

Introduction

German strategy workshop
“The future of Collider Physics”
in preparation of the ESPP update

November 27 – 29, 2024
Hamburg

Johannes Haller, Universität Hamburg
Jenny List, DESY

Very warm welcome to Hamburg !

- ... on behalf of the organizers:

Scientific organising committee:

Lutz Feld, Karsten Koeneke, Thomas Kuhr, Johannes Haller (co-chair), Ruth Jacobs, Jenny List (co-chair), Daniel Mohler, Tillmann Plehn, Markus Schumacher, Uli Uwer

Local organising committee:

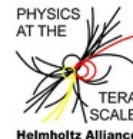
Andrea Bremer (UHH), Ruth Jacobs (DESY), Johannes Haller (UHH), Iffni Meza (DESY), Jenny List (DESY), Matthias Schröder (UHH)

- thanks for coming and participating !
 - registered people: total: 168 in-person/online: 122/46
- thanks to our sponsors for their support:



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Timeline for the update of the European Strategy for Particle Physics



not familiar with this? → check out this web-page:

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

The KET process

- National inputs are due by March 31, 2025
- KET has initiated workshops to prepare the input to ESPP update
 - Future Collider @ CERN Community Event, Bonn, 22.-24.05.2024
 - German strategy workshop "The Future of Non-Collider Particle Physics" in preparation of the ESPP update, Bad Honnef, 22.-24.11.2024
 - German strategy workshop "The future of Collider Physics" in preparation of the ESPP update, DESY, 27.-29.11.2024
 - Concluding Workshop in preparation of the input to the ESPP update, Bad Honnef, 19.-22.01.2025
- Summary documents of the non-collider and the collider workshop will be available before the concluding workshop
 - **ie we need to prepare a document !!**

Remit of the ESG

Karl Jakobs, Chair of ESG, 21.11.24, Bad Honnef

- defines the aim of the strategy update:
 - ‘develop a visionary, concrete plan ... through the realisation of the next flagship project at CERN...’
 - ‘... include the preferred option for the next collider at CERN and prioritised alternative options... if ... not feasible or competitive’

Remit of the European Strategy Group (ESG)

- In June 2024, the CERN Council established and approved the **remit of the European Strategy Group**
*"The aim of the Strategy update should be to develop a **visionary and concrete plan** that greatly advances human knowledge in fundamental physics through the **realisation of the next flagship project at CERN**. This plan should attract and value **international collaboration** and should **allow Europe to continue to play a leading role in the field**."*
- The ESG should take into consideration:
 - The **input of the particle physics community**;
 - The **status of implementation of the 2020 Strategy update**;
 - The **accomplishments over recent years**, including the results from the LHC and other experiments and facilities worldwide, the progress in the construction of the High-Luminosity LHC, the outcome of the Future Circular Collider Feasibility Study, and recent technological developments in accelerator, detector and computing;
 - **The international landscape of the field**
- *The Strategy update should include the **preferred option** for the next collider at CERN and **prioritised alternative options** to be pursued if the chosen preferred plan turns out not to be feasible or competitive.*



K. Jakobs, KET meeting, Bad Honnef, 21st November 2024

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[link to full document](#) of remit

ECFA guidelines for national input

Paris Sphicas, ECFA Chair

- ECFA has proposed a set of guidelines for the national inputs
 - preferred collider project?
 - most important elements?
 - couple of if-statements

- last week we agreed to provide answers to these questions

ECFA guidelines / questions

- a) Which is the preferred next major/flagship collider project for CERN?
- b) What are the most important elements in the response to (a)?
 - i) Physics potential
 - ii) Long-term perspective
 - iii) Financial and human resources: requirements and effect on other projects
 - iv) Timing
 - v) Careers and training
 - vi) Sustainability
- c) Should CERN/Europe proceed with the preferred option set out in (a) or should alternative options be considered:
 - i) if Japan proceeds with the ILC in a timely way?
 - ii) if China proceeds with the CEPC on the announced timescale?
 - iii) if the US proceeds with a muon collider?
 - iv) if there are major new (unexpected) results from the HL-LHC or other HEP experiments?
- d) Beyond the preferred option in (a), what other accelerator R&D topics (e.g. high-field magnets, RF technology, alternative accelerators/colliders) should be pursued in parallel?
- e) What is the prioritised list of alternative options if the preferred option is not feasible (due to cost, timing, international developments, or for other reasons)?
- f) What are the most important elements in the response to (e)? (The set of considerations in (b) should be used).

