VON WITZLEBEN, Tiziana (Rheinisch Westfaelische Tech. Hoch. (DE))

Co-authors: HOLZER, Bernhard (CERN); PEREZ SEGURANA, Gustavo (CERN); PRETZ, Jorg (Rheinisch Westfaelische Tech. Hoch. (DE)); ANDRE, Kevin Daniel Joel (CERN); GIOVANNOZZI, Massimo (CERN); KLEIN, Max (University of Liverpool (GB))

Presenter: VON WITZLEBEN, Tiziana (Rheinisch Westfaelische Tech. Hoch. (DE))

Session Classification: FCC-eh accelerator

Track Classification: FCC-eh accelerator

Contribution ID: **414** Type: **Oral presention (by invitation only)**

Physics and design of the eh detector

Thursday, 8 June 2023 14:30 (15 minutes)

The Future Circular Collider in electron-hadron mode [1] will make possible the study of DIS in the TeV regime providing electron-proton (nucleus) collisions with per nucleon instantaneous luminosities around 1034 (1033) cm−2s−1. Here we describe the main physics goals of this experiment and current detector design that realises the objective [1,2], and the key developments needed.

[1] LHeC Collaboration and FCC-he Study Group: P. Agostini et al., J. Phys. G 48 (2021) 11, 110501, e-Print: 2007.14491 [hep-ex].
[2] K.D. J. Andre et al., Eur. Phys. J. C 82 (2022) 1, 40, e-Print: 2201.02436 [hep-ex].

Primary author: YAMAZAKI, Yuji (Kobe University (JP))

Session Classification: FCC-eh accelerator

Contribution ID: **415** Type: **Poster (one author must be in person)**

Active learning for DA simulations

Thursday, 8 June 2023 17:09 (1 minute)

The study of Dynamic Aperture (DA) plays a crucial role in understanding non-linear beam dynamics in circular accelerators. The DA defines the phase-space region where particles' motion remains bounded over a finite number of turns. It is affected by various elements such as the regular magnetic lattice, magnetic field imperfections, beam-beam effects, electron clouds, and other nonlinear phenomena. Investigating the DA offers valuable insights into beam loss evolution, which is vital for the design of future accelerators like the Future Circular Collider.
Traditionally, numerical evaluation of the DA involves computationally-intensive simulations of initial conditions distributed in phase space over a realistic time interval. In this work, we propose a novel approach utilizing two deep neural networks: the first network regresses the DA values, while the second network estimates the error associated with the DA estimation, leveraging machine parameters.
Through extensive training, our models enable fast and smart sampling. When the estimated error from the second network is within an acceptable range, we utilize the DA value provided by the first network. However, if the estimated error exceeds the threshold, we resort to the conventional simulation approach with tracking simulations, accumulating sufficient samples for subsequent training.
This active learning framework allows for efficient exploration of machine parameters space, reducing computational demands while maintaining accuracy. Our approach demonstrates the potential for accelerating DA simulations and offers a promising avenue for improving the design and tuning of machine parameters for future circular accelerators.

Primary authors: DI CROCE, Davide (EPFL - Ecole Polytechnique Federale Lausanne (CH)); VAN DER VEKEN, Frederik (CERN); GIOVANNOZZI, Massimo (CERN); SEIDEL, Mike; Dr PIELONI, Tatiana (EPFL)

Presenter: DI CROCE, Davide (EPFL - Ecole Polytechnique Federale Lausanne (CH))

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **416** Type: **Oral presention (by invitation only)**

RTE preliminary study for grid connection

Thursday, 8 June 2023 08:48 (18 minutes)

On demand of the Technical and Infrastructure Working Group for Electricity & Energy Management Work Package, the French Transmission System Operator has led a preliminary study of the FCC connexion for electricity supply. The goal of the pre-study is:
- to define how to connect the FCC to the French grid,
- to evaluate the impact on the electric system and on the other users connected to the grid,
- and to identify the infrastructure to be built for the project.
Several points of connexion are forecasted with particular power demand & back-up expectation. Each of them presents specificity in terms of grid ability for power delivery and electric infrastructures to be build. The presentation will display a draft of what could be the future connexions and the forecasted impacts, costs and delays to consider for them.
RTE preliminary study is the first step of a regulated procedure of connexion which includes further studies et civil works to be led.

