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

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PLENARY ECFA  
105th meeting  
CERN – 15 November 2019

Draft Minutes



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## LIST OF PARTICIPANTS

<b>Chair:</b>	J. D'Hondt	Belgium
<b>Secretary:</b>	C. Lacasta Llacer	Spain
<b>Attendees:</b>	E. Adli	Norway
	P. Adžić	Serbia
	U. Bassler	CERN
	S. Bentvelsen	Netherlands
	J. Bielcikova	Czech Republic
	F. Blanc	Switzerland
	D. Boumediene	France
	A. Bragadireanu	Romania
	J-C. Brient	France
	P. Burrows	United Kingdom
	P. Campana	INFN
	S. Çetin	Turkey
	P. Conde Muíño	Portugal
	M. Dam	Denmark
	T. Davidek	Czech Republic
	E. Elsen	CERN
	R. Forty	CERN
	T. Gehrmann	EPS-HEPP Chair
	E. Gross	Israel
	R. Harlander	Germany
	P. Iaydjiev	Bulgaria
	M. Jeitler	Austria
	M. Klein	United Kingdom
	K. Lassila-Perini	Finland
	P. Levai	Hungary
	M. Lewitowicz	NuPECC Chair
	B. Lund-Jensen	Sweden
	V. Manzari	Italy
	L. Masetti	Germany
	I. Melzer-Pellmann	Germany
	M. Merk	Netherlands
	M. Mikuž	Slovenia
	E. Nappi	Italy

V. Okorokov	JINR
R. Pasechnik	Sweden
N. Pastrone	Italy
A. Read	Norway
C. Schwanda	Austria
M. Seidel	Switzerland
D. Šijacki	Serbia
S. Sultansoy	Turkey
M. Taševský	Czech Republic
N. Van Remortel	Belgium
G. Veres	Hungary
M. Voutilainen	Finland
A. Zarnecki	Poland
M. Zeyrek	Turkey



The meeting was called to order at 1.30 p.m. on Friday, 15 November 2019.

1. ADOPTION OF THE DRAFT AGENDA

(Item 1 of the Agenda) (ECFA/RC/19/487/Draft)

The Agenda (ECFA/RC/19/487) was adopted.

2. APPROVAL OF THE DRAFT MINUTES OF THE 103RD MEETING OF PLENARY ECFA HELD AT CERN ON 15 AND 16 NOVEMBER 2018

(Item 2 of the Agenda) (ECFA/RC/18/309/Draft)

The Minutes of the 103rd meeting of Plenary ECFA (ECFA/RC/18/309/) were approved.

3. REPORT FROM THE ECFA CHAIR

(Item 3 of the Agenda)

The CHAIR presented<sup>1</sup> a report covering the schedule for PECFA and RECFA meetings in 2020, including the PECFA meeting that would be held at JINR in Dubna, Russia, in July; the first ever Joint ECFA-NuPECC-ApPEC Seminar (JENAS), which had taken place in October; the agenda for the Early-Career Researchers and the European Strategy for Particle Physics (ESPP) event that had begun that morning and was continuing in the afternoon in parallel with the present meeting; and the ECFA Newsletters, which were available on the Committee's website. He noted that the ESPP update process was on schedule and gave an overview of the main themes that had been discussed at the Open Symposium in Granada and the future collider scenarios that were under consideration by the European Strategy Group (ESG). He then presented the list of outgoing and incoming members of Plenary ECFA and representatives to Restricted ECFA.

The Committee unanimously endorsed the appointment of the following new or renewed members of PECFA:

- M. Weber of Austria, replacing E. Widmann;
- T. Lappi of Finland, replacing K. Rummukainen;

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<sup>1</sup> See Indico:

<https://indico.cern.ch/event/847002/contributions/3579903/attachments/1945643/3228008/PECFA-chair-report-CERN-Nov2019.pdf>

- J-L. Biarrotte, S. Bousson, C. Collard, D. Contardo, A. Stocchi, L. Vacavant and C. Vallée of France, replacing A. Djannati-Atai, S. Gascon-Shotkin, E. Kajfasz, A. Lucotte, L. Poggioli and M. Winter;
- G. Bernardi, D. Boumediene, G. Hamel de Monchenault and O. Napoly of France (renewed);
- E. Garutti of Germany (renewed);
- S. Djordje of Serbia (renewed);
- D. Della Volpe of Switzerland (renewed).

