

Introduction. ECFA matters

Wishes of good health to all!

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Introduction

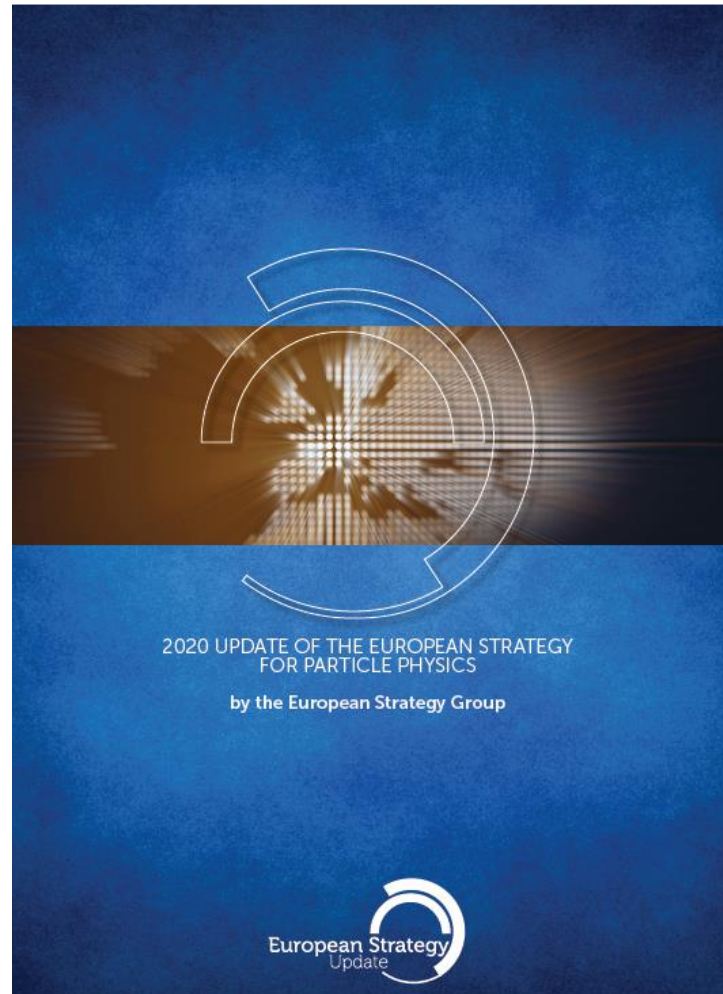
- About 10th yearly assembly of CZ HEP Community
- Usually in villa Lanna in December
- Last two years: online – due to covid-19
- Purpose: share of information & discussion
- Information about World & European & CZ HEP activities
- ECFA organizes some of them → CZ representatives in ECFA organize this assembly

Grand replacement from 1st January 2022:

Jana Bielčíková (PECFA), Tomáš Davídek (PECFA), Marek Taševský(PECFA, RECFA)

Jana Bielčíková (PECFA, RECFA), Zdeněk Hubáček (PECFA), Jar. Zálešák (PECFA)

Reminder: Update of European Strategy for Particle Physics



June 2020

Implementation of Strategy (in MTP)



2020 ESPP update: scientific priorities



FG at Council in
Sep 2020

- ❑ Full exploitation of LHC physics potential → successful completion of the high-luminosity upgrade of accelerators and experiments
- ❑ e^+e^- Higgs factory as the highest-priority next collider
- ❑ Increased R&D on accelerator technologies: high-field superconducting magnets, high-gradient accelerating structures, plasma wakefield, muon colliders, ERL, etc.
- ❑ Investigation of the technical and financial feasibility of a future ≥ 100 TeV hadron collider at CERN, with e^+e^- Higgs and electroweak factory as a possible first stage.
→ to be completed by next Strategy update (~ 2026)
- ❑ Support to long-baseline neutrino projects in US and Japan
→ in particular, successful implementation of DUNE at LBNF
- ❑ Support to high-impact scientific diversity programme complementary to high-E colliders (role of national labs emphasised, as well as participation in experiments outside Europe)
- ❑ Theory, detector R&D, SW and computing

Preliminary implementation in this MTP → to be completed and refined in future MTPs

What is ECFA

EUROPEAN COMMITTEE FOR FUTURE ACCELERATORS

ECFA is advisory to CERN Management, CERN Council and its Committees, and to other organizations, national or international.

