

# FCC Status

CERN-KEK Committee, meeting #19, 26 November 2024

Michael Benedikt, Frank Zimmermann, CERN  
on behalf of FCC collaboration



Swiss Accelerator  
Research and  
Technology

<http://cern.ch/fcc>



Work supported by the **European Commission** under the **HORIZON 2020** projects **EuroCirCol**, grant agreement 654305; **EASITrain**, grant agreement no. 764879; **iFAST**, grant agreement 101004730, **FCCIS**, grant agreement 951754; **E-JADE**, contract no. 645479; **EAJADE**, contract number 101086276; and by the Swiss **CHART** program



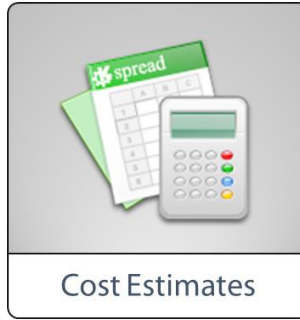
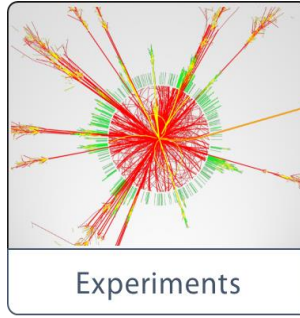
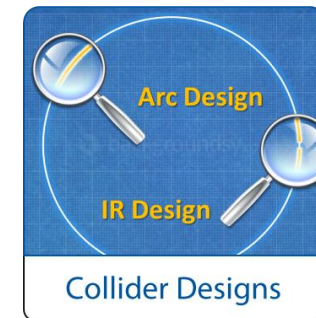
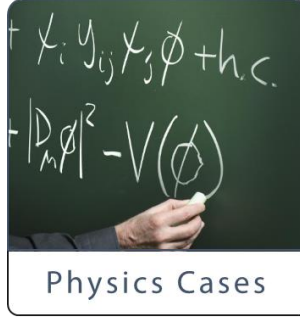
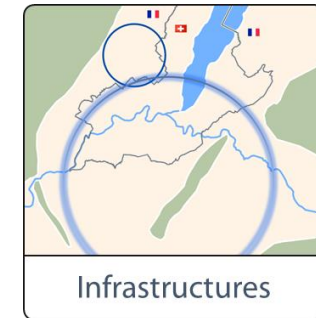
European  
Commission

Horizon 2020  
European Union funding  
for Research & Innovation

photo: J. Wenninger

# High-level goals of the FCC Feasibility Study

- together with the Host States, optimisation of placement and layout of the ring, and demonstration of the geological, technical, environmental and administrative feasibility of the tunnel and surface areas;
- consolidation of the physics case and detector concepts, optimisation of the design of the colliders and their injector chains, supported by targeted R&D to develop the needed key technologies;
- development of the technical infrastructure concepts and integration with territorial constraints and identification of opportunities for co-construction;
- elaboration of a sustainable operational model for the colliders and experiments in terms of human and financial resource needs, environmental aspects and energy efficiency;
- identification of substantial resources from outside CERN's budget for the implementation of the first stage of a possible future project;
- final deliverable is a Feasibility Study Report by March 2025.



# Feasibility Study Report for March 2025

## Structure: Three Volumes

- **Vol. 1: Physics, Experiments and Detectors (~200 pages)**
- **Vol. 2: Accelerators, Technical Infrastructures, Safety Concepts (~400 pages)**
- **Vol. 3: Civil Engineering, Implementation & Sustainability (~200 pages)**
- **Executive Summary of the FCC Feasibility Study: ~40 pages**

## **Input for Update of European Strategy for Particle Physics**

to be prepared with Overleaf & published by EPJ (Springer-Nature) – FCCIS members



### In addition:

- Documentation on Cost Estimate – Funding Models**
- Environmental Report**

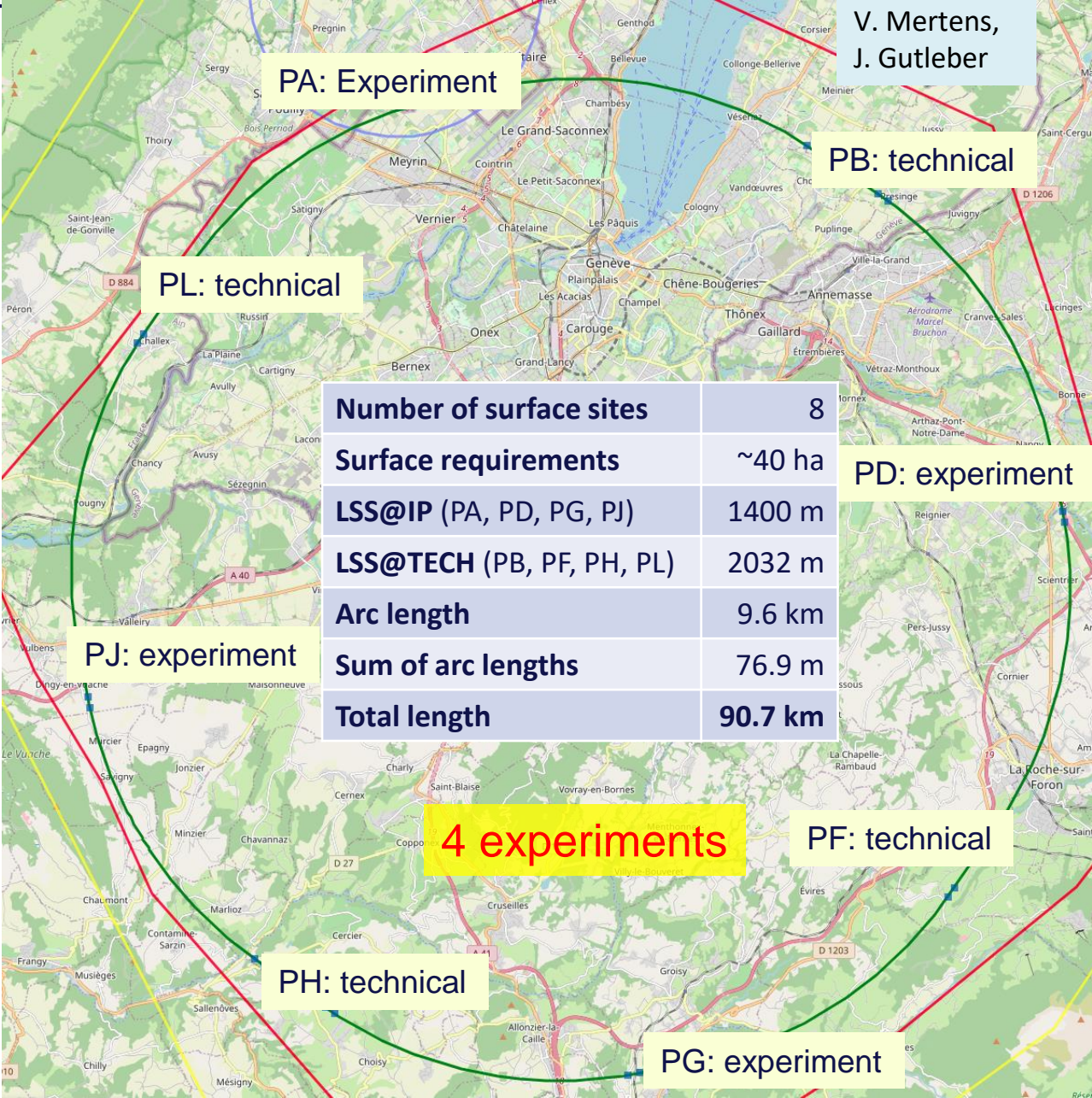
# Reference layout and implementation: PA31 - 90.7 km

V. Mertens,  
J. Gutleber

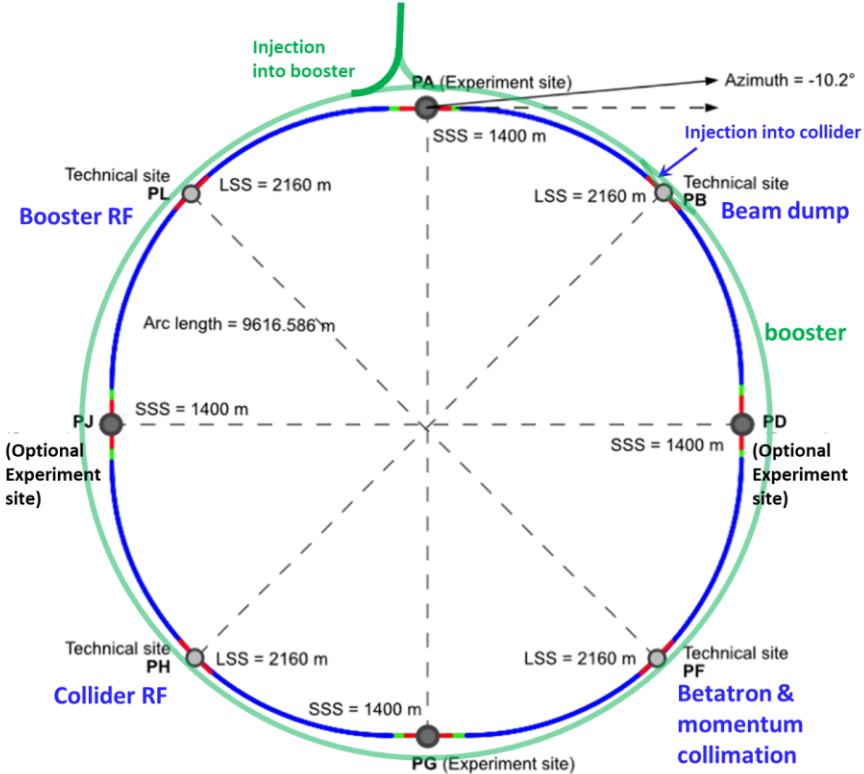
Layout chosen out of ~ 100 initial variants, based on **geology** and **surface constraints** (land availability, access to roads, etc.), **environment**, (protected zones), **infrastructure** (water, electricity, transport), **machine performance** etc.