Primary author: Mr BILLEROT, Jean-François (RTE France)

Presenter: Mr BILLEROT, Jean-François (RTE France)

Session Classification: Technical Infrastructures

Contribution ID: **417** Type: **Oral presention (by invitation only)**

Status of the FCC-ee optics tuning studies

Wednesday, 7 June 2023 09:10 (15 minutes)

Primary author: TOMAS GARCIA, Rogelio (CERN)

Presenter: TOMAS GARCIA, Rogelio (CERN)

Session Classification: FCC-ee accelerator (FCCIS WP2)

Contribution ID: **418** Type: **Poster (one author must be in person)**

FCC-ee: Vacuum System Technologies R&D

Thursday, 8 June 2023 17:20 (1 minute)

The Vacuum Group at CERN are undertaking various studies for FCC-ee R&D. One avenue of work is focused on the vacuum chamber (beam screen) and its associated components. The designs for the interconnections between the beam screens have been completed and are now undergoing intensive impedance simulation for beam stability checks. The enormous scale of FCC-ee poses a significant challenge in terms of cost scalability, as such, innovative approaches to the design are necessary. We are studying how to implement additive manufacturing processes, not only for cost optimisation, but to meet the rigorous requirements of FCC-ee.

Primary author: Mr RORISON, Sam (CERN)

Presenter: Mr RORISON, Sam (CERN)

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **420** Type: **Poster (one author must be in person)**

Characterisation of the Beamstrahlung radiation at FCC-ee

Thursday, 8 June 2023 17:19 (1 minute)

Beamstrahlung is a dominant effect in the beam dynamics of the high luminosity next-generation lepton collider FCC-ee. We characterize the beamstrahlung radiation for the beam parameters at the four operating energies, and present the effect of this radiation in the Machine-Detector-Interface region. We discuss the conceptual need for a photon dump due to the high power produced, which is in the order of hundreds of kilowatts.

Primary authors: CIARMA, Andrea (INFN e Laboratori Nazionali di Frascati (IT)); BOSCOLO, Manuela (INFN e Laboratori Nazionali di Frascati (IT))

Presenter: CIARMA, Andrea (INFN e Laboratori Nazionali di Frascati (IT))

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **422** Type: **Oral presention (by invitation only)**

FCC-eh and LHeC: Project overview and developments on ERL and sustainable technology

Thursday, 8 June 2023 13:30 (30 minutes)

.

Primary author: D'HONDT, Jorgen (Vrije Universiteit Brussel (BE))

Presenter: D'HONDT, Jorgen (Vrije Universiteit Brussel (BE))

Session Classification: FCC-eh accelerator

Track Classification: FCC-eh accelerator

Contribution ID: **423** Type: **Oral presention (by invitation only)**

Positron production, capture and acceleration until the damping ring

Wednesday, 7 June 2023 11:10 (15 minutes)

Primary author: Dr CHAIKOVSKA, Iryna (CNRS/IJCLab)

Presenter: Dr CHAIKOVSKA, Iryna (CNRS/IJCLab)

Session Classification: FCC-ee injector

Contribution ID: **424** Type: **Poster (one author must be in person)**

Proposal of an alternative coupling correction scheme at FCC-ee

Thursday, 8 June 2023 17:18 (1 minute)

We present preliminary results for an alternative coupling compensation scheme for the FCC-ee IR, based on the novel HFD lattice recently proposed by P. Raimondi, but that in principle can be implemented also in the baseline IR design. The study shows a very good correction of the IR coupling induced by the detector solenoid using skew quads, resulting in an increase of the vertical emittance of only few percents with respect to the nominal value of 1 pm. We discuss the approximations used for these first results, and the plans to continue the study.

Primary authors: CIARMA, Andrea (INFN e Laboratori Nazionali di Frascati (IT)); BURKHARDT, Helmut (Albert Ludwigs Universitaet Freiburg (DE)); BOSCOLO, Manuela (INFN e Laboratori Nazionali di Frascati (IT)); HOFER, Michael (CERN); Dr RAIMONDI, Pantaleo (SLAC National Accelerator Laboratory (US))

Presenter: CIARMA, Andrea (INFN e Laboratori Nazionali di Frascati (IT))

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **425** Type: **Oral presention (by invitation only)**

Welcome address STFC

Monday, 5 June 2023 08:30 (15 minutes)

Primary authors: THOMSON, Mark Andrew; THOMSON, Mark

Presenter: THOMSON, Mark

Session Classification: Monday plenaries

Contribution ID: **426** Type: **Oral presention (by invitation only)**

Introductory remarks

Monday, 5 June 2023 08:45 (20 minutes)

Primary author: GIANOTTI, Fabiola (CERN)

Presenter: GIANOTTI, Fabiola (CERN)

Session Classification: Monday plenaries

Contribution ID: **427** Type: **Oral presention (by invitation only)**

A CERN Council perspective on the FCC

Monday, 5 June 2023 09:05 (15 minutes)

Primary author: RABINOVICI, Eliezer (Weizmann Institute of Science (IL))

Presenter: RABINOVICI, Eliezer (Weizmann Institute of Science (IL))