Web page: ecfa.web.cern.ch

□ **Plenary ECFA:** Jana Bielčíková (ÚJF Řež), Zdeněk Hubáček (ČVUT), Jaroslav Zálešák (FZÚ)
(Members supposed to represent views of HEP community of their country)

- decides on all ECFA activities, appoints the Chair and Secretary, approves the final reports of working groups and terminates their activities, decides on admission of new observers, and **makes recommendations to outside organizations.**
- organizes workshops, seminars. Public and very useful!!!
- 2 PECFA meetings per year

Newsletters: ecfa.web.cern.ch/ecfa-newsletters

ECFA Chair: Prof. Karl Jakobs (Uni Freiburg)



What is RECFA

EUROPEAN COMMITTEE FOR FUTURE ACCELERATORS

ECFA is advisory to CERN Management, CERN Council and its Committees, and to other organizations, national or international.

Web page: ecfa.web.cern.ch

❑ **Restricted ECFA:** Jana Bilečíková (ÚJF Řež)

(Member acts as the communication channel to the physics community and national institutes and authorities of each participating country)

- organizes **Visits** to CERN member countries: 2-day seminar with presentations summarizing status of HEP, education system, financing of HEP etc. of the country which is visited. Summary written by RECFA and sent to RECFA representative who makes it available to whoever may be concerned.
- Last RECFA visit to CZ: March 2015: indico.cern.ch/event/361781
- Mid-term report about CZ situation: November 2019: indico.cern.ch/event/847002
- 4-5 visits/year
- 4-5 additional RECFA meetings/year: regular reports from large labs (CERN, DESY, Frascati)

Committee for cooperation of CR with CERN

- Home
- O Výboru
- Kontakty
- Seznam členů
- Volná místa v CERN
- Události
 - Evropská strategie fyziky částic 2020
 - Předsedkyně Rady CERN U. Bassler v Praze
 - DG CERN Fabiola Gianotii v Praze
 - Výstava o CERN
 - Zasedání Výboru RECFA v Praze
 - Seminář "Pracovní příležitosti v CERN"
 - Návštěva místopředsedy vlády v CERN
 - Nobelova cena za fyziku 2013
 - Otevřené dny v CERN 28.-29. 9. 2013
 - Ministr zdravotnictví L. Heger v CERN
 - Evropská strategie fyziky částic
 - 20. výročí vstupu ČR do CERN
 - Návštěva ředitele CERN v ČR
- Média
- Tiskové zprávy CERN
- Projekty
- Spolupráce s průmyslem
- Sbor poradců

Web page: particle.cz/vyborcern

VSCERN: [Advisory body for manager of cooperation of CR with CERN, i.e. Ministry of Education, Youth and Sports of CR](#)

Chair: Prof. Rupert Leitner (MFF UK)

CR Representatives in **CERN Council**:

- Prof. Rupert Leitner (MFF UK)
- H.E. Václav Bálek (Permanent Mission of CR in Geneva)

CR Reps in Financial Committee of CERN Council:

- Branislav Gál (Permanent Mission of CR in Geneva)
- Ondřej Novák (Ministry of EYS)

JENAS & JENAA

□ Three large communities of nuclear physicists, astroparticle physicists and HEP physicists are searching for regions of overlap and where synergies could pay off. Some activities are organized together.