“Avoid-reduce-compensate” principle of EU and French regulations

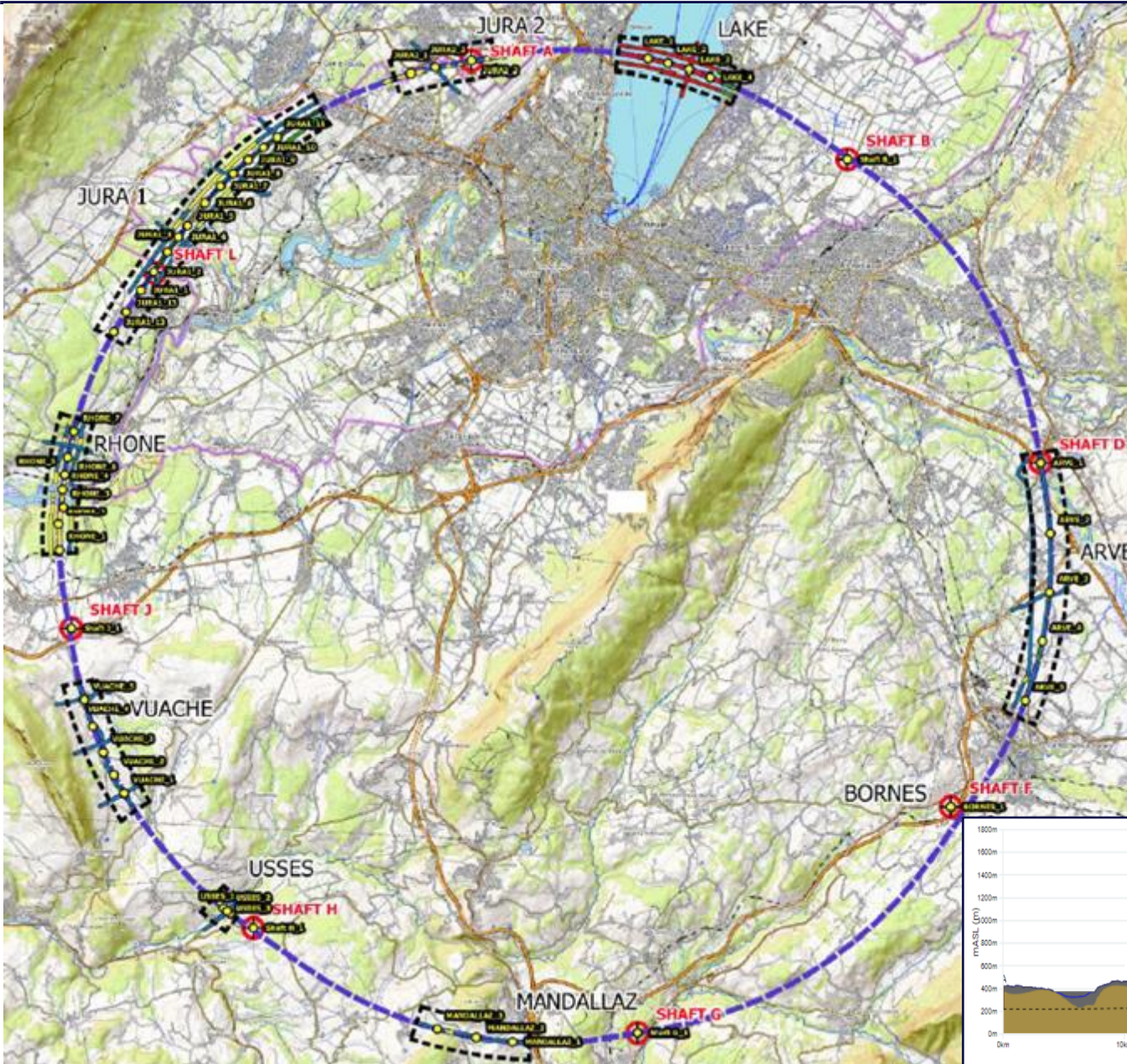
**Overall lowest-risk baseline: 90.7 km ring, 8 surface points, 4-fold symmetry**



Number of surface sites	8
Surface requirements	~40 ha
LSS@IP (PA, PD, PG, PJ)	1400 m
LSS@TECH (PB, PF, PH, PL)	2032 m
Arc length	9.6 km
Sum of arc lengths	76.9 m
Total length	90.7 km



# First series of site investigations



## Site investigations to identify exact location of geological interfaces:

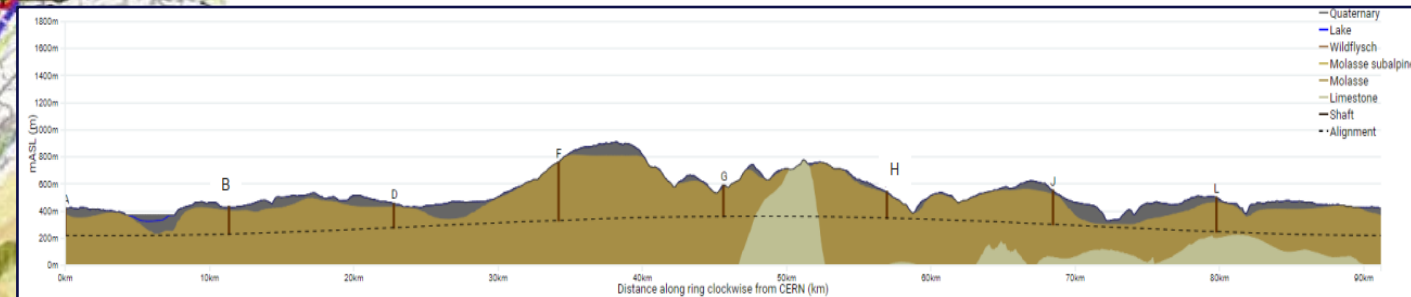
- Molasse layer vs moraines/limestone
  - ~30 drillings and ~90 km seismic lines
- Vertical position and inclination of tunnel



Sondage A89 (2007) incliné de 45° de 125 ml (surface plateforme estimée : 12 x 12 m soit environ 150 m<sup>2</sup>)



example of drilling works on a lake the lake



# Start of site investigations – seismic investigations

## First seismic line :

### Seismic line SL USSES 02 :

Acquisition date : 01/10/2024

Length : 480 meters

Method(s) : Explosive and Seismic gun

Geophones : 96 units (5 meters of spacing)

Shot points : 13 shot points in total

## Second seismic line :

### Seismic line SL USSES 01 :

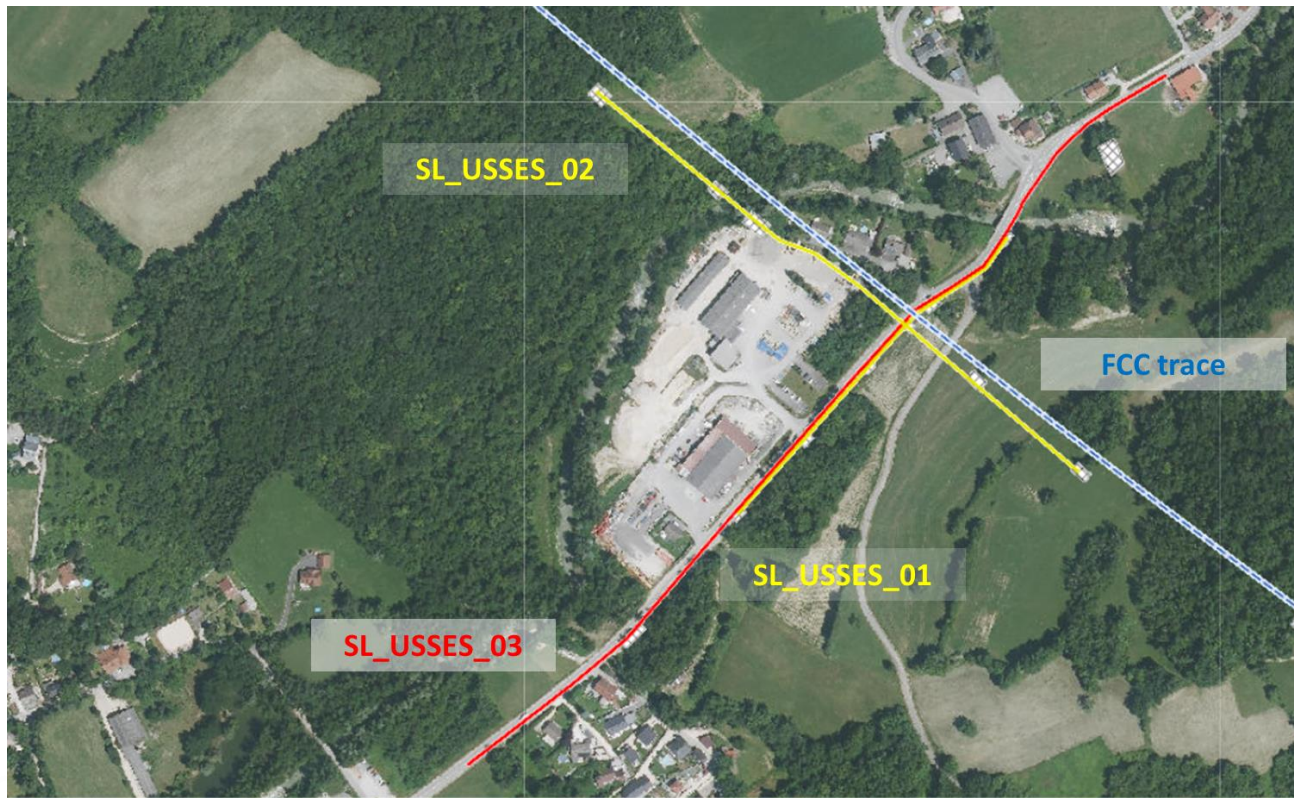
Acquisition date : 02/10/2024

Length : 300 meters

Method(s) : Weight drop

Geophones : 60 units (5 meters of spacing)