Session Classification: Monday plenaries

Contribution ID: **428** Type: **Oral presention (by invitation only)**

Practical information about the conference

Monday, 5 June 2023 09:20 (5 minutes)

Primary author: WILKINSON, Guy (University of Oxford (GB))

Presenter: WILKINSON, Guy (University of Oxford (GB))

Session Classification: Monday plenaries

Contribution ID: **429** Type: **Oral presention (by invitation only)**

Key note: Physics perspectives

Monday, 5 June 2023 09:25 (1 hour)

Primary author: SALAM, Gavin (University of Oxford)

Presenter: SALAM, Gavin (University of Oxford)

Session Classification: Monday plenaries

Contribution ID: **430** Type: **Oral presention (by invitation only)**

FCC Feasibility Study Status

Monday, 5 June 2023 10:55 (25 minutes)

Primary author: BENEDIKT, Michael (CERN)

Presenter: BENEDIKT, Michael (CERN)

Session Classification: Monday plenaries

Contribution ID: **431** Type: **Oral presention (by invitation only)**

Reference implementation scenario and work with the host states

Monday, 5 June 2023 11:20 (35 minutes)

Primary author: GUTLEBER, Johannes (CERN)

Presenter: GUTLEBER, Johannes (CERN)

Session Classification: Monday plenaries

Contribution ID: **432** Type: **Oral presention (by invitation only)**

Civil Engineering

Monday, 5 June 2023 11:55 (35 minutes)

Primary author: WATSON, Timothy Paul (CERN)

Presenter: WATSON, Timothy Paul (CERN)

Session Classification: Monday plenaries

Contribution ID: **433** Type: **Oral presention (by invitation only)**

FCC Accelerator

Monday, 5 June 2023 14:00 (1 hour)

Primary author: RAUBENHEIMER, Tor (SLAC National Accelerator Laboratory (US))

Presenter: RAUBENHEIMER, Tor (SLAC National Accelerator Laboratory (US))

Session Classification: Monday plenaries

Contribution ID: **434** Type: **Oral presention (by invitation only)**

Technical infrastructure

Monday, 5 June 2023 15:00 (30 minutes)

Primary author: HANKE, Klaus (CERN)

Presenter: HANKE, Klaus (CERN)

Session Classification: Monday plenaries

Contribution ID: **435** Type: **Oral presention (by invitation only)**

Civil Engineering summary

Friday, 9 June 2023 08:30 (15 minutes)

Primary author: WATSON, Timothy Paul (CERN)

Presenter: WATSON, Timothy Paul (CERN)

Session Classification: Friday summaries

Contribution ID: **437** Type: **Oral presention (by invitation only)**

The impact potentials of FCC on the global and regional job markets

Tuesday, 6 June 2023 13:30 (25 minutes)

Primary author: STREICHER, Gerhard (WIFO)

Presenter: STREICHER, Gerhard (WIFO)

Session Classification: FCCIS WP4

Contribution ID: **438** Type: **Oral presention (by invitation only)**

FCC local communication strategy & progress

Wednesday, 7 June 2023 08:30 (20 minutes)

Presenter: PEREZ FERNANDEZ, Andrea (CERN)

Session Classification: FCCIS WP5 (Leverage & Engage)

Contribution ID: **439** Type: **Oral presention (by invitation only)**

Developing a territorial communications strategy

Wednesday, 7 June 2023 08:50 (20 minutes)

Presenter: ARRIVET, Domitille

Session Classification: FCCIS WP5 (Leverage & Engage)

Contribution ID: **440** Type: **Oral presention (by invitation only)**

Stakeholder engagement strategies

Wednesday, 7 June 2023 09:10 (20 minutes)

Presenter: Mr FAGGIANI, Iacopo (TELT)

Session Classification: FCCIS WP5 (Leverage & Engage)

Contribution ID: **441** Type: **Oral presention (by invitation only)**

RAL discussing local communications strategy

Wednesday, 7 June 2023 09:30 (20 minutes)

Presenter: PALMER, Sophy (STFC)

Session Classification: FCCIS WP5 (Leverage & Engage)

Contribution ID: **442** Type: **Oral presention (by invitation only)**

Q&A

Wednesday, 7 June 2023 09:50 (10 minutes)

Session Classification: FCCIS WP5 (Leverage & Engage)

Contribution ID: **443** Type: **Oral presention (by invitation only)**

Communication challenges for complex projects: the ITER experience

Wednesday, 7 June 2023 10:30 (20 minutes)

Presenter: Mr COBLENTZ, Laban (ITER)

Session Classification: FCCIS WP5 (Leverage & Engage)