[link to ECFA guidelines](#)

Goal of this workshop

let's reach consensus on:

- our preferred option for the next collider flagship project at CERN
- our priorities of alternative options for a few scenarios
 - if-‘not feasible’, if ‘ILC@Jpn’, if ‘CEPC@Ch’, if ‘MC@US’, ...

reaching this goal is crucial for the future of our field

Structure of this workshop - 1

Wednesday afternoon

	Introduction	
	Auditorium (Bdg. 5), DESY	13:30 - 13:45
14:00	Higgs	Margarete Muehleitner
	Auditorium (Bdg. 5), DESY	13:45 - 14:30
	Top	Michal Czakon
	Auditorium (Bdg. 5), DESY	14:30 - 15:00
15:00	EW precision	Stefan Dittmaier
	Auditorium (Bdg. 5), DESY	15:00 - 15:30
	Direct searches	Georg Weiglein
	Auditorium (Bdg. 5), DESY	15:30 - 16:00
16:00	Discussion	
	Auditorium (Bdg. 5), DESY	16:00 - 16:30
	Coffee break	
	Foyer, Bdg. 5	16:30 - 17:00
17:00	QCD	Sven-Olaf Moch
	Auditorium (Bdg. 5), DESY	17:00 - 17:20
	Flavour	Guidrun Hiller
	Auditorium (Bdg. 5), DESY	17:20 - 17:40
	Hadron spectroscopy	Mikhail Mikhasenko
	Auditorium (Bdg. 5), DESY	17:40 - 18:00
18:00	QCD phase diagram, high density QCD	Urs Wiedemann
	Auditorium (Bdg. 5), DESY	18:00 - 18:20
	Discussion	
	Auditorium (Bdg. 5), DESY	18:20 - 18:50
19:00	Reception/dinner	
20:00		
21:00	DESY canteen extension	19:00 - 21:00

■ ‘physics talks’

- what’s the impact of research in the respective field on the big questions?

• comparison of physics performance of proposed colliders

- FCC, LC, LHeC, medE–hh, MuC, ...
- What’s the added value compared to HL-LHC and CEPC/SPPC

■ 30’ slots for discussions

■ dinner in DESY canteen

Structure of this workshop - 2

Thursday morning

	LHC, HL-LHC (including Alice3 and LHCb upgrades)	Stephanie Hansmann-Menzemer
09:00	Auditorium (Bdg. 5), DESY	08:30 - 09:15
	Belle II - Upgrade	Florian Bemmlechner
	Auditorium (Bdg. 5), DESY	09:15 - 09:35
	LHeC, EIC (FCC-eh)	Christian Schwanenberger
	Auditorium (Bdg. 5), DESY	09:35 - 09:55
10:00	Discussion	
	Auditorium (Bdg. 5), DESY	09:55 - 10:25
	Conference photo: Conference photo in front of the Auditorium, DESY	10:25 - 10:30
	Coffee break	
	Foyer, Bdg. 5	10:30 - 11:00
11:00	High Field Magnets and scenarios for future hadron colliders	Frank Zimmermann
	Auditorium (Bdg. 5), DESY	11:00 - 11:25
	Muon collider	Daniel Schulte
	Auditorium (Bdg. 5), DESY	11:25 - 11:50
	Plasma acceleration	Matthew Wing
12:00	Auditorium (Bdg. 5), DESY	11:50 - 12:15
	Discussion	
	Auditorium (Bdg. 5), DESY	12:15 - 12:45
13:00	Lunch break	

Thursday afternoon

		12:45 - 13:45
14:00	FCC (ee, hh, eh)	Frank Simon
	Auditorium (Bdg. 5), DESY	13:45 - 14:30
	CEPC/SPPC	Joao Guimaraes da Costa
	Auditorium (Bdg. 5), DESY	14:30 - 15:00
15:00	LC (ILC, CLIC, HALHE, ...)	Benno List
	Auditorium (Bdg. 5), DESY	15:00 - 15:45
	Discussion	
16:00	Auditorium (Bdg. 5), DESY	15:45 - 16:25
	Coffee break	
	Foyer, Bdg. 5	16:25 - 16:55
17:00	Goals and constraints of Strategy Process	Karl Jakobs
	Auditorium (Bdg. 5), DESY	16:55 - 17:15
	Experience with projects in China	Wolfgang Gradi
	Auditorium (Bdg. 5), DESY	17:15 - 17:35
	Discussion	
	Auditorium (Bdg. 5), DESY	17:35 - 18:05
18:00	General discussion of strategy input	Johannes Haller, Prof. Lutz Feld
	Auditorium (Bdg. 5), DESY	18:05 - 18:55
19:00	Dinner	
	Closed session: Drafting session for a first attempt of a prioritization Jenny List, Johannes Haller, Prof. Lutz Feld	
20:00		
21:00		
	DESY canteen extension	19:00 - 22:00
	großer Gästesperaum, DESY	19:00 - 22:00

■ 'facility talks'

- focus on political aspects: costs, timing, critical R&D, organisation, German interests, political situation world-wide, sustainability, ...