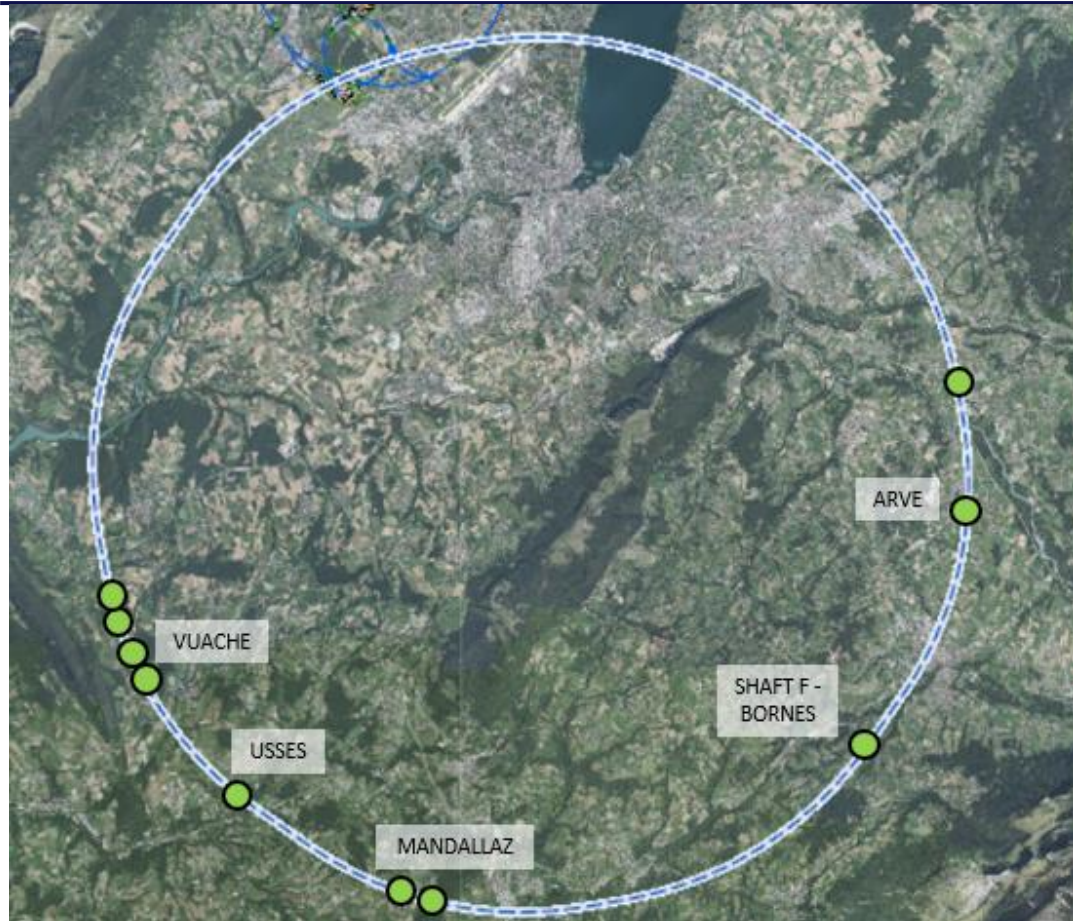
Shot points : 15 shot points in total



Extract from the FCC GIS – 20/09/2024



# Status of site investigations – drillings



Drilling for first borehole commenced on 14/10/2024

The drilling (USSES 2) is within the commune of Marlioz

The drill site is located within the storage yard of a private construction company (Besson).

Drilling Depth = 70m

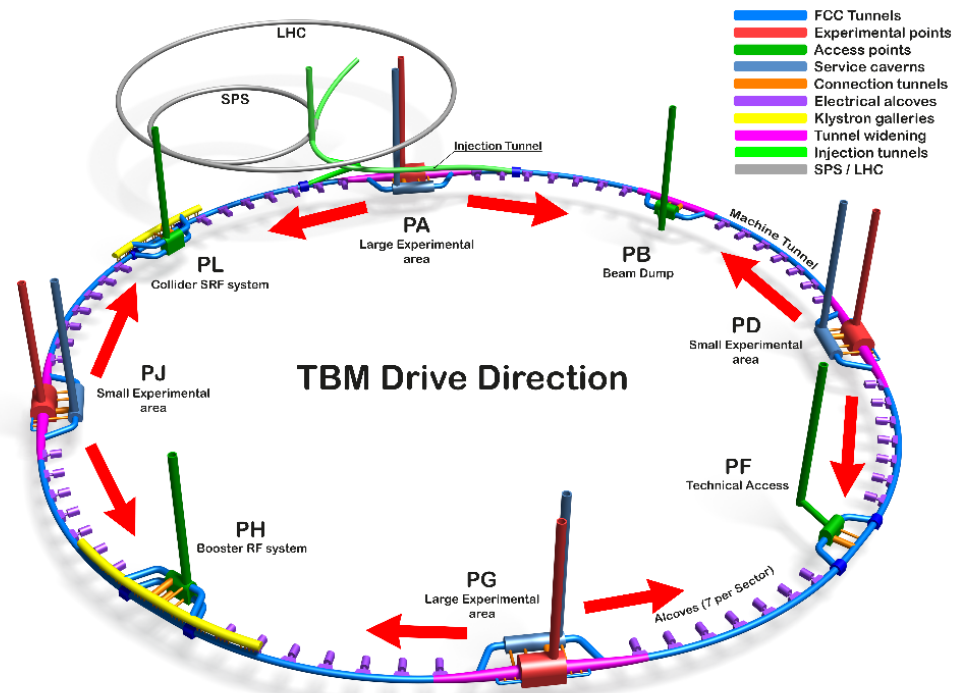
Fully cored recovery

Drill time should be about 2 weeks

Equipped with Piezometer

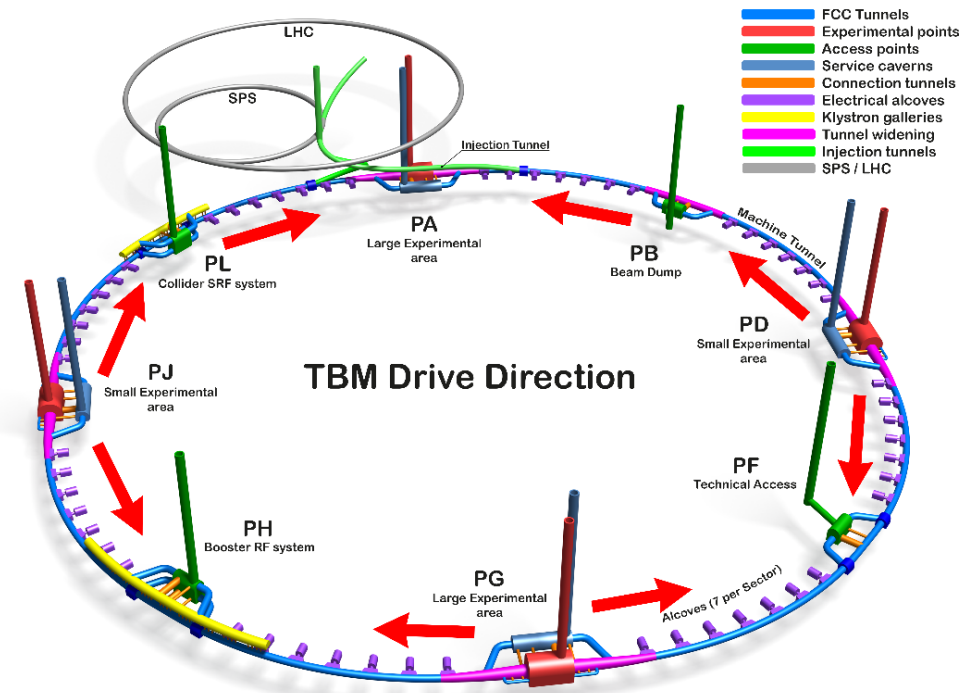
# Studies on excavation strategy and material quantities

## 2 TBMs from each experimental point



[ Not to scale ]

## Alternative with no TBMs from PA



[ Not to scale ]

	Limestone (m3)	Molasse (m3)	Moraine (m3)	Total (in-situ) (m3)	Total (Bulk factor 1.3) (m3)	%	Start Excavation	End Excavation
PA	-	1,315,336	62,721	1,378,058	1,791,475	22%	Jan-33	Jun-38
PB	-	137,379	10,473	147,852	192,207	2%	Jan-33	Jul-35
PD	-	1,248,824	24,925	1,273,749	1,655,874	20%	Jan-33	Jun-37
PF	-	165,213	-	165,213	214,777	3%	Jan-33	Apr-35
PG	141,175	1,193,094	30,829	1,365,098	1,774,628	22%	Jan-33	Jun-38
PH	-	304,083	7,482	311,565	405,034	5%	Jan-33	Dec-35
PJ	-	1,258,608	29,910	1,288,518	1,675,073	20%	Jan-33	Sep-37
PL	-	227,088	13,468	240,556	312,723	4%	Jan-33	Dec-35
Inj	-	122,329	-	122,329	159,028	2%	Jan-33	Jun-36
<b>Total</b>	<b>141,175</b>	<b>5,971,954</b>	<b>179,808</b>	<b>6,292,937</b>	<b>8,180,819</b>	<b>100%</b>		

	Limestone (m3)	Molasse (m3)	Moraine (m3)	Total (in-situ) (m3)	Total (Bulk factor 1.3) (m3)	%	Start Excavation	End Excavation
PA	-	562,457	62,721	625,178	812,731	10%	Jan-33	Jun-38
PB	-	499,592	10,473	510,066	663,085	8%	Jan-33	Jul-35
PD	-	1,248,824	24,925	1,273,749	1,655,874	20%	Jan-33	Jun-37
PF	-	165,213	-	165,213	214,777	3%	Jan-33	Apr-35
PG	141,175	1,193,094	30,829	1,365,098	1,774,628	22%	Jan-33	Jun-38
PH	-	304,083	7,482	311,565	405,034	5%	Jan-33	Dec-35
PJ	-	1,258,608	29,910	1,288,518	1,675,073	20%	Jan-33	Sep-37
PL	-	617,754	13,468	631,222	820,589	10%	Jan-33	Dec-35
Inj	-	122,329	-	122,329	159,028	2%	Jan-33	Jun-36
<b>Total</b>	<b>141,175</b>	<b>5,971,954</b>	<b>179,808</b>	<b>6,292,937</b>	<b>8,180,819</b>	<b>100%</b>		



# Start of public information & engagement sessions

First public information and discussion meeting at the Science Gateway on the 24th April at CERN.



The meeting was organised for the **local community of our Host States, France and Switzerland**, in the Science Gateway.

The "**Progress of the feasibility study of the Future FCC circular collider**" was followed by a discussion with the participants.

La Roche-sur-Foron - Haute Savoie international fair April 27 to May 6



CERN's participation in the **International Fair of Haute-Savoie/Mont Blanc**, enhanced by the valuable help of volunteers from the FCC team, resulted in meaningful **discussions with more than 2000 members of the local community** on topics ranging from the required technological advancements to sustainability measures.

On 15 May, RTS (Radio Télévision Suisse) broadcasted a special program celebrating CERN's 70th anniversary and hosted at CERN's Science Gateway.



The event featured a comprehensive look at **CERN's illustrious history, groundbreaking achievements, and future ambitions**, including the prominently featured Future Circular Collider (FCC) project with **study experts interacting with the audience**.