Contribution ID: **444** Type: **Oral presention (by invitation only)**

SKA's communications strategy: challenges and perspectives

Wednesday, 7 June 2023 10:50 (20 minutes)

Presenter: Mr GARNIER, William (SKA)

Session Classification: FCCIS WP5 (Leverage & Engage)

Contribution ID: **445** Type: **Oral presention (by invitation only)**

Reflections on CERN's and ESA's communications strategies (tbc)

Wednesday, 7 June 2023 11:10 (20 minutes)

Presenter: MARSOLLIER, Arnaud (CERN)

Session Classification: FCCIS WP5 (Leverage & Engage)

Contribution ID: **446** Type: **Oral presention (by invitation only)**

Towards a communications strategy for FCC

Wednesday, 7 June 2023 11:30 (20 minutes)

Presenter: Mr MOOSLECHNER, Markus

Session Classification: FCCIS WP5 (Leverage & Engage)

Contribution ID: **447** Type: **Poster (one author must be in person)**

Circulant Matrix Model For Flat Beams: First Steps.

Thursday, 8 June 2023 17:17 (1 minute)

The circulant matrix model was succefuly used to study mode coupling instabilities in the presence of electromagnetic wakefields, space-charge, beam-beam interactions and active feedbacks. The following work shows the implementation of beam-beam interactions with flat beams in the code BimBim in order to address issues encountered in electron positron collider such the FCC-ee or SuperKEKB. The computation of the linearised coherent beam-beam force is optimised using a semi analytical approach. The tune shifts obtained with the new model are benchmarked against theoretical predictions. First results related to collective instabilities driven by synchrobetatron resonance, so called <x,z> instabilities, are compared to those obtained with existing models. The promising results show the potential of this model for the estimation of performance limitations linked to beam instabilities in high energy electron-positron colliders.

Primary author: SOOS, Roxana (Université Paris-Saclay (FR))

Co-authors: Dr FAUS-GOLFE, Angeles (IJClab IN2P3 CNRS-Université Paris-Saclay (FR)); BUFFAT, Xavier (CERN)

Presenter: SOOS, Roxana (Université Paris-Saclay (FR))

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **449** Type: **Poster (one author must be in person)**

Structural Optimization of Future Circular Collider Interaction Region Support Structure

Thursday, 8 June 2023 17:16 (1 minute)

This poster presents a study on the structural optimization of the support structure for the interaction region (IR) of the Future Circular Collider (FCC). The aim is to optimize the structure to reduce the mass, maintaining the stifness needed. Finite element analysis (FEA) is used to develop a detailed numerical model considering complex geometries, material properties, and loading conditions. The study seeks to identify design improvements using optimization algorithms, such as SIMP, Generative Design and Lattice approach, to ensure the respect of requirements of the FCC IR support structure during operation.

Primary author: FRANSESINI, Francesco

Presenter: FRANSESINI, Francesco

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **451** Type: **Poster (one author must be in person)**

Future Circular Collider (FCC) Dual Readout: a step closer to a scalable solution

Thursday, 8 June 2023 17:15 (1 minute)

Future ElectroWeaK factories require unprecedented highly granular jet calorimeters energy resolution. This goal appears to be achievable only with an imaging calorimeter it exploits particle flow algorithms or a fiber sampling Dual Readout (DR) calorimeter using scintillation and Cerenkov effects, the former produced by all ionising particles, the latter only by relativistic charged particles. In both cases, many problems are still open and R&D is needed to build a hadron-sized prototype and evaluate the performance. Finally, new digital devices as digital SiPMs, currently not in the schedule, could lead to a simpler and innovative readout architecture.
The DR features absorber composed of stainless steel, and detector which are composed of scintillating and clear fibers. The former are sensitive to all kind of charged particles, to measure the total deposited energy, the latter are sensitive to Cherenkov light to measure EM shower parameters.
The Hidra-2 project aims to design, build and qualify prototype of fiber sampling granular DR calorimeter to evaluate:
a) a stand-alone hadronic resolution around 30%/√E or better, both for single hadrons and for jets, while maintain a resolution for isolated electromagnetic (em) showers close to 10%/√E;
b) a transversal resolution of O(1 mrad)/√E;
c) a longitudinal one of a few cm (by phasing);
d) a modular and scalable construction technique;
e) an innovative reading architecture based on SiPM;
f) the performance of Deep Neural Network algorithms in exploiting such a large amount of (3D) information.

