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ORGANISATION EUROPÉENNE POUR LA RECHERCHE NUCLÉAIRE  
**CERN** EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

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PLENARY ECFA

112th meeting

24 August 2023

Draft Minutes



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**LIST OF PARTICIPANTS**

<b>Chair:</b>	K. Jakobs	Germany
<b>Secretary:</b>	P. Conde Muíño	Portugal
<b>Members:</b>	E. Adli	Norway
	G. Bernardi	France
	D. Bettoni	Italy
	D. Bortoletto	United Kingdom
	L. Brenner	ECR Panel
	P. Campana	Italy
	A. Cardini	Italy
	S. Caron	Netherlands
	B. Clerbaux	Belgium
	M. Cobal	Italy
	D. Contardo	France
	M. Dam	Denmark
	A. De Cosa	Switzerland
	S. De Curtis	Italy
	M. Delmastro	France
	A. Dobrin	Romania
	B. Erazmus	France
	S. Farrington	United Kingdom
	A. Ferrari	Sweden
	E. Gallo	Germany
	E. Gross	Israel
	Z. Hubacek	Czech Republic
	U. Husemann	Germany
	C. Joram	CERN
	H. Lacker	Germany
	A. Lucotte	France
	V. Manzari	Italy
	C. Martínez Rivero	Spain

	C. Meroni	Italy
	M. Mikuž	Slovenia
	S. Plätzer	Austria
	A. Robson	United Kingdom
	F. Siklér	Hungary
	P. Sphicas	Greece
	N. Tuning	Netherlands
	L. Vacavant	France
	C. Vallée	France
	M. Vos	Spain
	M. Voutilainen	Finland
	M. Weber	Switzerland
	M. Wing	United Kingdom
	J. Zalesak	Czech Republic
<b>Ex officio:</b>	J. Mnich	CERN
	T. Akesson	Former ECFA Chair
	H. Abramowicz	Former ECFA Chair
	J. D'Hondt	Former ECFA Chair
	B. Foster	Former ECFA Chair
<b>Invited:</b>	M. Benedikt	CERN
	B. Heinemann	DESY
	A. Ilg	ECR Panel
	J. List	DESY
	G. Marchiori	APC-Paris
	N. Pastrone	INFN
<b>Observers:</b>	F. Maltoni	EPS-HEP Chair
	United States	Y.-K. Kim

**Other attendees:** I. Alekseev, J. Alimena, P. Allport, P. Azzi, J. Bach, M. Bahmani, L. Benato, T. Bergauer, M. Borysova, M. Chen, A. Colaleo, S. De Capua, J. Dutta, Y.

Fisher, R. Forty, F. Goertz, K. Hidaka, P. Janot, F. Januscheck, E. Jones, H. Kirschenmann, J. Klein, M. Komm, M. Krab, R. Kumar, Q. Li, A. Macchiolo, T. Madlener, N. Nicassio, C. Parkes, M. Pierini, H. Qi, G. Salam, F. Sefkow, M.-F. Sevilla, A. Shah, D. Stafford, B. Stapf, S. Stapnes, N. Styles, V. Tioukov, M. Titov, A. Velyka, J. Wang, M. Wolf





The meeting (held in hybrid mode) was called to order at 4.45 p.m. on Thursday, 24 August 2023.

1. INTRODUCTION BY THE ECFA CHAIR

(Item 1 of the agenda)

The CHAIR welcomed the members and presented<sup>1</sup> his opening remarks, highlighting ECFA's ongoing activities in connection with the 2020 update of the European Strategy for Particle Physics, notably the ECFA Initiative on Physics, Experiments and Detectors at a Future  $e^+e^-$  Factory and the implementation of the ECFA Detector R&D Roadmap, together with an overview of the work of the ECFA Early-Career Researchers Panel and the outcomes of the May 2022 joint ECFA–NuPECC–APPEC seminar in Madrid and the JENA Computing Workshop in Bologna in June 2023.

The Committee took note of the introduction by the Chair.

2. THE FCC FEASIBILITY STUDY

(Item 2 of the agenda)

BENEDIKT (CERN) presented<sup>2</sup> a status report on the FCC Feasibility Study, highlighting the timeline and main milestones for the Study itself and for the mid-term review, the placement and layout of the machine, communication with the authorities in each of the French and Swiss municipalities located along the path of the tunnel and with the local media in both countries, connections to the electrical grid and transport infrastructure, ongoing R&D on various aspects of accelerator layout and design, the main machine parameters for the FCC-ee and the FCC-hh and the status of the global FCC collaboration, which had recently met in London for FCC Week 2023.