# Commission Nationale de Debat Public (CNDP)

mission & public information meetings

The **CNDP**, created in 1995, is an **independent French authority that ensures public participation in the definition and decision process of major projects in France**, impacting the environment by providing a neutral and transparent framework for discussions between decision-makers and citizens.

On July 2, 2024, the **CERN DG requested the CNDP to undertake an advisory mission** on public participation for the FCC. On July 3, the president of the CNDP appointed two guarantors to:

- **Assist CERN in preparing the first information meetings** on the ongoing studies in the region.
- **Provide non-binding advice to CERN** on the next steps for public participation regarding the FCC.

RÉPUBLIQUE FRANÇAISE  
Commission nationale  
du débat public

Décision n° 2023 / 109 / CERN / 1 du 3 juillet 2024 relative au projet FCC de futur collisionneur circulaire d'accélérateur de particules du CERN (74)

La Commission nationale du débat public,

Vu le code de l'environnement en ses articles L.121-1 et suivants :

Vu le courrier du 2 juillet 2024 et le dossier annexé de Mme Fabiola GIANOTTI, représentant le CERN, sollicitant une mission de conseil afin de préparer la saisine à venir sur le projet FCC de futur collisionneur circulaire d'accélérateur de particules du CERN et d'accompagner les premières démarches d'information du public menées par le maître d'ouvrage :

Après en avoir délibéré,

Décide :

**Article 1er**

Mme Brigitte FARGEVIEILLE et M. Jonas FROSSARD sont désignés pour assurer une mission de conseil relative à la préparation de la saisine à venir sur le projet FCC d'accélérateur de particules du CERN et à l'accompagnement des premières démarches d'information du public menées par le maître d'ouvrage.

**Article 2**

A l'issue de leur mission, Mme Brigitte FARGEVIEILLE et M. Jonas FROSSARD, produiront un bilan de leur mission relative à la préparation de la saisine à venir sur le projet d'accélérateur de particules du CERN et à l'accompagnement des premières démarches d'information du public menées par le maître d'ouvrage.

**Article 3**

La présente décision sera publiée au *Journal officiel* de la République française.

Fait le 3 juillet 2024

Le Président

Signature numérique de Marc  
PAPINUTTI marc.papinutti  
Date : 2024.07.03 16:30:58  
+02'00'

Le président  
M. Papinutti

# FCC-ee main machine parameters

Parameter	Z	WW	H (ZH)	ttbar
beam energy [GeV]	45.6	80	120	182.5
beam current [mA]	1270	137	26.7	4.9
number bunches/beam	11200	1780	440	60
bunch intensity [ $10^{11}$ ]	2.14	1.45	1.15	1.55
SR energy loss / turn [GeV]	0.0394	0.374	1.89	10.4
total RF voltage 400/800 MHz [GV]	0.120/0	1.0/0	2.1/0	2.1/9.4
long. damping time [turns]	1158	215	64	18
horizontal beta* [m]	0.11	0.2	0.24	1.0
vertical beta* [mm]	0.7	1.0	1.0	1.6
horizontal geometric emittance [nm]	0.71	2.17	0.71	1.59
vertical geom. emittance [ $\mu\text{m}$ ]	1.9	2.2	1.4	1.6
vertical rms IP spot size [nm]	36	47	40	51
beam-beam parameter $\xi_x / \xi_y$	0.002/0.0973	0.013/0.128	0.010/0.088	0.073/0.134
rms bunch length with SR / BS [mm]	5.6 / 15.5	3.5 / 5.4	3.4 / 4.7	1.8 / 2.2
luminosity per IP [ $10^{34} \text{ cm}^{-2}\text{s}^{-1}$ ]	140	20	$\geq 5.0$	1.25
total integrated luminosity / IP / year [ $\text{ab}^{-1}/\text{yr}$ ]	17	2.4	0.6	0.15
beam lifetime rad Bhabha + BS [min]	15	12	12	11

4 years  
 $5 \times 10^{12} \text{ Z}$   
 $\text{LEP} \times 10^5$

2 years  
 $> 10^8 \text{ WW}$   
 $\text{LEP} \times 10^4$

3 years  
 $2 \times 10^6 \text{ H}$

5 years  
 $2 \times 10^6 \text{ tt pairs}$

## Design and parameters to maximise luminosity at all working points:

- allow for 50 MW synchrotron radiation per beam.
- Independent vacuum systems for electrons and positrons
- full energy booster ring with top-up injection, collider permanent in collision mode

- $\square$  x 10-50 improvements on all EW observables
- $\square$  up to x 10 improvement on Higgs coupling (model-indep.) measurements over HL-LHC
- $\square$  x10 Belle II statistics for b, c,  $\tau$
- $\square$  indirect discovery potential up to  $\sim 70 \text{ TeV}$
- $\square$  direct discovery potential for feebly-interacting particles over 5-100 GeV mass range

Up to 4 interaction points  $\rightarrow$  robustness, statistics, possibility of specialised detectors to maximise physics output

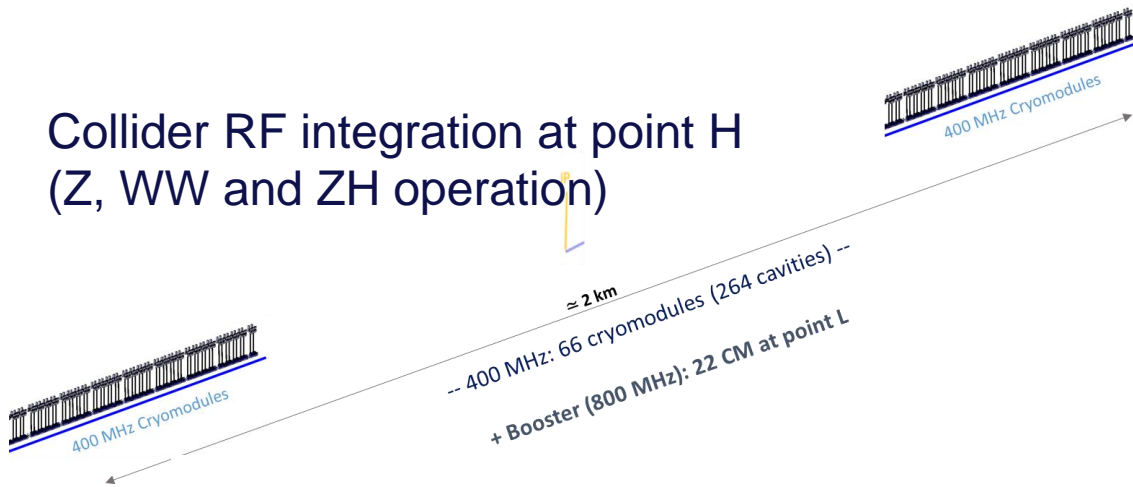
# Optimisation for operation: 400 MHz SRF and beam switchyard

## Beam switching between (Z, W) and ZH operation

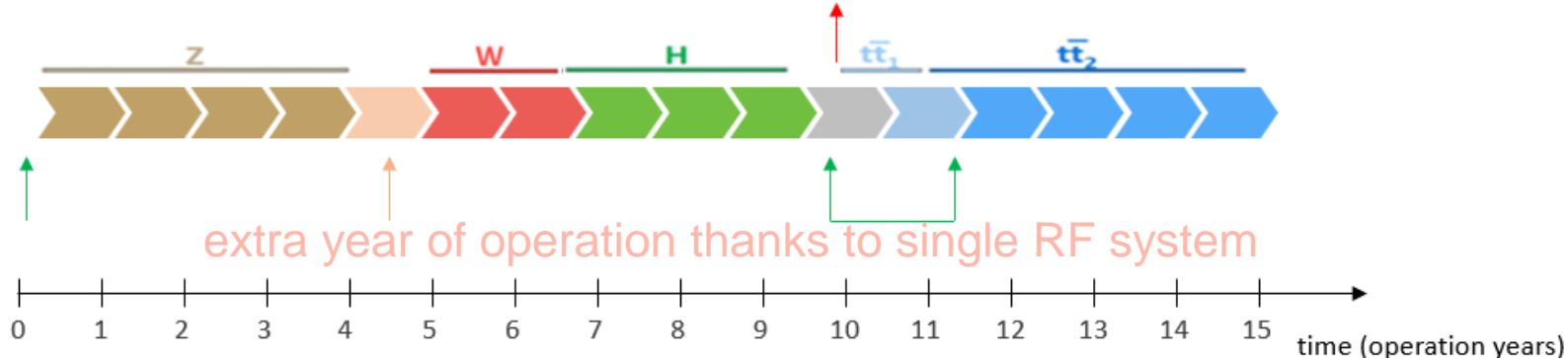
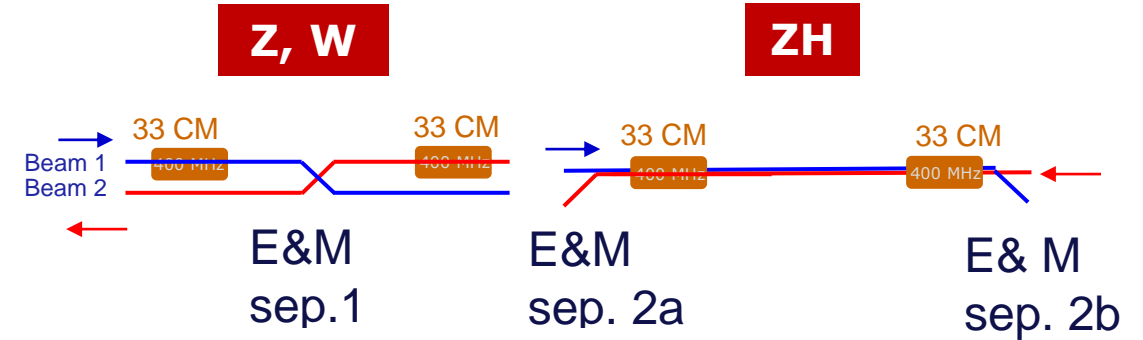
- 2-cell 400 MHz cavities for all three working points, identical configuration thanks to **reverse phase operation**: (1) experimentally verified w high beam loading at **KEKB** (Y. Morita et al., 2009), (2) baseline solution for US EIC
- ES separators + magnetic field for switching beams
- Allows quasi “instantaneous” switching between Z, W, ZH

	Energy (GeV)	Current (mA)	RF voltage (GV)
Z	45.6	1280	0.08
W	80	135	1
H	120	26.7	2.08
ttb	182.5	5	11.67