Primary author: Prof. GABRIELLI, Alessandro (Università e INFN, Bologna (IT))

Co-authors: FALCHIERI, Davide (Universita e INFN, Bologna (IT)); VERI, Carlo (INFN - National Institute for Nuclear Physics); GIACOMELLI, Paolo (INFN Sezione di Bologna)

Presenters: Prof. GABRIELLI, Alessandro (Università e INFN, Bologna (IT)); GIACOMELLI, Paolo (INFN Sezione di Bologna)

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **452** Type: **Poster (one author must be in person)**

Ferroelectric Fast Reactive Tuner for SRF Cavities – Material Properties and its Applications

Thursday, 8 June 2023 17:14 (1 minute)

Ferroelectric ceramic materials with low loss tangent at RF frequencies allow development of electrically controlled devices (tuners) with extremely fast switching times (τ<100 ns). This offers the possibility of a Ferroelectric fast reactive tuner (FE-FRT) ferroelectric cavity tuner, operating at room temperature, that can: (1) alter the coupling between the transmission line and the acceleration structure, (2) electronically control the cavity frequency within a bandwidth needed for active compensation of microphonics.

FE-FRTs can be foreseen for a wide variety of RF use cases including microphonics suppression, RF switching, and transient beam loading compensation. This promises entirely new operational capabilities, increased performance, and cost savings for a variety of existing and proposed accelerators.

The ferroelectric material at the heart of FE-FRTs is a BST ferroelectric ceramic, which can be synthesized in the form of polycrystalline ceramic layers and in bulk. Very fast permittivity response times, high dielectric breakdown strength, low gas permeability and simplicity of mechanical treatment make such ferroelectric ceramics an attractive solution for the loading material in fast tuning and switching devices of RF accelerator systems. The material properties of the BST (M) ferroelectric (BST ferroelectric with Mg-based additives, as developed by Euclid Techlabs) in the frequency range 80 MHz –1.5 GHz, have been assessed in terms of applicable material properties, including dielectric constant and loss tangent variations in the 50C –550C temperature range. The results of these measurements are presented here.

The potential for fast reactive tuning with ferroelectric material is presently under development, with CERN considering a potential FE- FRT based beam loading compensation scheme for LHC injection scenarios. Such a use case takes advantage of the fast response time of the ferroelectric material in order to alter the cavity detuning during gaps in bunch trains, which in turn translates to appreciable reductions of required RF power whilst maintaining a constant cavity phase in the presence of transient beam loading.

Primary author: Dr KANAREYKIN, Alexei (Euclid Techlabs LLC)

Co-authors: Dr CASTILLA, Alejandro (Thomas Jefferson National laboratory); MACPHERSON, Alick (CERN); Dr FREEMIRE, Ben (Euclid Techlabs); Dr JING, Chunguang (Euclid Techlabs); Dr BEN-ZVI, Ilan (Brookhaven National Laboratory); SHIPMAN, Nicholas (Lancaster University (GB)); Dr PODDAR, Shashi (Euclid Techlabs)

Presenter: Dr KANAREYKIN, Alexei (Euclid Techlabs LLC)

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **454** Type: **Poster (one author must be in person)**

Review of MAD-X for FCC-ee studies

Thursday, 8 June 2023 17:24 (1 minute)

The design of the electron-positron Future Circular Collider (FCC-ee) challenges the requirements on optics codes (like MAD-X) in terms of accuracy, consistency, and performance. This paper analyses MAD-X TWISS, TRACK and EMIT modules by comparing their mutual consistency, absolute accuracy and stability and will make improvement proposals.

Primary author: SIMON, Guillaume (Université Paris-Saclay (FR))

Co-authors: Dr FAUS-GOLFE, Angeles (IJClab IN2P3 CNRS-Université Paris-Saclay (FR)); DE MARIA, Riccardo (CERN)

Presenter: SIMON, Guillaume (Université Paris-Saclay (FR))

Session Classification: Poster session and Wine & cheese

Track Classification: PE&D posters

Contribution ID: **455** Type: **Poster (one author must be in person)**

Monochromatization Interaction Region Optics Design for Direct s-channel production at FCC-ee

Thursday, 8 June 2023 17:21 (1 minute)

One of the most fundamental measurements since the Higgs boson discovery, is its Yukawa couplings. Such a measurement is only feasible, if the centre-of-mass (CM) energy spread of the e+e- collisions can be reduced from ˜50 MeV to a level comparable to the Higgs boson's natural width of ˜4 MeV. To reach such desired collision energy spread and improve the CM energy resolution in colliding-beam experiments, the concept of a monochro-matic colliding mode has been proposed as a new mode of operation in FCC-ee. This monochromatization mode could be achieved by generating a nonzero dispersion function of opposite signs for the two beams, at the Inter-action Point (IP). Several methods to implement a mono-chromatization colliding scheme are possible, in this paper we report the implementation of such a scheme by means of dipoles. More in detail a new Interaction Re-gion (IR) optics design for FCC-ee at 125 GeV (direct Higgs s-channel production) has been designed and the first beam dynamics simulations are in progress.