In reply to a question from PIERINI (CERN) concerning the sociological impact of constructing three of the four FCC-ee experiments at a great distance from CERN, BENEDIKT said that LEP and the LHC had presented a similar difficulty, although on a smaller scale. The locations of the experiments for both the FCC-ee and the FCC-hh were still being discussed, as was the question of whether the entire infrastructure should be operated from the present CERN

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<sup>1</sup> See Indico:

[https://indico.desy.de/event/34916/contributions/142197/attachments/84418/111855/Introduction\\_ECFA-EPS\\_2023.pdf](https://indico.desy.de/event/34916/contributions/142197/attachments/84418/111855/Introduction_ECFA-EPS_2023.pdf)

<sup>2</sup> See Indico:

[https://indico.desy.de/event/34916/contributions/142198/attachments/84437/111884/230824\\_FCC-FS-Status-ap.pdf](https://indico.desy.de/event/34916/contributions/142198/attachments/84437/111884/230824_FCC-FS-Status-ap.pdf)

site or whether it would be better to construct one or more additional support facilities or campuses in Haute-Savoie, for example near La Roche-sur-Foron or Annecy, close to Laboratoire d'Annecy de Physique des Particules (LAPP).

In reply to a question from VOS (IFIC-Valencia), BENEDIKT said that reducing the circumference of the tunnel from 100 km to 90.7 km would result in only a minor decrease in the luminosity achievable with the FCC-ee.

In reply to a question from GOERLACH (University of Strasbourg), BENEDIKT said that lepton-hadron running was a valid option in the long term and was being studied by a working group but, since it would not be possible before the 2070s, following the construction of the FCC-hh, it was currently being given lower priority than studies relating to the FCC-ee.

The Committee took note of the presentation by Benedikt and of the additional information that he provided during the discussion.

### 3. STATUS OF $e^+e^-$ HIGGS FACTORY PROJECTS

(Item 3 of the agenda)

LIST (DESY) presented<sup>3</sup> a status report on  $e^+e^-$  Higgs factory projects, covering the physics case, the key contenders in the field, namely the ILC, CLIC, the CEPC, the FCC-ee, the Cool Copper Collider and HALHF, a selection of recent technological and organisational developments and information on sustainability.

In reply to a question about the feasibility of research infrastructures producing their own energy, LIST remarked that other institutes might benefit from following the example of the European Spallation Source, which was equipped with solar panels. However, a research organisation actually running an electrical network and thus becoming its own energy provider would be an enormous challenge, particularly given the inconsistent power consumption of an accelerator. It was certainly important that any institute planning a new facility should collaborate closely with the relevant energy providers, as CERN was currently doing in the context of the FCC Feasibility Study.

In reply to a question from the CHAIR, LIST said that, to the best of her knowledge, the FCC collaboration had not yet studied the polarisation of colliding particle bunches, but the

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<sup>3</sup> See Indico:  
[https://indico.desy.de/event/34916/contributions/142199/attachments/84420/111868/jlist\\_higgsfact\\_epshep23.pdf](https://indico.desy.de/event/34916/contributions/142199/attachments/84420/111868/jlist_higgsfact_epshep23.pdf)

results of the CEPC collaboration's recent simulations were promising and could perhaps also be applied to the FCC.

In reply to a question from PIERINI (CERN), LIST explained that the LEP3 project was generally no longer considered to be a key contender, and had not been for several years, because its comparatively small tunnel circumference would make it more difficult to reach interesting luminosities. In addition, the LHC tunnel would need time to cool down before LEP3 could be installed, whereas the FCC tunnel could be excavated and the machine constructed and fully installed while the LHC was still running, thereby minimising the gap between the two machines. Finally, LEP3 would be limited to a lepton stage only, because the high-field magnets needed for a future hadron collider would be too large to fit into the existing tunnel.

The Committee took note of the presentation by List and of the additional information that she provided during the discussion.

#### 4. ECFA STUDY ON $e^+e^-$ HIGGS FACTORIES

(Item 4 of the agenda)

MARCHIORI (APC-Paris) presented<sup>4</sup> a report on the ECFA study on future  $e^+e^-$  factories, outlining the mandate and goals of the study group, the activities of the Physics Potential, Physics Analysis Methods and Detector (R&D) working groups, the second ECFA workshop on  $e^+e^-$  Higgs, electroweak and top factories, which would be held in Paestum, Italy, on 11–13 October, and the progress made so far towards the study group's final report, which would be published in spring 2025 and submitted as input for the next update of the European Strategy for Particle Physics.