Collider RF integration at point H (Z, WW and ZH operation)



Beam crossing and combination at RF section in point H

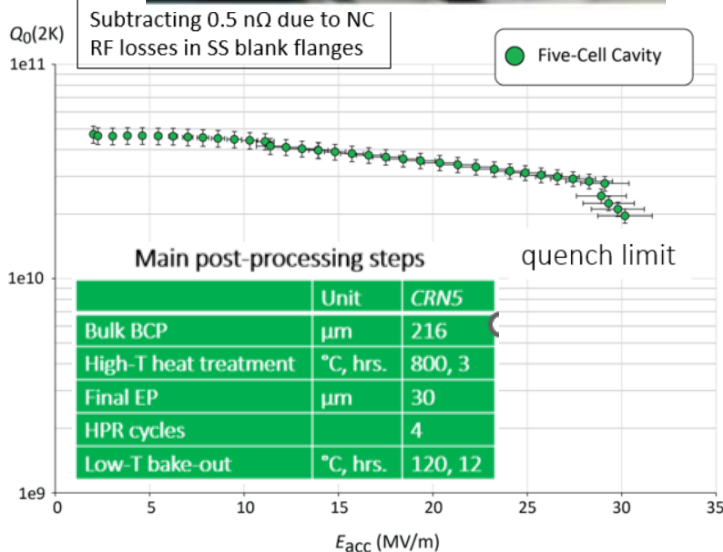


# RF R&D activities

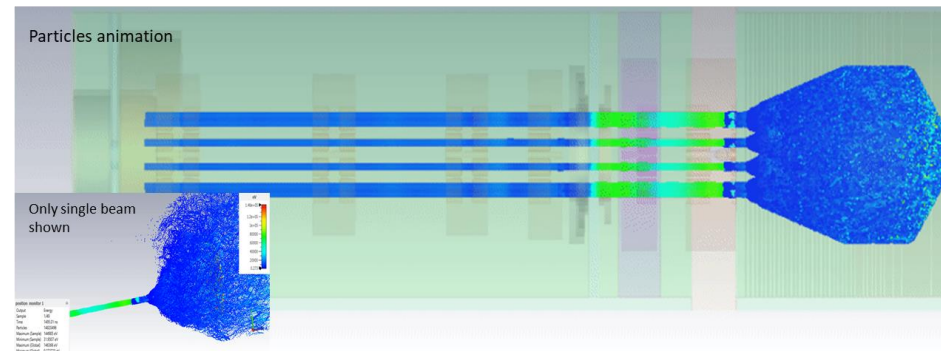
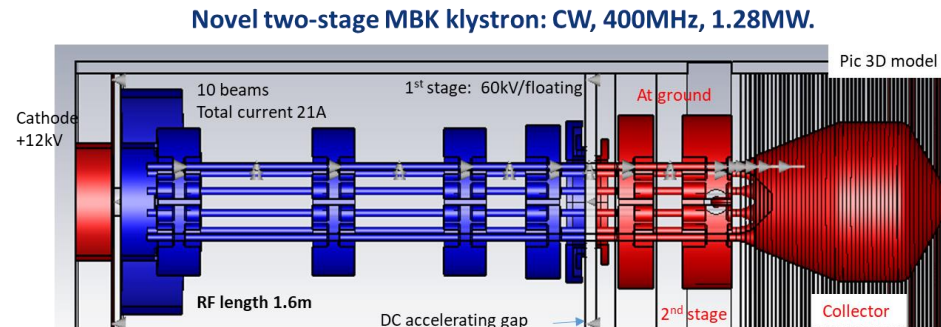
## RF system R&D is key for increasing energy efficiency of FCC-ee

- Nb on Cu 400 MHz cavities (KEK as R&D partner), seamless cavity production, coating techniques
- Bulk Nb 800 MHz cavities, surface treatment techniques
- RF power source R&D in synergy with HL-LHC.

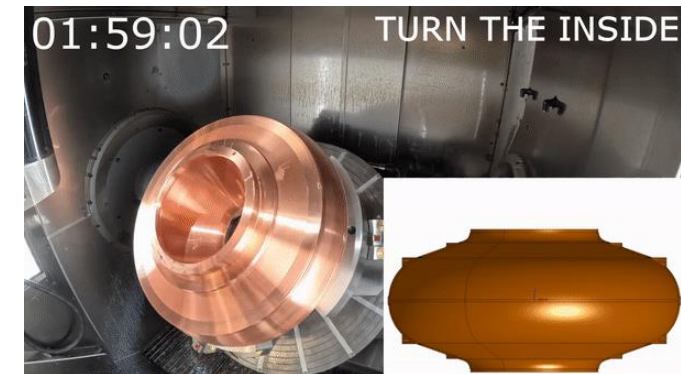
## 5/6-cell 800 MHz cavity development collaboration with JLAB



## high-efficiency klystron R&D



## 400 MHz monoblock prototype



# Interaction region mock up at INFN-LNF (Frascati)

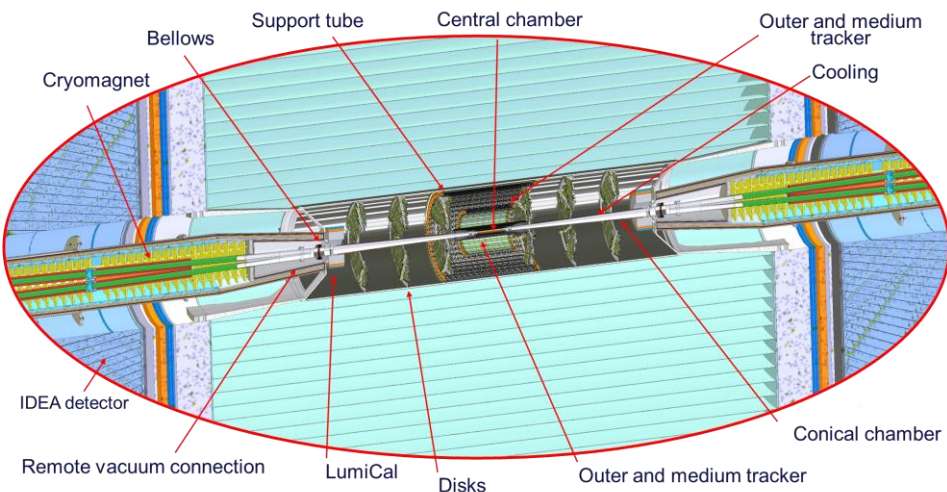
INFN-LNF, CERN and  
INFN-Pisa collaboration

Assembly & test lab in Frascati

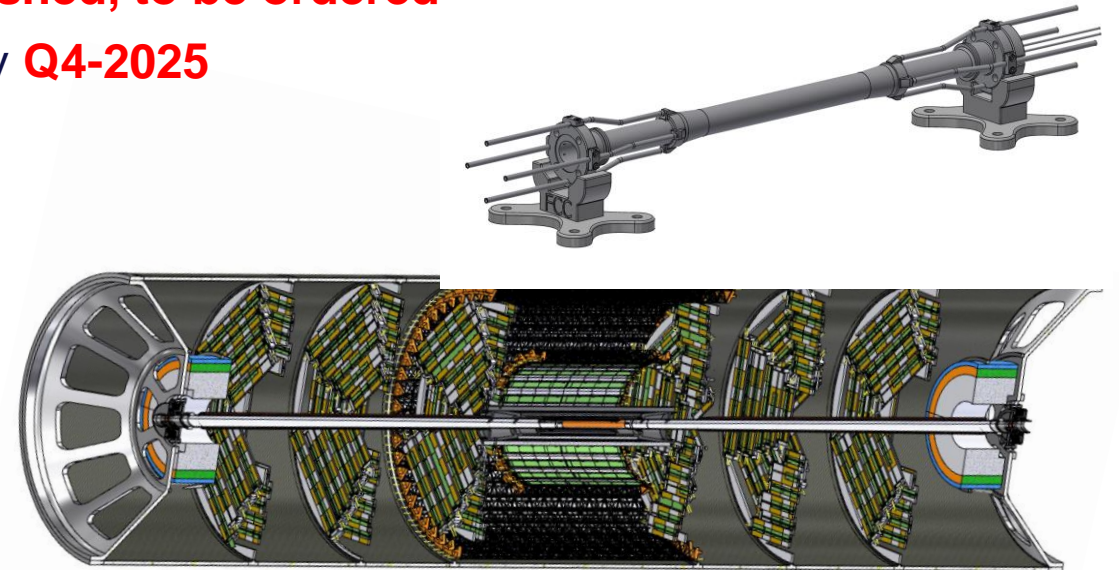


B. 5/a Serv. ing. mecc. (SIM) div.acc.

- Central chamber with paraffin cooling **in production** – Tests starting end of Oct.
- Conical chamber(s) with water cooling **~ to be ordered** – Delivery end of the year
- Vertex mechanical structure Carbon fibre foils **arriving**
- Vertex air cooling tunnel – **orders placed** – assembled Q1 2025
- Support tube - **orders expected Q1-2025**
- Bellows ~ **design almost finished, to be ordered**
- Integration & overall assembly **Q4-2025**