Primary authors: Dr FAUS-GOLFE, Angeles (IJClab IN2P3 CNRS-Université Paris-Saclay (FR)); BAI, Bowen (Harbin institute of technology, Shenzhen); ZIMMERMANN, Frank (CERN); JIANG, Hongping; Dr OIDE, Katsunobu (Universite de Geneve (CH)); ZHANG, Zhandong (Université Paris-Saclay (FR))

Presenter: ZHANG, Zhandong (Université Paris-Saclay (FR))

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **456** Type: **Oral presention (by invitation only)**

General Lay-out, integration update RF systems

Tuesday, 6 June 2023 13:30 (18 minutes)

Following up the updates on RF section studies, the integration studies focus on a new integration scenario where the Collider RF elements (400MHz and 800 MHz cryogenics modules) will be installed at point H, and Booster RF elements (800 MHz cryogenics modules) will be installed at point L. The integration studies is taking into account boundaries in term of space limitations and design requirements, such as straight section length, cryogenics modules length, general services (electrical, cooling and ventilation), reserved volumes (transport, and alignment). All systems shall fit in the 5.5m inner diameter tunnel.

Primary author: VALCHKOVA-GEORGIEVA, Fani (Bulgarian Academy of Sciences (BG))

Presenter: VALCHKOVA-GEORGIEVA, Fani (Bulgarian Academy of Sciences (BG))

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **457** Type: **Oral presention (by invitation only)**

Integration update tunnel and arcs, caverns, service caverns, etc.

Tuesday, 6 June 2023 15:30 (22 minutes)

After collecting updated requirements from the different stakeholders (cooling, HVAC, electrical supply, transport, safety systems, and machine systems), the integration studies evolved into optimizing the space in the underground infrastructures. The 3D integration models, and layout configurations were updated wrt these updated requirements for the FCC into the tunnel and the arcs, the experimental and service caverns, and the technical underground infrastructure.

Primary author: VALCHKOVA-GEORGIEVA, Fani (Bulgarian Academy of Sciences (BG))

Presenter: VALCHKOVA-GEORGIEVA, Fani (Bulgarian Academy of Sciences (BG))

Session Classification: Technical Infrastructures

Track Classification: Technical Infrastructures

Contribution ID: **460** Type: **Poster (one author must be in person)**

The FCC-ee HTS4 Project

Thursday, 8 June 2023 17:22 (1 minute)

The FCC-ee HTS4 (High-Temperature-Superconducting Short Straight Section) project, a collaboration between CERN and PSI, aims at the replacement of normal conducting short straight sectors of the FCC-ee main storage ring with high-temperature-superconducting (HTS) ones. The study focuses on the creation of a 1-meter-long (full-size) prototype module, which consists of a nested quadrupole - sextupole magnet and uses high temperature superconductors (HTS, ReBCO tape), which can operate at 40K. The main pillars of this new design are minimizing power consumption, gaining luminosity and flexibility in optics and constructing a smaller and lighter system, with a vision for a more sustainable, green, cutting-edge technology with no additional costs.

Primary authors: Mrs BATSARI, Vasiliki (CERN); AUCHMANN, Bernhard (PSI/CERN); Dr KOSSE, Jaap (PSI); KORATZINOS, Michael (PSI/CERN)

Presenters: Mrs BATSARI, Vasiliki (CERN); KORATZINOS, Michael (PSI/CERN)

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **462** Type: **Oral presention (by invitation only)**

Scientific writing part 1

Wednesday, 7 June 2023 13:30 (20 minutes)

Presenter: ARUNDELL, Katherine (Springer Nature)

Session Classification: FCCIS WP5 (Leverage & Engage)

Contribution ID: **463** Type: **Oral presention (by invitation only)**

Scientific writing part 2

Wednesday, 7 June 2023 13:50 (20 minutes)

Presenter: HAMMERSLEY, John

Session Classification: FCCIS WP5 (Leverage & Engage)

Contribution ID: **464** Type: **not specified**

Round table discussion

Wednesday, 7 June 2023 14:10 (50 minutes)

Session Classification: FCCIS WP5 (Leverage & Engage)

Contribution ID: **466** Type: **Poster (one author must be in person)**

Overview of Kicker Magnets for FCC-ee and equivalent circuit modelling for the beam dump kicker magnet.