□ JENAS (Joint ECFA-NuPECC-APPEC Seminar):

- 1st seminar: Paris-Orsay October 2019 (participated: Jakub Vícha, MT)
- next seminar: Madrid 3-6 May 2022
- Topics: present the Science case; Big questions; Detector R&D; Computing; (Common) funding for these activities; Governance models for large facilities

□ JENAA (Joint ECFA-NuPECC-APPEC Activities):

<http://www.nupecc.org/jenaa>

- Expressions of Interest from JENAS 2019 (to strengthen synergies between ECFA, NuPECC and APPEC):

JENAS & JENAA

□ JENAA: Expressions of interest

1. Dark Matter - iDMEu (<https://indico.cern.ch/event/869195/overview>)
2. Gravitational Waves for fundamental physics (<https://agenda.infn.it/event/22947/overview>)
3. Machine-Learning Optimized Design of Experiments - MODE (<https://userswww.pd.infn.it/~dorigo/MODE.html>)
4. Nuclear Physics at the LHC (<https://indico.ph.tum.de/event/4492/>)
5. Storage Rings for the Search of Charged-Particle Electric Dipole Moments (EDM) (<https://indico.ph.tum.de/event/4482/overview>)
6. Synergies between the Electron-Ion Collider and the Large Hadron Collider experiments ()

JENAS EoI Task Force representatives

For ECFA:

- Peter Levai (2) ✉
- Isabell Melzer-Pellmann (1) ✉
- Nick van Remortel (2) ✉
- Mike Seidel (5) ✉
- Marek Tasevsky (3) ✉
- Claude Vallee (1) ✉
- Mikko Voutilainen (3) ✉

For NuPECC:

- Navin Alahari (4) ✉
- Dave Ireland (6) ✉
- Eugenio Nappi (6) ✉
- Franck Sabatié (3,6) ✉
- Boris Sharkov (1,2) ✉
- Hans Stroehler (5) ✉
- Eberhard Widmann (5) ✉
- György Wolf (2,4) ✉

For APPEC:

- Jo van den Brandt (2) ✉
- Jürgen Brunner (3) ✉
- Tomek Bulik (2) ✉
- Francesca Calore (1) ✉
- Fiorenza Donato (4) ✉
- Elena Cuoco (3) ✉
- Uwe Oberlack (1) ✉
- Xin Wu (4) ✉



Organize follow-up topical meetings

JENAS & JENAA

WG Diversity:

*“For particle physicists, **the principles of equality, diversity and inclusion should be clearly and recognisably present in all of the field’s activities**. Training appropriate to this end should be available at CERN and other institutes, and best practices shared among them.”*

Extract from the 2020 Strategy update

- Diversity charter presented to large collaborations of APPEC/NuPECC/ECFA above 150 people: few signed already, some contacted their Col.Boards/Diversity Com, received Questions
- Contacted the CERN Data protection Office
- Next steps: collect & analyze data from survey (also issued at big conferences), report at 2nd JENA seminar in Madrid.

WG Recognition:

*“It is important that **recognition for individuals in large collaborations be improved, following the guidelines of the corresponding ECFA study group**. In particular, journals dedicated to technologies and theoretical and experimental methods should be supported.”*

