

INPUT FROM CFTP



M. (Gui) N. Rebelo

“Portuguese Discussion on the European Strategy for Particle Physics” at LIP

Lisboa, 20 January 2025
(5 minute presentation)

<https://indico.lip.pt/event/1924/>

CFTP Directive Board: Gustavo C. Branco, Filipe Joaquim, M. N. Rebelo

ABOUT CFTP

Centro de Física Teórica de Partículas

Only research group in Theoretical Particle Physics in Portugal whose research is entirely dedicated to this field

At present 11 permanent members with PhD and with tenure, 3 postdocs, 8 PhD students

CFTP topics of research intimately related to LHC Physics (Higgs, Flavour, CP Violation, Physics Beyond SM, Machine Learning tools). Strong connection to the CERN Theory Department since long.

**The survival of CERN as a Laboratory depends on two alternative Projects
FCC, CLIC**

CERN member states already reiterated their support for the continuation of CERN

Last week at CERN, F. Gianotti urged the community to strongly support the FCC

IMPORTANT MESSAGE FOR PORTUGUESE FUNDING AGENCIES

Attractive research grants, scholarships, and career advancement opportunities are strongly needed to keep talented physicists in our field

FCC, some pros and cons

Some pros

There is a growing interest in the FCC Project in the worldwide community (F Gianotti)

First choice for the European Strategy in 2020

FCC feasibility study mid-term review has been successfully completed (Gutleber)

Environmental initial state analysis, engagement with the public, socio-economic assessment and sustainability studies were carried out as pre-requisites for the authorisation processes (Gutleber)

Very encouraging results. Physics, Software, Computing, Detector, Machine studies well under way for already 8 years. Tunnelling feasibility favourable.

New scenario under consideration: 4 interaction points (experiments) rather than 2

Two stages, FCC-ee; FCC-hh with heavy ion possibility

CERN wants to give a strong signal to the HEP community worldwide of its commitment to FCC as host lab.

Some cons

Question of financial feasibility; Will China build a similar machine well in advance?

(based on information from FCC Meeting at CERN January 25) <https://indico.cern.ch/event/1439509/>

CLIC, some pros and cons

Some pros

Alternative to FCC in case China builds CEPC well before FCC could start
Financial feasibility of initial stage will be easier to achieve (lower initial cost)

Some cons

Energy upgrades during lifetime of the machine will make it more expensive later
Necessary feasibility studies would have to start from scratch, implying delays
Physics scope limited when compared to FCC. Only e plus e minus machine
Only one experiment. No possibility of more than one detector operating simultaneously

CONCLUSION: FCC LOOKS LIKE THE WAY TO GO

Announcement



Invitation for a Seminar by **Michelangelo Mangano** organised by CFTP at IST

Title: Perspectives on future colliders

Date: the 7th of March 2025, Time: 3.30 pm (to be confirmed), Location IST

More detailed information will be given soon