Thursday, 8 June 2023 17:25 (1 minute)

This paper summarizes the first iteration of the FCC-ee kicker magnet design parameters. There will be 5 different kicker and septum systems in the FCC-ee complex. This work mainly focuses on the kicker magnet design for the beam dump system. A MATLAB script was created for automatized iteration on the design and optimization of the kicker magnet. The input parameters of this script are the required kicker magnet parameters, whilst the output parameters are the values of the equivalent electronic circuit and other parameters, such as the pulse current and voltage values. A simulation model was developed that approximates the parameters of the proposed kicker magnet as an equivalent circuit model. Results from the simulation of the equivalent circuit are presented. These are frequency simulation, transient simulation and electrical impedance simulation. In the next stages of development, the magnet model will be refined. A 3D simulation model of the electromagnetic field will be created and the principle will be applied to other FCC-ee kicker systems.

Primary author: MARTINEK, Petr (FCC)

Co-authors: BARNES, Mike (CERN); RAMJIAWAN, Rebecca Louise (CERN); KRAMER, Thomas (CERN); BARTMANN, Wolfgang (CERN); DUTHEIL, Yann (CERN)

Presenter: MARTINEK, Petr (FCC)

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **468** Type: **Oral presention (by invitation only)**

Funding options and integration of the FCC ee construction and operation in CERN's financial plan

Tuesday, 6 June 2023 14:45 (20 minutes)

Primary author: Dr SONNEMANN, Florian (CERN)

Presenter: Dr SONNEMANN, Florian (CERN)

Session Classification: FCCIS WP4

Contribution ID: **469** Type: **Oral presention (by invitation only)**

Introduction to detectors

Thursday, 8 June 2023 10:30 (5 minutes)

Primary authors: SEFKOW, Felix (Deutsches Elektronen-Synchrotron (DE)); DAM, Mogens (University of Copenhagen (DK))

Presenters: SEFKOW, Felix (Deutsches Elektronen-Synchrotron (DE)); DAM, Mogens (University of Copenhagen (DK))

Session Classification: PE&D

Contribution ID: **470** Type: **Oral presention (by invitation only)**

Technical Infrastructure summary

Friday, 9 June 2023 08:45 (15 minutes)

Presenter: HANKE, Klaus (CERN)

Session Classification: Friday summaries

Contribution ID: **471** Type: **Oral presention (by invitation only)**

FCC-ee summary

Friday, 9 June 2023 09:00 (25 minutes)

Primary author: ZIMMERMANN, Frank (CERN)

Presenter: ZIMMERMANN, Frank (CERN)

Session Classification: Friday summaries

Contribution ID: **472** Type: **Oral presention (by invitation only)**

FCC-ee injector summary

Friday, 9 June 2023 09:30 (20 minutes)

Primary author: CRAIEVICH, Paolo

Presenter: CRAIEVICH, Paolo

Session Classification: Friday summaries

Contribution ID: **473** Type: **Oral presention (by invitation only)**

FCC-hh & magnet summary

Friday, 9 June 2023 09:45 (20 minutes)

Primary author: SHILTSEV, Vladimir

Presenter: SHILTSEV, Vladimir

Session Classification: Friday summaries

Contribution ID: **474** Type: **Oral presention (by invitation only)**

MDI summary

Friday, 9 June 2023 10:40 (15 minutes)

Primary author: BOSCOLO, Manuela (INFN e Laboratori Nazionali di Frascati (IT))

Presenter: BOSCOLO, Manuela (INFN e Laboratori Nazionali di Frascati (IT))

Session Classification: Friday summaries

Contribution ID: **475** Type: **Oral presention (by invitation only)**

EPOL Summary

Friday, 9 June 2023 10:55 (15 minutes)

Primary author: KEINTZEL, Jacqueline (CERN)

Presenter: KEINTZEL, Jacqueline (CERN)

Session Classification: Friday summaries

Contribution ID: **476** Type: **Oral presention (by invitation only)**

PED summary

Friday, 9 June 2023 11:10 (30 minutes)

Primary author: WILKINSON, Guy (University of Oxford (GB))

Presenter: WILKINSON, Guy (University of Oxford (GB))

Session Classification: Friday summaries

Contribution ID: **477** Type: **Oral presention (by invitation only)**

Closing remarks

Friday, 9 June 2023 11:40 (15 minutes)

Primary author: BENEDIKT, Michael (CERN)

Presenter: BENEDIKT, Michael (CERN)

Session Classification: Friday summaries

Contribution ID: **478** Type: **not specified**

Brief introduction

Tuesday, 6 June 2023 09:45 (5 minutes)

Presenter: WILKINSON, Guy (University of Oxford (GB))

Session Classification: UK session

Contribution ID: **479** Type: **not specified**

Welcome & Introduction (STFC and the UK ILO Office)

Tuesday, 6 June 2023 09:50 (10 minutes)

Presenter: FARROW, Richard Charles

Session Classification: UK session

Contribution ID: **480** Type: **not specified**

Introduction to CERN and the FCC Project

Tuesday, 6 June 2023 10:00 (20 minutes)