The Committee unanimously endorsed the appointment of the following new RECFA country representatives, who would also be PECFA members:

- J-C. Brient of France, replacing G. Wormser;
- P. Schleper of Germany (renewed);
- P. Adžić of Serbia (renewed).

The Committee took note that Y.-K. Kim had been appointed as the USA's representative to PECFA, replacing J. Incandela, and that T. Gehrman, the new Chair of EPS-HEPP, would replace B. Erazmus in RECFA.

Finally, the CHAIR informed the Committee with regret that Professor Karlheinz Meier, ECFA Chair between 2007 and 2009, had passed away on 24 October 2018.

The Committee observed a minute of silence in honour of Professor Meier.

In reply to a question from SULTANSOY (TOBB ETÜ) regarding the possibility of constructing the LHeC without energy recovery linacs so that the circular tunnel could be reused for a muon or muon-proton collider, the CHAIR said that a number of parameters had to be taken into account when constructing a muon collider, including the necessity of placing it half a kilometre below the surface to avoid the neutrino hazard. Moreover, energy recovery linacs were more cost-efficient than a 9 km tunnel with conventional magnets.

In reply to a question from KLEIN (University of Liverpool), the CHAIR said that the Japanese delegation had presented an update on the status of the ILC project at most of the ESG meetings so far. The Science Council of Japan was in the process of deciding whether or not to approve the project and aimed to reach a decision by March 2020; if it were given the green



light, the project would be considered by the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT) and integrated into a roadmap or master plan, which would then be resource-loaded.

NAKADA (EPFL) added that, if the Science Council of Japan approved the ILC project, the MEXT roadmap could, in principle, be expected to be published in summer 2020, but the discussions leading up to that point were likely to be protracted and the timeline could not be guaranteed.

In reply to a further comment from NAKADA, who observed that if, for example, the ILC or CepC were approved or new physics were found at 500 GeV, discussions would need to be held in Europe well before the next ESPP update in seven years' time, the CHAIR said that the simplified timeline shown on slide 53 of his presentation did not preclude other deliberations from being scheduled in the meantime.

NAKADA added that it was important to be clear that the question was not whether new physics existed but at what energy scale it could be found.

In reply to a question from IAYDJIEV (INRNE-Sofia) about ECFA's role in the ESPP update, the CHAIR said that ECFA had provided information and stimulation to the community throughout the process, notably through its 2019 survey on individual recognition; its nomination of four members of the Physics Preparatory Group (PPG); the Higgs and Future Colliders working group; the PECFA meeting held during the EPS-HEP conference in July 2019; and the early-career researchers debate taking place that day. However, ECFA as a body would not provide input to the ESG: ECFA members wishing to express their opinions on aspects of the Strategy should approach their national delegate, who would take their views into account during the discussions at the Strategy Drafting Session in Bad Honnef in January.

In reply to questions from LEVAI (MTA Wigner RCP), the CHAIR said that it was unlikely that second-generation technologies, such as 16 T magnets, would be ready for use in a first-generation collider, such as the HE-LHC, because the R&D would probably take ten years, followed by another ten years for the industrialisation process. Moreover, replacing low-field magnets with higher-field ones in the LHC tunnel would require major expenditure and would probably not result in significant progress in Higgs sector exploration.

In reply to a question from ADŽIĆ (University of Belgrade), the CHAIR said that running two major collider facilities, such as CLIC and the FCC-ee, simultaneously at CERN was probably not feasible, due to the resultant strain on both financial and human resources.