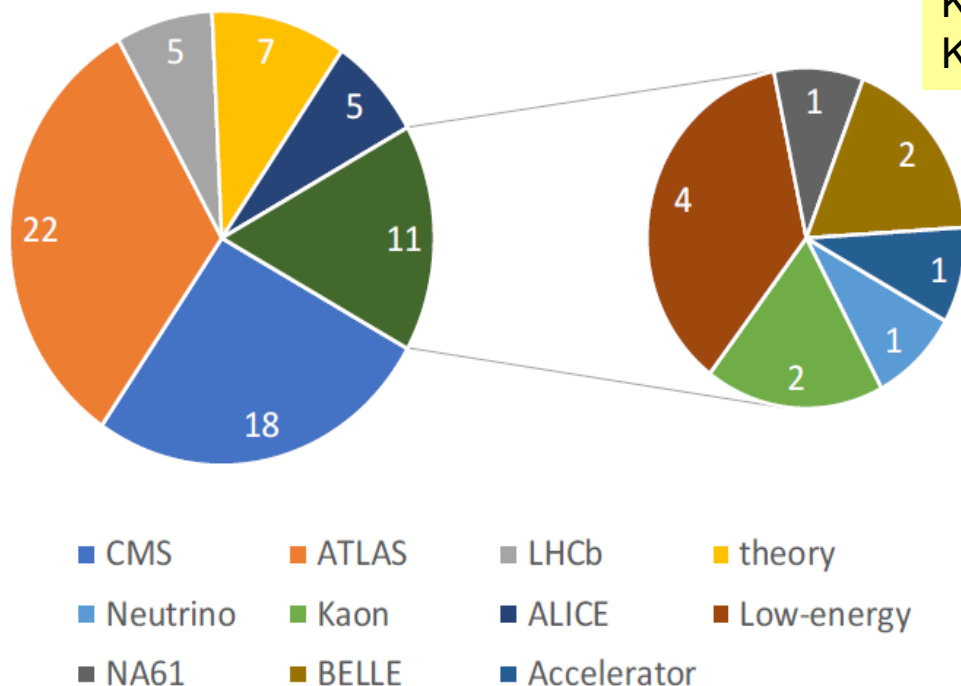
Extract from the 2020 Strategy update

- Key objective: create a platform to exchange best practices among large coll. and disciplines
- Recognition questionnaire sent to larger collaborations (emphasize on young researchers and work in technical areas [sw/detector/calibrations...]). Issues scale with the size of collaboration.
- 1st draft of document to be discussed with chairs of APPEC/ECFA/NuPECC and to be sent to large collaborations. Report at JENA seminar in Madrid.

ECFA Early-Career Researchers Panel

Nominations received

Overview of research orientation



November 19th, 2020

Report from E

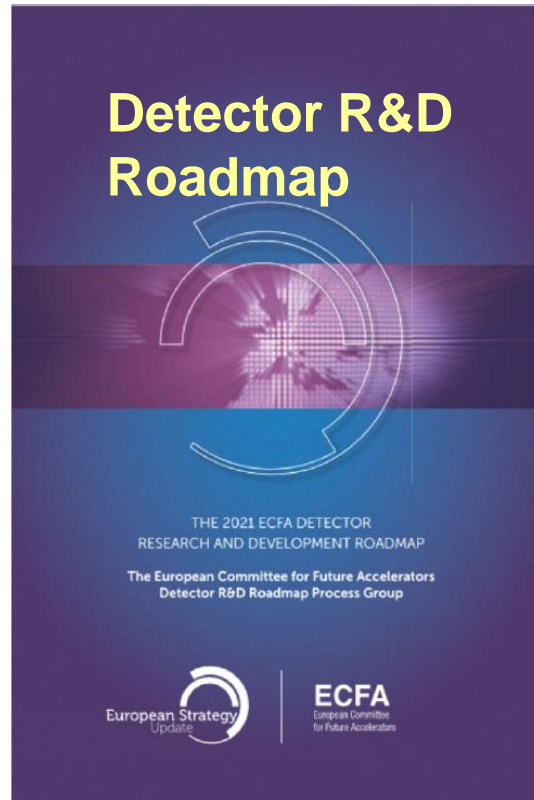
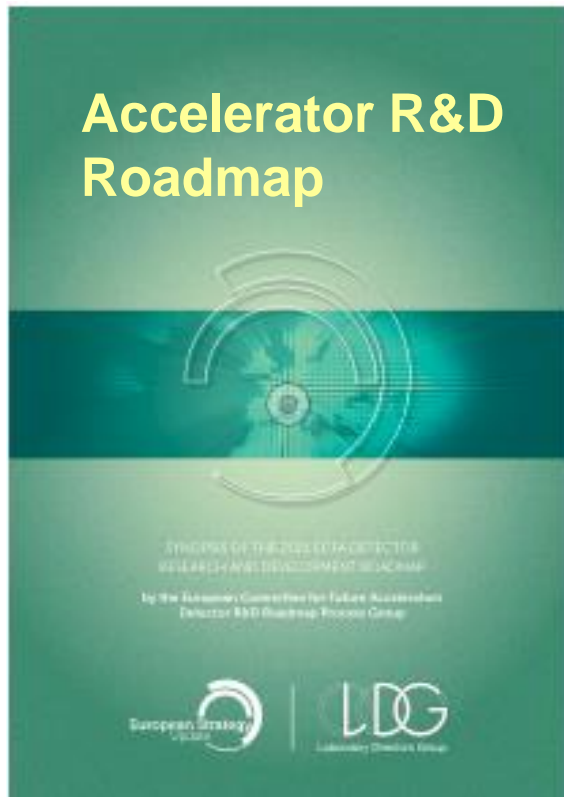
Activity kicked-off on Nov 30, 2020