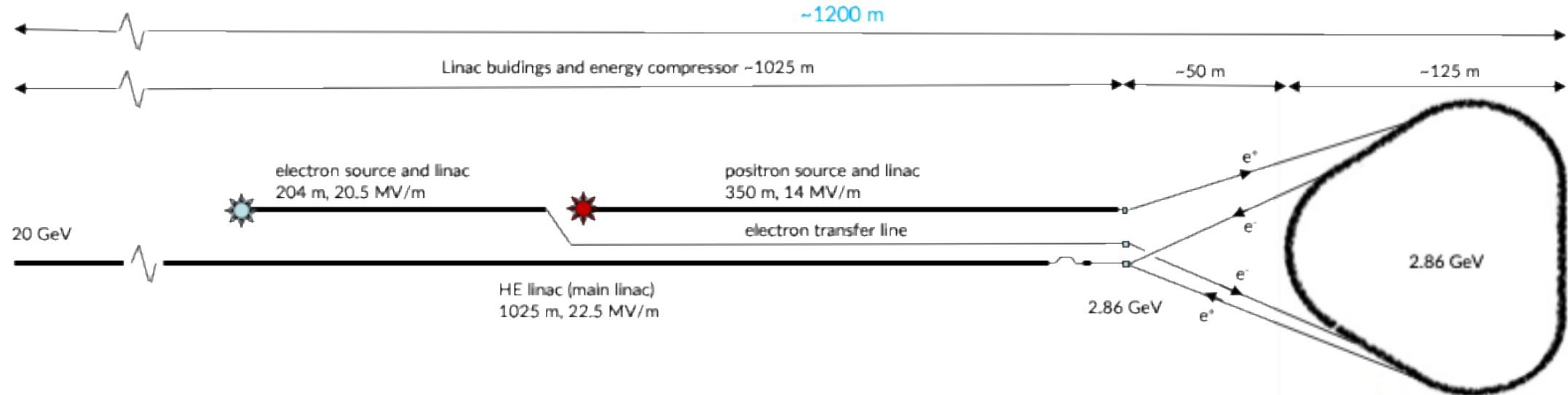


M. Boscolo,  
F. Franesini,  
F. Palla



# Optimized injector concept and parameters (PSI & CERN)

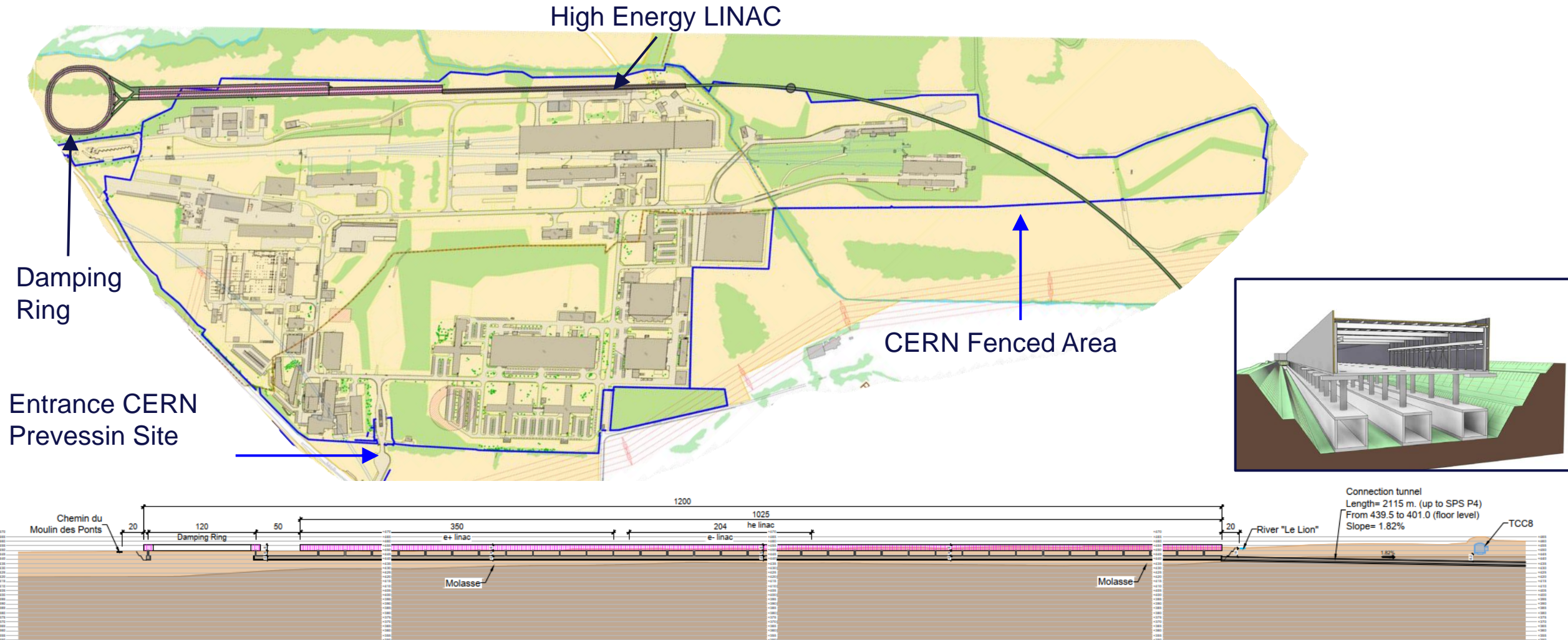
- Mid-term review recommendations to reduce gradients and repetition rate → new linac optimization in terms of cost and power density



- Overall power consumption (for linacs) is reduced by **more than a factor 3** by means of:
  - new accelerating structures with higher shunt impedance;
  - lower gradient (29.5 MV/m → 22.5/20.5 MV/m);
  - lower repetition rate (200/400 Hz → 100 Hz).
- Repetition rate of **100 Hz with 4 bunches** per rf pulse
- New layout: **Damping Ring at higher energy 2.86 GeV**, no common linac with 2x repetition rate.

# Optimised injector implementation at Préveessin site

- Good integration with existing CERN Préveessin Site and strongly reduced visibility from outside.
- Ideal connection to existing experimental halls.
- Good conditions for construction.



LONGITUDINAL PROFILE



# Other FCC-ee science applications under study

→ Workshop on “Other Science Opportunities at the FCC-ee”  
28-29 November at CERN, <https://indico.cern.ch/event/1454873/>

for example:

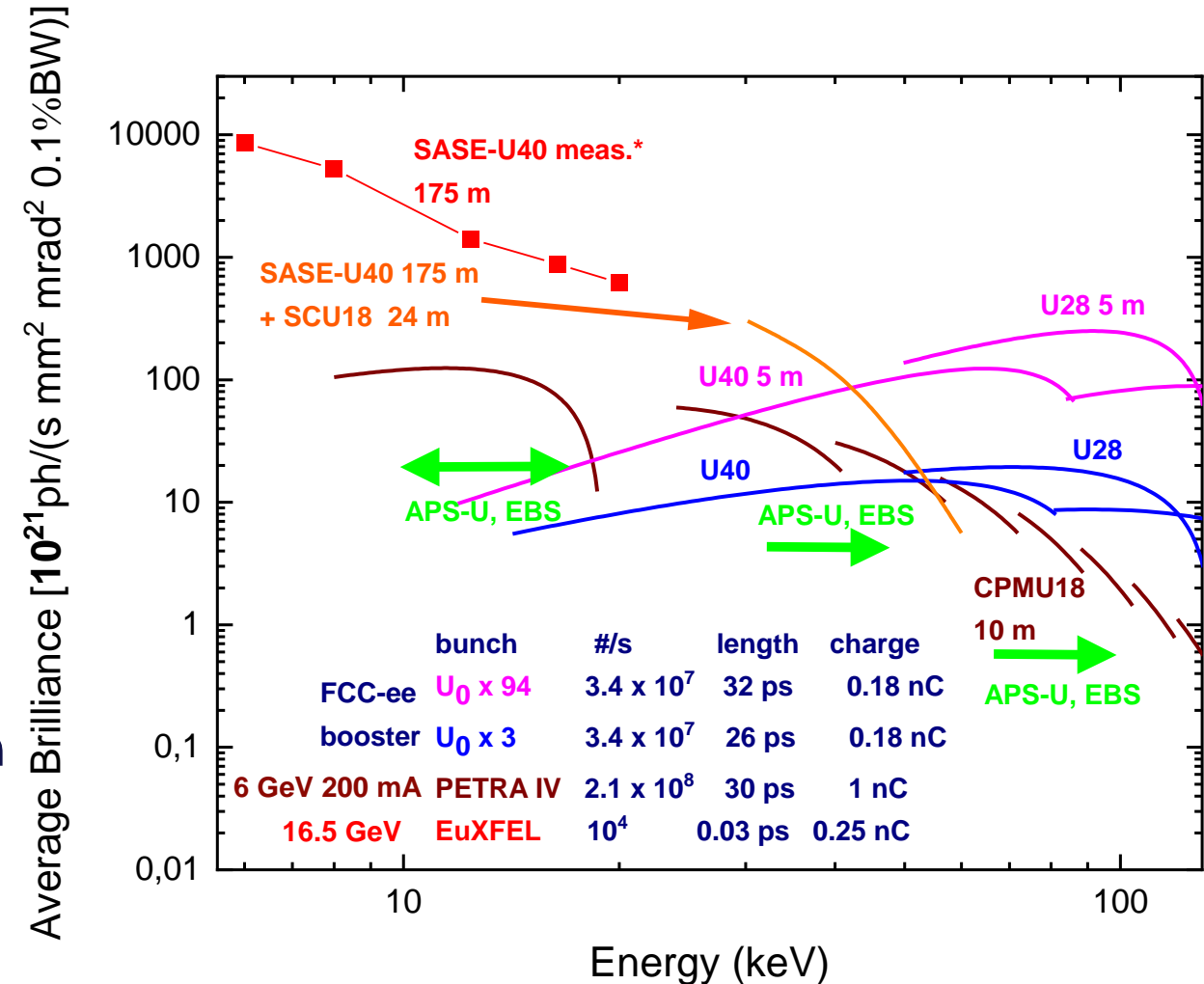
**FCC-ee booster as diffraction limited storage ring** with coherent synchrotron radiation down to 0.1 Å

FCC-ee injector as the world’s **ultimate positron source** for material studies and paving a path towards the first **Bose-Einstein condensation of Ps** (511-keV gamma-ray laser)

using beamstrahlung for **radionuclide production**

e<sup>-</sup> beam driven **neutron source**

etc.



# FCC-hh main machine parameters

parameter	FCC-hh	HL-LHC	LHC
collision energy cms [TeV]	81 - 115	14	
dipole field [T]	14 - 20	8.33	
circumference [km]	90.7	26.7	
arc length [km]	76.9	22.5	
beam current [A]	0.5	1.1	0.58
bunch intensity [ $10^{11}$ ]	1	2.2	1.15
bunch spacing [ns]	25	25	
synchr. rad. power / ring [kW]	1020 - 4250	7.3	3.6
SR power / length [W/m/ap.]	13 - 54	0.33	0.17
long. emit. damping time [h]	0.77 - 0.26	12.9	
peak luminosity [ $10^{34} \text{ cm}^{-2}\text{s}^{-1}$ ]	~30	5 (lev.)	1
events/bunch crossing	~1000	132	27
stored energy/beam [GJ]	6.1 - 8.9	0.7	0.36
Integrated luminosity/main IP [ $\text{fb}^{-1}$ ]	20000	3000	300

With FCC-hh after FCC-ee: significant amount of time for high-field magnet R&D, aiming at highest possible collision energies

- Target field range for cryo-magnet R&D

Formidable challenges:

- ❑ high-field superconducting magnets: 14 - 20 T
- ❑ power load in arcs from synchrotron radiation: 4 MW → cryogenics, vacuum
- ❑ stored beam energy: ~ 9 GJ → machine protection
- ❑ pile-up in the detectors: ~1000 events/xing
- ❑ optimization of energy consumption: → R&D on cryo, HTS, beam current, ...

