FCC @ Clermont — Sommaire

1. The team;
2. Contributions to Physics studies;
3. Contributions to detector design;

FCC-Clermont, FCC— 1. Staff 2024-2026

Staffs	#	FTE	Names ans Comments
CNRS	1	0.2	R. Madar (CR)
University	2	0.6	H. Chanal (MCF), S.Monteil (PR)
Post-doc	2	1.	M. Yeresko (GRAiNITA ANR), C. Lemettais (LHCb/FCC20%),
Doctorants	2	1.3	L. Roehrig (SM, RM) [100%, defended in 2024], T. Miralles (SM, EC) [15%, defended in 2024], W. Weber (RM) [100%, 2024, 2027], Leandra Moeser (SM) [30%, 2025, 2028].
ITA (GRAiNITA)	3	0.8	H. Chanal (MCF, u-elec), M. Magne (IE, elec), D. Picard (IE, elec)

FCC-Clermont— 2. Contributions to Physics

- Longstanding implication in the FCCee project (since 2014).

- A selection of publications along the way:

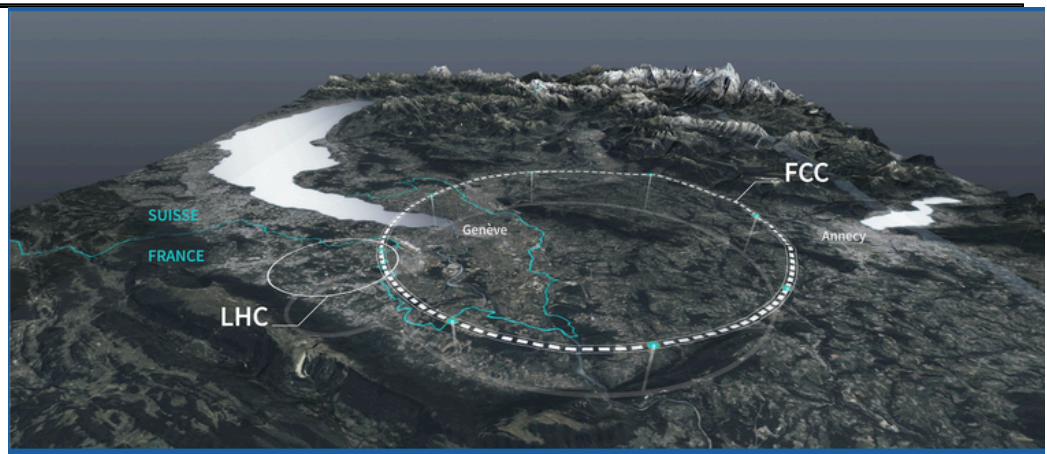
  - $b \to s\tau\tau$ phenomenology: this one
  - Conceptual Design report (edition of the Flavour chapter): here

  - FCC-ee essentials for Flavours: w/ G. Wilkinson
  - The heavy quark electroweak properties (Roehrig et al): that one
  - ECFA H/Top/EWK report: a three-year study
  - FCC-ee Feasibility Study report: 2025

  - A first publication on charm physics: w/ TuDO and BNL

FCC-Clermont — 2. Contributions to Physics

- Initiating a new scientific object: the Flavoured Circular Collider Workshop
- Organised with Guy Wilkinson (Oxford); Gino Isidori (Zurich) and Zoltan Ligeti (Berkeley) as theory counterparts.
- 5 working groups: Romain Madar convener of the tau physics and selected EW properties.
- Shaping the Flavour effort in the next two-years. Aim at a yellow report in time for the decision.



Flavours at FCC Workshop

19–21 Nov 2025
CERN
Europe/Zurich timezone

Enter your search term

Overview
Videoconference
Scientific Programme
Timetable
Contribution List
Registration
Participant List
Privacy Information
CERN Hostel
CERN's Values and Code of Conduct
Hands-on tutorial: introduction to FCC analyses

Contact the organisers
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Physics at the Flavoured Circular Collider: preparing for heavy quark and lepton studies in the post HL-LHC/Belle II era

Experimentalists and theorists from the world-wide particle physics community are invited to participate in an extended workshop, beginning autumn 2025 and scheduled to continue until summer 2027 to deepen our understanding of the potential of the FCC-ee for heavy-flavour physics in the quark and lepton sector. This will build on the studies performed for the Conceptual Design Report and Feasibility Study Report and seek to set the agenda, and prepare the tools, for physics in the post HL-LHC and Belle II era.