The CHAIR, noting that the workshop on  $e^+e^-$  Higgs, electroweak and top factories presented an excellent opportunity to explore a series of interesting topics, expressed the hope that it would be attended by not only the  $e^+e^-$  community but also by individuals working on Higgs physics and analysis in the LHC experiments and on flavour physics at experiments such as LHCb and BABAR.

MARCHIORI emphasised that, although the topical meetings and workshops held so far had been attended by representatives of competing experiments, the atmosphere had always been extremely collaborative and positive. The hope now was to encourage more people to join the three working groups.

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<sup>4</sup> See Indico:

[https://indico.desy.de/event/34916/contributions/142200/attachments/84434/111891/2023\\_08\\_24%20-%20EPSHEP2023%20-%20ECFA%20study%20on%20ee%20factories.pdf](https://indico.desy.de/event/34916/contributions/142200/attachments/84434/111891/2023_08_24%20-%20EPSHEP2023%20-%20ECFA%20study%20on%20ee%20factories.pdf)

In reply to PASTRONE (INFN), who observed that it might be beneficial to involve the muon collider community in the work on generators and detector R&D for future  $e^+e^-$  colliders, MARCHIORI said that contributions from parties outside the  $e^+e^-$  community would be useful in certain areas, such as software, where potential synergies with muon colliders were being explored: notably, the Key4HEP software stack was being adapted for use in muon colliders. However, to enable the study group to address all aspects of its mandate fully, it would need to limit the participation of other communities to contributions on specific points, rather than inviting them to participate in the study as a whole.

The CHAIR, reiterating that the study group would doubtless appreciate contributions from the muon collider community on topics of common interest and adding that duplicating the work would be a waste of resources, said that the study would clearly be unable to address every single topic pertaining to future  $e^+e^-$  factories, so the individual collaborations would need to continue their own studies in parallel.

PASTRONE said that she fully agreed with the Chair's remarks.

The Committee took note of the presentation by Marchiori and of the additional information that he provided during the discussion.

## 5. THE ECFA EARLY-CAREER RESEARCHERS PANEL (Item 5 of the agenda)

ILG (ECR Panel) presented<sup>5</sup> an update on the ECFA Early-Career Researchers (ECR) Panel, highlighting its mandate and composition and the activities of its various working groups in 2021, 2022 and 2023.

In reply to a question about the inclusion of accelerator scientists in the ECR Panel's activities, the CHAIR said that, although ECFA's Detector R&D Roadmap and the Accelerator R&D Roadmap of the LDG (Large Particle Physics Laboratory Directors Group) were separate endeavours, they were closely connected and it had been agreed with the LDG that the ECFA Training Panel currently being set up under General Strategic Recommendation 8 of the Detector R&D Roadmap would seek to improve the training provided for people working on both accelerator and detector R&D. A report on the Panel's creation and mandate would be presented at the November PECFA meeting.

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<sup>5</sup> See Indico:  
[https://indico.desy.de/event/34916/contributions/142201/attachments/84409/111883/ECFA%20ECR%20Panel\\_EPS-HEP2023\\_Armin%20Ilg.pdf](https://indico.desy.de/event/34916/contributions/142201/attachments/84409/111883/ECFA%20ECR%20Panel_EPS-HEP2023_Armin%20Ilg.pdf)

The Committee took note of the presentation by Ilg and of the additional information that he provided during the discussion.

6. ECFA DETECTOR R&D ROADMAP

(Item 6 of the agenda)

CONTARDO (IP2I CNRS/IN2P3) presented<sup>6</sup> a report on the Detector Research and Development (DRD) collaborations set up under the auspices of the ECFA Detector R&D Roadmap, highlighting their organisational structure, the financial and human resources allocated to them and an overview of their scientific programmes.

In reply to a question from CONDE MUÍÑO (LIP), CONTARDO said that the size of each DRD collaboration was an accurate reflection of the size of the community working on the topic in question, and the R&D areas covered generally reflected the needs of each community, although certain topics, such as drift chambers and 3D interconnection, might need to be given more prominence once the R&D requirements had been more clearly defined.

The Committee took note of the presentation by Contardo and of the additional information that he provided during the discussion.

The meeting rose at 7.20 p.m.

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<sup>6</sup> See Indico:  
[https://indico.desy.de/event/34916/contributions/142202/attachments/84421/111858/EPS2023\\_DC\\_2408\\_2023.pptx](https://indico.desy.de/event/34916/contributions/142202/attachments/84421/111858/EPS2023_DC_2408_2023.pptx)