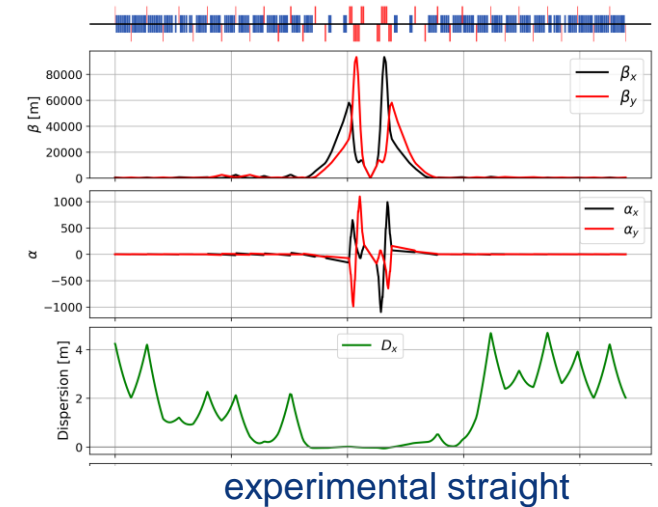
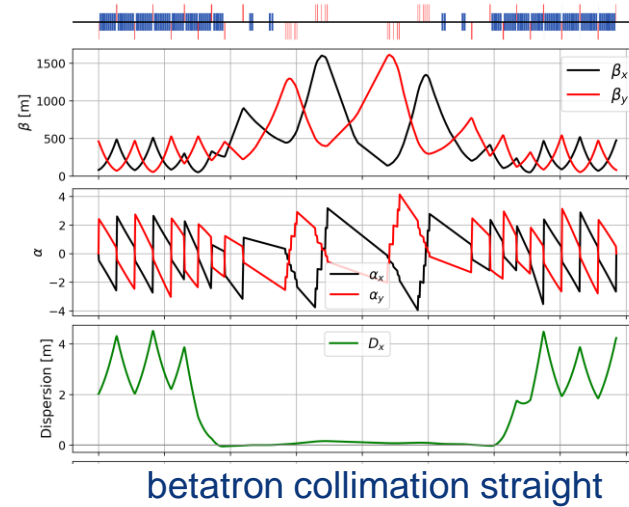
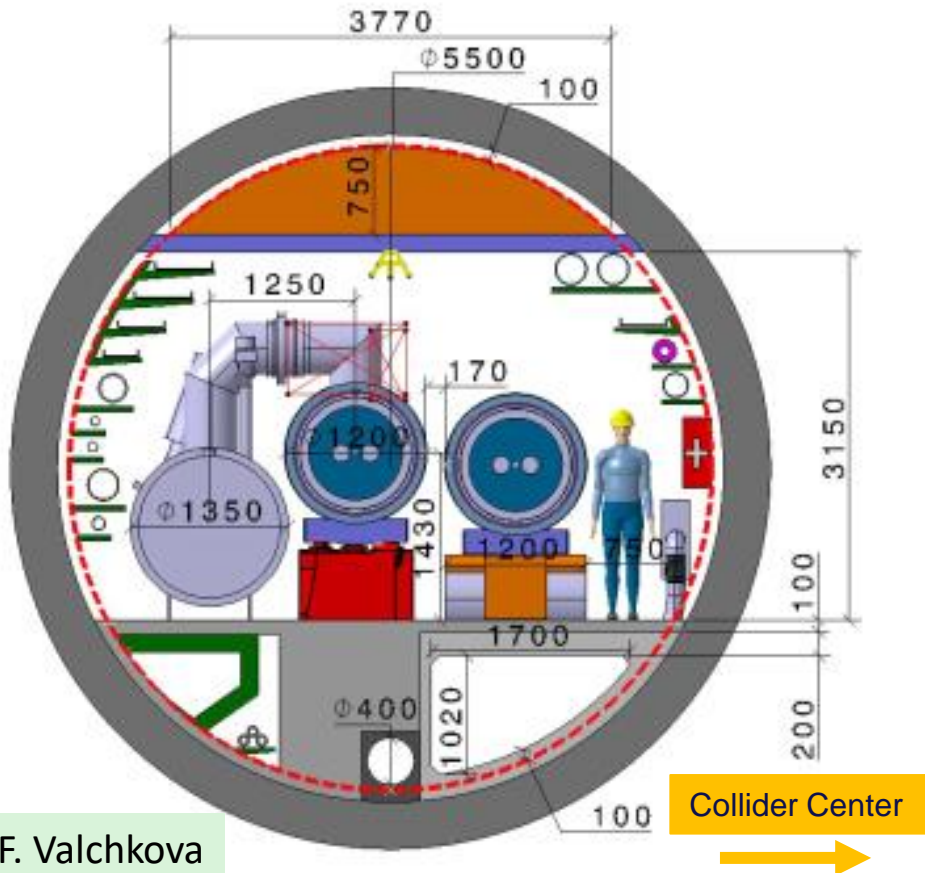
Formidable physics reach, including:

- ❑ Direct discovery potential up to ~ 40 TeV
- ❑ Measurement of Higgs self to ~ 5% and ttH to ~ 1%
- ❑ High-precision and model-indep (with FCC-ee input) measurements of rare Higgs decays ( $\gamma\gamma$ ,  $Z\gamma$ ,  $\mu\mu$ )
- ❑ Final word about WIMP dark matter

# Key activities on FCC-hh: cryo magnet system, optics design

## Optics design activities:

- adaptation to new layout and geometry
- shrink  $\beta$  collimation & extraction by ~30%
- optics optimisation (filling factor etc.)



M. Giovannozzi, G. Perez, T. Risselada

## High-field cryo-magnet system design

- Conceptual study of cryogenics concept and temperature layout for LTS and HTS based magnets, in view of electrical consumption.
- Update of integration study for the ongoing HFM designs and scaling to preliminary HTS design.

→ **Confirmation of tunnel diameter!**

- HFM R&D (LTS and HTS) on technology and magnet design, aiming also at bridging the TRL gap between HTS and  $\text{Nb}_3\text{Sn}$ .

# Status of FCC global collaboration

**Increasing international collaboration as a prerequisite for success:**

→ links with **science, research & development** and **high-tech industry** will be essential to further advance and prepare the implementation of FCC

## **FCC Feasibility Study:**

Aim is to increase further the collaboration, on all aspects, in particular on Accelerator and Particle/Experiments/Detectors

**155  
Institutes**

**36  
countries  
+  
CERN**



**FUTURE  
CIRCULAR  
COLLIDER**  
*Feasibility Study*

# FCC collaboration members in Asia

## India

UPES Dehradun  
IIT Hyderabad

## Iran

University of Tehran  
IPM

## Japan

The University of Tokyo  
Tokyo International University  
KEK

## Pakistan

PAEC

## South Korea

Pusan National University  
Hanyang University Seoul  
Kyung Hee University Seoul  
Pohang Accelerator Laboratory (PAL)  
Kyungpook National University Daegu  
KAIST Daejeon  
Gangneung-Wonju National University  
Korea University Seoul  
Yonsei University Seoul  
Sungkyunkwan University Seoul  
University of Seoul

## Thailand

Faculty of Science / Chiang Mai University  
Thailand Center of Excellence in Physics  
Chulalongkorn University Bangkok  
Srinakharinwirot University Bangkok

## Türkiye

Ege University Bornova-Izmir  
TOBB University of Economics  
and Technology Ankara  
Giresun University  
Isik University Sile Istanbul  
Izmir University Bakircay (IBU)  
Bursa Uludağ University Nilüfer  
Ankara University  
Kirikkale University  
AIBU Bolu  
İstinye University Istanbul  
Piri Reis Üniversitesi Tuzla Istanbul  
IYTE Urla Izmir  
Istanbul Aydin University  
Istanbul University  
Izmir University of Economics Balçova-Izmir

# 2014: KEK joining FCC collaboration



# FCC Week 2024

Complete status of the FCC Study and all the latest advancements were presented at the Future Circular Collider Week 2024, in San Francisco, 10-14 June 2024

<https://fccweek2024.web.cern.ch/>



449 participants : 75 remote, 374 on site



# EU Competitiveness Report

edited by Mario Draghi, and officially handed over to Ursula von der Leyen in September 2024

The future —  
— of European  
competitiveness



***“One of CERN’s most promising current projects, with significant scientific potential, is the construction of the Future Circular Collider (FCC): a 90-km ring designed initially for an electron collider and later for a hadron collider..”***

***Refinancing CERN and ensuring its continued global leadership in frontier research should be regarded as a top EU priority, given the objective of maintaining European prominence in this critical area of fundamental research, which is expected to generate significant business spillovers in the coming years.”***

[https://commission.europa.eu/topics/strengthening-european-competitiveness/eu-competitiveness-looking-ahead\\_en](https://commission.europa.eu/topics/strengthening-european-competitiveness/eu-competitiveness-looking-ahead_en)



# Supporting statements at CERN's 70th anniversary



*"...No European country alone could have built the world's largest particle collider. CERN has become a global hub because it rallied Europe and this is even more crucial today.*

***I am proud that we have financed the feasibility study for CERN's Future Circular Collider (FCC). This could preserve Europe's scientific edge and could push the boundaries of human knowledge even further. And as the global science race is on, I want Europe to switch gears. To do so, European unity is our greatest asset. ...."***