The workshop will be focused on the physics opportunities and challenges at FCC-ee, with the following goals:

- Obtain realistic estimates for precision on key flavour benchmarks;
- Identify and develop strategies for potentially limiting systematics from experiment and theory;
- Work closely with the physics performance and detector-concept groups to investigate the requirements on and impact of various detector designs;
- Formulate new measurement strategies and identify new decay modes of interest;
- Understand the complementarities with the HL-LHC;
- Explore the interplay with the Higgs, electroweak, and possible hidden sectors;
- Assess whether there exists a physics case for extending the TeraZ programme beyond 6×10^{12} decays.

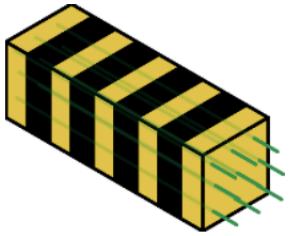
As well as pure flavour studies, the workshop will address electroweak measurements at the Z pole involving fully reconstructed heavy-flavour final states, and will also consider the rich possibilities that exist in hadron spectroscopy with the TeraZ dataset. In addition, consideration will be given to how the

- In close collaboration with Orsay a novel idea (©J. Lefrançois), of electromagnetic calorimeter for the Future Circular Collider: GRAiNITA

1. Principles of GRAiNITA

- The equation: reaching an exquisite cost-effective energy resolution while preserving high transverse granularity for W, Z, H physics.

Typical sampling calorimeter (e.g. Shashlik)

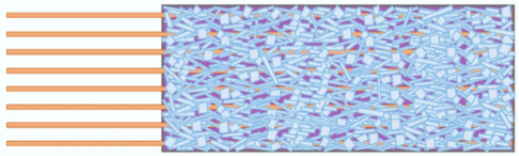


$$\frac{\sigma_E}{E} \sim \frac{10\%}{\sqrt{E}}$$

Crystal calorimeter

$$\frac{\sigma_E}{E} \sim \frac{1-2\%}{\sqrt{E}}$$

- Can we make the best of the two approaches ?
- Fine sampling
- Local containment of the scint.light (inspired by A. Cabrera et al. LiquidO Commun Phys 4, 273 (2021)



S. Monteil GRAiNITA@ FCC 7

FCC-Clermont — 3. Contributions to detectors

- In close collaboration with Orsay, a novel idea of electromagnetic calorimeter for the Future Circular Collider: GRAiNITA

First characterization of a novel grain calorimeter: the GRAiNITA prototype

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Abstract: A novel type of calorimeter based on grains of inorganic scintillating crystal readout by wave length shifting fibers is proposed. The concept and main features as well as the prototype design are introduced and the first results obtained using cosmic rays are presented. The number of photo-electrons generated by cosmic rays muons in the prototype detector is estimated to be of the order of 10000 photo-electrons per GeV, validating the concept of this next-generation shashlik calorimeter.

FCC-Clermont— 3. Contributions to detectors

- In close collaboration with Orsay, a novel idea of electromagnetic calorimeter for the Future Circular Collider: GRAiNITA
- After the test of the prototype with cosmic muons, proof of principle that a resolution $1 - 2\,\%/\sqrt{E}$ is at reach (paper in JINST)
- In Summer 2024, test beam at CERN in the shadow of the LHCb calorimeter. Confirmation that the constant term can be $< 0.6\,\%$ (submitted to JINST).
- The project was selected by ANR in 2025 to build an ECAL demonstrator. PI: G. Hull (IJCLAb) and SM (LPCA). About 500 kEuros. Just started.
- Part of DRD6 effort (aligned w/ ANR timeline and deliverables).
- The project grows with members of the CERN FCC-PED group joining GRAiNITA. Possibly part of a novel detector concept proposal.