■ 30' slots for discussions

questionnaire

■ general discussion

■ evening:

- for some: dinner
- for others: drafting session of WS summary document by program committee

Structure of this workshop - 3

Friday morning

09:00	Detector R&D <i>Auditorium (Bdg. 5), DESY</i>	<i>Ingrid-Maria Gregor</i> 08:30 - 09:00
	Theory (MC generators) <i>Auditorium (Bdg. 5), DESY</i>	<i>Steffen Schumann</i> 09:00 - 09:30
10:00	Computing, Data Analysis Tools, AI <i>Auditorium (Bdg. 5), DESY</i>	<i>Lukas Heinrich</i> 09:30 - 10:00
	Discussion <i>Auditorium (Bdg. 5), DESY</i>	10:00 - 10:30
11:00	Coffee break <i>Foyer, Bdg. 5</i>	10:30 - 11:00
	General discussion of strategy input: First draft of WS summary <i>Auditorium (Bdg. 5), DESY</i>	<i>Johannes Haller, Prof. Lutz Feld</i> 11:00 - 13:30
12:00		
13:00		

- early morning:
 - cross-cutting activities
 - 30' discussion
- Fr 11h: 2.5h plenary discussion of document draft

The questionnaire

- on Thu afternoon we plan to open a survey in INDICO
 - a PDF-file is already uploaded
 - please form your own opinion on the 18 questions during the workshop
 - fill the survey once it is opened
- open discussion of survey results on Thu ~6.00 pm

- it's not a vote!
- hope that some conclusions can be drawn to come to a consensus
- input to the drafting session

KET-Collider-WS

Questionnaire:

Personal questions:

1. What's your age:
 - <30
 - 30-39
 - 40-49
 - 50-59
 - ≥60
 - Don't know
2. What is your current main area of research (you can tick multiple options)
 - LHC
 - Belle-II
 - Non-collider experiments
 - Theory
 - Data analysis
 - Detector R&D
 - Computing
 - LC
 - FCC
 - Other
 - don't know
3. For which type of institution are you working?
 - For a university
 - For a research centre or a Max-Planck institute
 - Other
 - don't know

General questions on decision of next flagship project at CERN

4. Do you consider a next flagship project at CERN?
 - Yes
 - No
 - don't know
5. Do you consider the following for CERN? (you can tick multiple options)
 - on-site collider
 - on-site non-collider
 - off-site collider project
 - off-site non-collider project
 - don't know

INDICO Survey
opening: Thu ~4.00pm
closing: Thu ~5.30pm

- time is very limited!
 - presenters: please stay in time!
 - discussion: focus on questions relevant for a strategy discussion !
- **reminder: further information** (e.g. access to the questionnaire, the workshop summary) **will only be sent to registered people**
 - late-comers can contact matthias.schroeder@uni-hamburg.de

people in ZOOM-land:

- please raise your hand before speaking → ZOOM scout
- use the chat only in case of technical problems
- don't use it for discussions on the subject itself

Practicalities - 2

- for the 30' slots of discussion, we use the Slido tool
- interactive tool to foster discussions
- several ways of accessing
 - a) use QR code (also INDICO)
 - b) use the #code at slido.com
- usage options:
 - a) propose a new question
 - b) vote for questions which you find interesting
- question with highest rank will be discussed in plenary

Join at
slido.com
#2808 635





Code of Conduct

The organizers are committed to making this meeting productive and enjoyable for everyone, regardless of gender, sexual orientation, disability, physical appearance, body size, race, nationality or religion. We will not tolerate harassment of participants in any form. Please follow these guidelines:

- Behave professionally. Harassment and sexist, racist, or exclusionary comments or jokes are not appropriate. Harassment includes sustained disruption of talks or other events, inappropriate physical contact, sexual attention or innuendo, deliberate intimidation, stalking, and photography or recording of an individual without consent. It also includes offensive comments related to gender, sexual orientation, disability, physical appearance, body size, race or religion.
- All communication should be appropriate for a professional audience including people of many different backgrounds. Sexual language and imagery is not appropriate.
- Be kind to others. Do not insult or put down other attendees.

Participants asked to stop any inappropriate behaviour are expected to comply immediately. Attendees violating these rules may be asked to leave the event at the sole discretion of the organisers.

- Our task for the next two days:

let's reach consensus on:

- our preferred option for the next collider flagship project at CERN
- our priorities of alternative options for a few scenarios
 - if 'not feasible', if 'ILC@Jpn', if 'CEPC@Ch', if 'MC@US', ...

- looking forward to a productive workshop !