Presenter: BENEDIKT, Michael (CERN)

Session Classification: UK session

Contribution ID: **481** Type: **not specified**

Civil Engineering requirements and ongoing investigations

Tuesday, 6 June 2023 10:20 (25 minutes)

Presenter: WATSON, Timothy Paul (CERN)

Session Classification: UK session

Contribution ID: **482** Type: **not specified**

Energy and sustainability issues

Tuesday, 6 June 2023 11:05 (25 minutes)

Presenter: BURNET, Jean-Paul (CERN)

Session Classification: UK session

Contribution ID: **483** Type: **not specified**

Radiofrequency (RF) Systems at CERN

Tuesday, 6 June 2023 11:30 (25 minutes)

Presenter: BRUNNER, Olivier (CERN)

Session Classification: UK session

Contribution ID: **484** Type: **not specified**

Procurement Strategy for LHC and a forward outlook for FCC

Tuesday, 6 June 2023 11:55 (25 minutes)

Presenter: UNNERVIK, Anders (CERN)

Session Classification: UK session

Contribution ID: **485** Type: **not specified**

Q&A

Tuesday, 6 June 2023 12:20 (10 minutes)

Session Classification: UK session

Contribution ID: **486** Type: **Poster (one author must be in person)**

FCC-ee Arc Half-Cell Mock-up Project: Dynamic stability analysis

Thursday, 8 June 2023 17:23 (1 minute)

A dedicated study is being undertaken at CERN, together with the FCC Feasibility Study collaborators, to propose a robust configuration for the FCC-ee arc half-cell considering all integration aspects of the elements. This study includes engineering analyses performed to design the supporting system of the booster and of the collider. The proposed layout must meet requirements in terms of stiffness, static alignment and dynamic stability. It must also take into consideration pre-alignment, handling and installation operations, as well as remote re-adjustment and maintenance. Finally, given the very large scale of the facility, a robust and cost-effective design must be proposed that is suitable for large-scale industrialization. This document presents the methodology related to the dynamic stability analysis implemented to help in the design of the supporting system of the collider short straight section.

Primary authors: Ms PICCINI, Audrey (Junior Fellow); CARRA, Federico (CERN); BAUDIN, Lucie (CERN)

Presenters: Ms PICCINI, Audrey (Junior Fellow); CARRA, Federico (CERN); BAUDIN, Lucie (CERN)

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **488** Type: **Oral presention (by invitation only)**

PERLE: Status and prospects for high power ERL

Thursday, 8 June 2023 14:00 (15 minutes)

Primary author: KAABI, Walid

Presenter: KAABI, Walid

Session Classification: FCC-eh accelerator

Contribution ID: **489** Type: **Oral presention (by invitation only)**

EIC and FCC synergies

Thursday, 8 June 2023 14:45 (15 minutes)

Primary author: CHAMIZO LLATAS, Maria (Brookhaven National Laboratory (US))

Presenter: CHAMIZO LLATAS, Maria (Brookhaven National Laboratory (US))

Session Classification: FCC-eh accelerator

Contribution ID: **490** Type: **Oral presention (by invitation only)**

Poster prize winner's presentation

Friday, 9 June 2023 09:25 (5 minutes)

Session Classification: Friday summaries

Contribution ID: **491** Type: **Poster (one author must be in person)**

Design of the FCC-ee Positron Damping Ring and Transfer Line

Thursday, 8 June 2023 17:26 (1 minute)

Primary authors: KEYKEN, Alex (Royal Holloway University of London); CHAN, Darren Zeming (University of Toronto (CA)); HOWLING, Emily Rose (Univ. of Oxford University College (GB)); Mr SALVESEN, John Patrick (University of Oxford, CERN)

Presenters: KEYKEN, Alex (Royal Holloway University of London); CHAN, Darren Zeming (University of Toronto (CA)); HOWLING, Emily Rose (Univ. of Oxford University College (GB)); Mr SALVESEN, John Patrick (University of Oxford, CERN)

Session Classification: Poster session and Wine & cheese

Track Classification: Accelerators posters

Contribution ID: **492** Type: **not specified**

FCC-eh summary

Friday, 9 June 2023 10:00 (10 minutes)

Presenter: PAPAPHILIPPOU, Yannis (CERN)

Session Classification: Friday summaries

Contribution ID: **493** Type: **Poster (one author must be in person)**

Initial Studies on Input signals for FCCee Interaction Point Fast Feedback Systems

Thursday, 8 June 2023 17:27 (1 minute)

Primary author: Mr SALVESEN, John Patrick (University of Oxford, CERN)

Presenter: Mr SALVESEN, John Patrick (University of Oxford, CERN)

Session Classification: Poster session and Wine & cheese