ELSEN (CERN) remarked that the ILC and the FCC were compatible and could be operated contemporaneously.

The Committee took note of the Chair's report and of the additional information provided during the discussion.

#### 4. STATUS OF ERL TECHNOLOGY FOR FUTURE COLLIDERS

(Item 4 of the Agenda)

BRÜNING (CERN) presented<sup>2</sup> a report on the status of energy recovery linac (ERL) technologies for future colliders, summarising their evolution over the past fifty years and their potential applications in high-energy accelerators.

In reply to questions from SULTANSOY (TOBB ETÜ), BRÜNING said that the total power of the electron beam under the "LHeC with the HL-LHC" scenario shown on slide 12 could be calculated by multiplying the 60 GeV electron beam energy by the beam current. The latter had a design value of 15 mA in the TDR, but it was hoped that it could be pushed to 25 mA if the LHeC, which was designed to initially be operated parasitically alongside the HL-LHC, could be run more independently after the first operation period and the electron beam parameters thus adjusted. The two main drains on the LHeC's power supply were the superconducting RF cooling systems and synchrotron radiation, and the machine's overall energy consumption would be 100 MW under every proposed scenario.

In reply to a further comment from SULTANSOY, who said that it might be useful to revisit the original ERL proposal put forward by M. Tigner in 1965, BRÜNING said that the main purpose of his presentation had been to demonstrate to ECFA the merits of ERL technologies and that it was always worth considering ways in which they could be put to use.

In reply to a question from BENTVELSEN (Nikhef), BRÜNING said that a proposal had been put forward at FCC Week 2019 to integrate ERLs into the FCC-ee, thus significantly boosting the machine's performance in high-energy mode, as well as its efficiency, since ERL injectors could operate in top-up mode up to W energies. The proposal needed to be studied in more detail in order to determine its viability and implications, but it was a good demonstration of the potential of energy recovery technology.

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<sup>2</sup> See Indico:

<https://indico.cern.ch/event/847002/contributions/3610583/attachments/1945110/3228150/ECFA-CERN-V4.pptx>

In reply to questions from BENTVELSEN and the CHAIR, BRÜNING said that, under the proposed ERL-based FCC-ee configuration, the beams would be boosted by the ERLs to the highest possible energy just before the collision point and the energy recovered immediately after the collision. During the subsequent recirculating phase, the energy would be lower again, resulting in reduced synchrotron radiation. The recovered energy could then be used either to boost the machine's performance or to reduce its power consumption.

In reply to a further comment from the floor, BRÜNING confirmed that an ERL-based FCC-ee would have the potential to operate at 550 rather than 365 GeV, thanks to the boost of 90 GeV from each of the two long linacs; it would then be possible to study the Higgs triple coupling.

In reply to questions from MERK (Nikhef), BRÜNING said that, although the push-pull configuration shown on slide 7 was very efficient, it had two disadvantages, namely the cost, since it would require two linacs, and the fact that only pulsed operation would be possible, due to the need to avoid collisions between accelerating and decelerating beams passing through the same structures in opposite directions; by contrast, the recirculating linac configuration could be operated in continuous wave mode, with a beam every 25 nanoseconds.

The Committee took note of the presentation by Brüning and of the additional information provided during the discussion.

## 5. REPORT FROM CERN

(Item 5 of the Agenda)

ELSEN (CERN) presented<sup>3</sup> a report on activities at CERN, covering the status of geographical enlargement, the progress made to date on the Science Gateway project, some recent physics highlights, the work under way on the accelerators and experiments during Long Shutdown 2 (LS2) and on the Phase II detector upgrades, plans to revisit the LS2 schedule and the duration of Run 3, and an update on the ProtoDUNE detectors at the Neutrino Platform.

In reply to a question from SULTANSOY (TOBB ETÜ) about medical applications, ELSEN said that the MEDICIS facility had encountered some delays due to funding uncertainties, but that the situation had now been resolved and the facility was available in principle, although it was not operational during LS2. ISOLDE also had interesting plans and would hold a meeting later that month to discuss future projects.