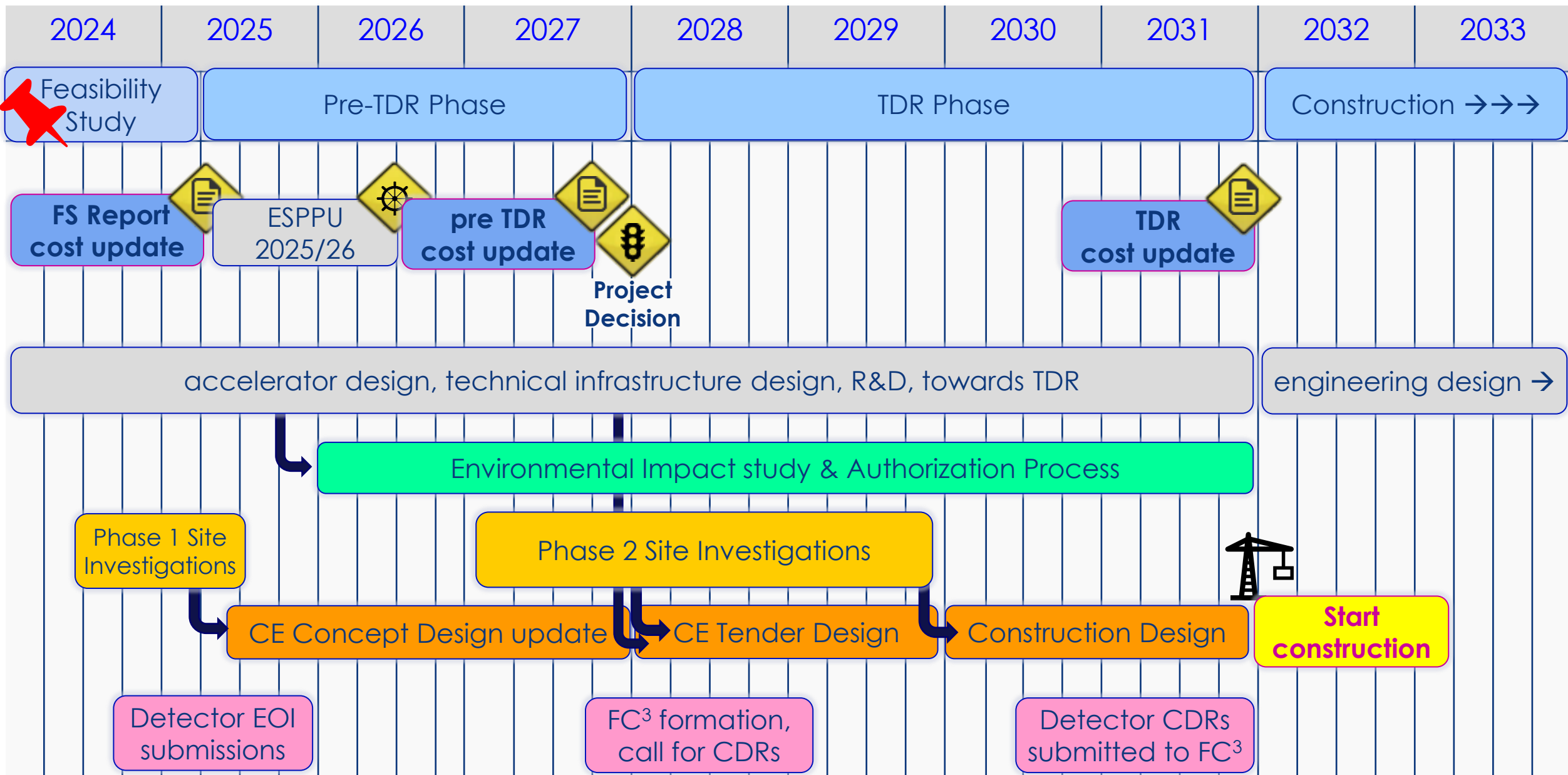
Ursula von der Leyen, President of the European Commission

# FCC Main Goals for Coming Years

---

- **Upcoming milestone for FCC is the completion of the Feasibility Study by March 2025 as input for the Update of the ESPP.**
- **The following pre-TDR phase should prepare for a possible project approval by 2027-2028 and enable the subsequent start of CE design contract:**
  - Updated cost and schedule studies
  - specifications to enable CE tender design by mid 2027
  - refined input for environmental evaluation and project authorisation process
  - requires overall integration study and designs based on technical pre-design of accelerators, technical infrastructure and detectors
- **Possible start of CE construction would then be 2032-33:**
  - CE groundbreaking
  - TDR to enable prototyping, industrialization towards component production
- **Strong international collaboration is essential for success!**

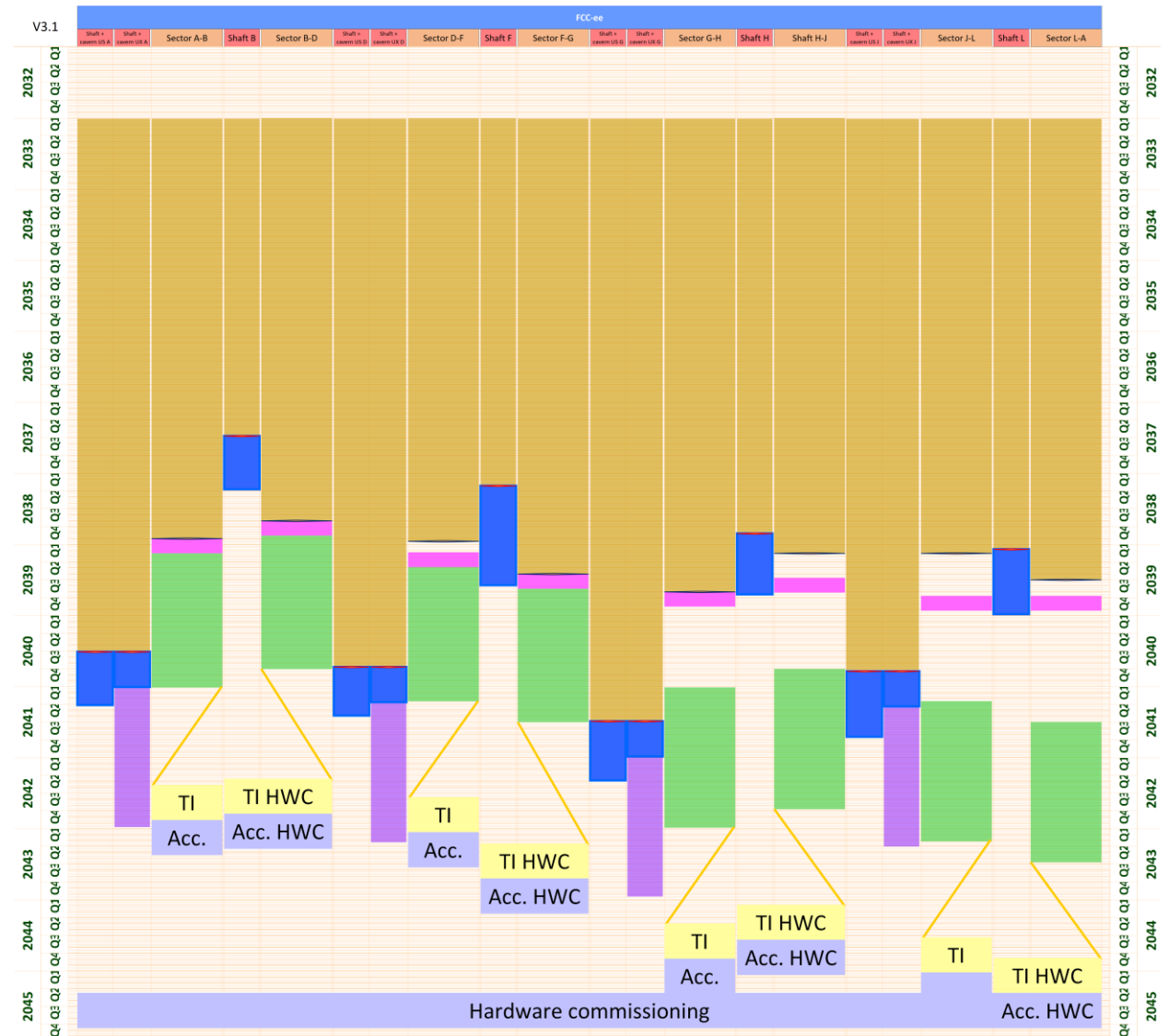
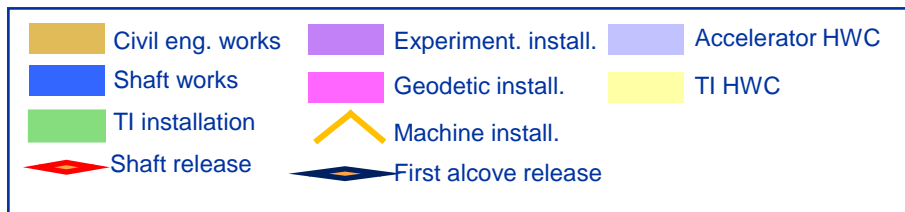
# Possible timeline till start of construction



# Construction and installation planning

## Baseline collider schedule

- Q1 2033, Start of CE construction work
- Q2 2041, Completion of last lot of CE construction
- Q2 2043, Overall completion of TI installation
- Q4 2044, Accelerator installation completed
- Q4 2045, HW commissioning completed
- Q4 2045, HW commissioning completed
- Q1 2046, First beams
- Q1 2048, Start of nominal operation
- Q3 2041 – Q3 2044, Experiment installation
- Q1 2046, Start beam commissioning



# take home messages

---

- FCC feasibility study is nearing completion; preparation for pre-TDR phase and FCC implementation is underway; strong support from CERN host states, EU and US ; international collaboration growing
- KEKB demonstrated RF reverse phase operation at high beam current, SuperKEKB operates with the virtual crab waist optics and  $\beta_y^* \sim 1$  mm – validating three key ingredients of the FCC-ee design
- numerous other areas of possible collaboration with KEK or Japan

# possible FCC contributions from Japan

## accelerators:

- expertise from SuperKEKB
  - FCC-ee virtual crab waist optics successfully implemented,  $\beta^*$  smaller than for FCC-ee, etc.
  - FCC-ee experts participating SuperKEKB in Int'l Task Force
  - final focus and MDI expertise from Belle II
- SRF and RF power sources
  - expertise from TRISTAN, KEKB, SuperKEKB, ILC, STF
  - reverse phase operation demonstrated at KEKB (key for FCC-ee and US EIC)
  - cavity design, optimization & production (e.g. 6-cell 800 MHz bulk Nb cavities)
  - highly efficient klystrons, IOTs, SSA ....
- beam diagnostics, vacuum system, collimators, magnets, ...

## experiments & detectors:

- expertise from Belle II, ATLAS, and ILC efforts

## physics:

- expertise from ILC and Belle II physics

# FCC Week 2025 - Vienna



## Event Overview

- **Venue: Hofburg Palace**, a historical and cultural landmark in **Vienna, Austria**.
- **Dates: Monday 19 to Friday 23 May 2025**
- **Presentation of the Feasibility Study Report and review of its findings and opportunities for future R&D projects**
- **Please save the date and join us in Vienna**

<https://indico.cern.ch/event/1408515>