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<sup>3</sup> See Indico:

[https://indico.cern.ch/event/847002/contributions/3579905/attachments/1945662/3228061/Report\\_from\\_CERN.pdf](https://indico.cern.ch/event/847002/contributions/3579905/attachments/1945662/3228061/Report_from_CERN.pdf)

The Committee took note of the presentation by Elsen and of the additional information provided during the discussion.

## 6. REPORT FROM DESY

(Item 6 of the Agenda)

GALLO (DESY) presented<sup>4</sup> news from DESY, highlighting the status of PETRA III and IV and the European XFEL; the DESY-2030 strategy and funding; the Science City Bahrenfeld project; and recent particle physics activities, including German contributions to the LHC experiment upgrades, Belle II and ALPS II; and the progress being made on planning for the new Wolfgang Pauli Centre.

In reply to a question from KLEIN (University of Liverpool), GALLO said that the Wolfgang Pauli Centre was so named because Wolfgang Pauli had taught in Hamburg; a room had also been named after him at the Jungiusstraße campus of the University of Hamburg's Institute of Theoretical Physics.

In reply to questions from LEWITOWICZ (GANIL/NuPECC), GALLO said that the Wolfgang Pauli Centre was both a new centre and a new building. The aim was to bring together under one roof all of the University of Hamburg's theoretical physicists, who were presently spread out between Building 2 on the DESY site, another building some 300 metres away and the Jungiusstraße campus in central Hamburg, as well as many collaborating partners. The Centre would have three floors and provide offices for a few hundred people, open working spaces and areas for visiting scientists.

The Committee took note of the presentation by Gallo and of the additional information provided during the discussion.

## 7. REPORT FROM FRASCATI

(Item 7 of the Agenda)

CAMPANA (LNF-INFN) presented<sup>5</sup> a report on recent activities at the Frascati Laboratory, including updates on the status of DAΦNE, PADME and the Beam Test Facility, the progress made on detector construction for the ALICE and ATLAS experiment upgrades,

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<sup>4</sup> See Indico:

[https://indico.cern.ch/event/847002/contributions/3579906/attachments/1945577/3227890/ECFA\\_DESY\\_2019.pptx](https://indico.cern.ch/event/847002/contributions/3579906/attachments/1945577/3227890/ECFA_DESY_2019.pptx)

<sup>5</sup> See Indico:

[https://indico.cern.ch/event/847002/contributions/3579907/attachments/1945610/3227935/Campana\\_20191115\\_PEcfa.pdf](https://indico.cern.ch/event/847002/contributions/3579907/attachments/1945610/3227935/Campana_20191115_PEcfa.pdf)

plans to reuse components of the KLOE detector in the DUNE experiment at Fermilab and an update on the EuPRAXIA project.

The Committee took note of the presentation by Campana.

#### 8. MID-TERM REPORT FROM PORTUGAL

(Item 8 of the Agenda)

CONDE MUÍÑO (LIP) presented<sup>6</sup> the mid-term report on the status of particle physics in Portugal since the last visit of Restricted ECFA, covering research funding, the main fields of study of Portuguese researchers and their scientific output, Portuguese involvement in experiments at CERN and elsewhere, steps being taken to improve Portugal's industrial return from CERN, educational programmes and workshops and Portugal's vibrant and diverse outreach programme.

In reply to the CHAIR, who remarked that, at the time of RECFAs last visit to Portugal, the path from post-doc to staff member had appeared somewhat unclear, CONDE MUÍÑO said that the situation had improved since then, with post-docs now having contracts and being considered as researchers. However, the path was still not as straight as it could be and the community had further improvements in mind, which nonetheless relied on the stability of funding and political goodwill.

The Committee took note of the presentation by Conde Muíño and of the additional information provided during the discussion.

#### 9. MID-TERM REPORT FROM THE CZECH REPUBLIC

(Item 9 of the Agenda)

TAŠEVSKÝ (Czech Academy of Sciences) presented<sup>7</sup> the mid-term report on the status of particle physics in the Czech Republic since the last visit of Restricted ECFA, covering the country's strong relationship with CERN and "well balanced" industrial return; the main activities undertaken by the particle physics community, including involvement in experiments at CERN and elsewhere, detector R&D, neutrino physics, astroparticle physics, theory, computing and outreach; and a detailed breakdown of the funding situation.

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<sup>6</sup> See Indico:

[https://indico.cern.ch/event/847002/contributions/3579915/attachments/1945713/3228141/ReportPortugal\\_v4.pdf](https://indico.cern.ch/event/847002/contributions/3579915/attachments/1945713/3228141/ReportPortugal_v4.pdf)

<sup>7</sup> See Indico:

[https://indico.cern.ch/event/847002/contributions/3579908/attachments/1945698/3232999/Mid-term\\_CZ\\_Tasevsky.pdf](https://indico.cern.ch/event/847002/contributions/3579908/attachments/1945698/3232999/Mid-term_CZ_Tasevsky.pdf)

The Committee took note of the presentation by Taševský.

#### 10. MID-TERM REPORT FROM NORWAY

(Item 10 of the Agenda)

READ (University of Oslo) presented<sup>8</sup> the mid-term report on the status of particle physics in Norway since the last visit of Restricted ECFA, covering Norwegian representation at CERN and the status of industrial return, noting that the country was deemed “very poorly balanced”; the community’s involvement in experimental and theoretical physics across Europe since 2016; the progress made in addressing the concerns noted by RECFA following its visit in 2015; a new funding programme for Norwegian research at CERN; and some recent physics highlights.

In reply to questions from ADŽIĆ (University of Belgrade), READ said that the annual funding of 24.7 million Norwegian krone (NOK) for CERN-related research was allocated by the Research Council of Norway, but would be reduced to 22.9 MNOK under the 2020-2027 funding programme.

In reply to a question from SULTANSOY (TOBB ETÜ), READ said that he was not aware of any Norwegian participation in the MYRRHA project in Belgium.

The Committee took note of the presentation by Read and of the additional information provided during the discussion.

#### 11. MID-TERM REPORT FROM SWITZERLAND

(Item 10 of the Agenda)

SEIDEL (PSI) presented<sup>9</sup> the mid-term report on the status of particle physics in Switzerland since the last visit of Restricted ECFA, covering the membership and activities of the Swiss Institute of Particle Physics (CHIPP), which included involvement in accelerator R&D and experiments worldwide; the national input to the ESPP update; the efforts under way to update the Swiss Particle Physics Roadmap; the funding landscape; and outreach and education activities.

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<sup>8</sup> See Indico:

<https://indico.cern.ch/event/847002/contributions/3579919/attachments/1945674/3249233/ECFA-NorwayMidterm-2019-Read.pdf>

<sup>9</sup> See Indico:

[https://indico.cern.ch/event/847002/contributions/3579921/attachments/1945634/3227987/RECFA\\_CH\\_midterm.pptx](https://indico.cern.ch/event/847002/contributions/3579921/attachments/1945634/3227987/RECFA_CH_midterm.pptx)

In reply to a question from the CHAIR regarding RECFA's concern following its last visit to Switzerland that the numbers of technicians and engineers in the Swiss research groups might fall, SEIDEL said that he was not aware of any shortfalls at present.

In reply to ELSÉN (CERN), who remarked that Switzerland was also making considerable contributions to WLCG computing, NAKADA (EPFL) said that a Tier 2 centre had been set up at the Swiss National Supercomputing Centre in Lugano, running both a dedicated cluster and a supercomputer, which were being extensively used by the Swiss research groups, and that several Swiss universities, including PSI, had their own Tier 3 centres.

The Committee took note of the presentation by Seidel and of the additional information provided during the discussion.

## 12. OTHER BUSINESS

(Item 12 of the Agenda)

There was no other business.

The meeting rose at 5.15 p.m.