More details: talk by Kateřina Jarkovská

CZ members of ECFA ECR Panel (term = 2 years):
Kamil Augsten (postdoc, ČVUT, ATLAS)
Katarína Gajdošová Křížková (postdoc, ČVUT, ALICE)
Kateřina Jarkovská (PhD student, MFF, theory)

- 75 members from 28 countries and major labs
- Typically 3 members per country/lab
- <https://ecfa.web.cern.ch/ecfa-early-career-researchers-panel>

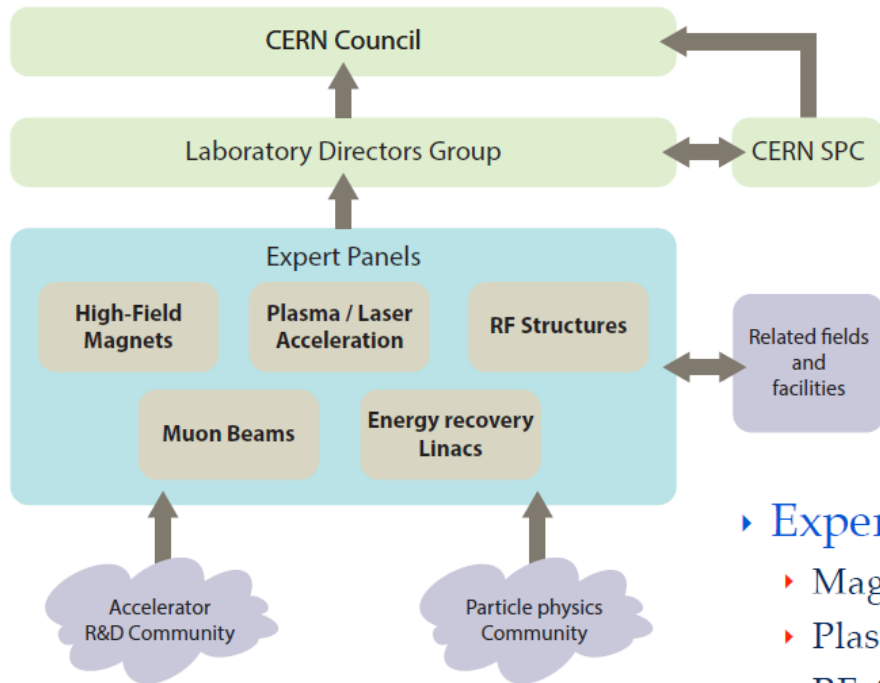
Towards Future Colliders



Physics,
Experiment &
Detector
Studies
Towards
a Higgs Factory

- ESPPU mandated creation of R&D roadmaps in 2021
 - These are now ready or close to ready
 - Substantial and extended community input captured and analysed
- Incredible work of expert panels and editors !

Accelerator R&D Roadmap



Questions

- › What R&D remains to be done towards future facilities?
- › What are the priorities?
- › How long might it take?
- › How much will it cost?
- › What different options and trade-offs exist?
- › What are the dependencies or conflicts between activities?
- › What science can be done using demonstrators, or intermediate-scale facilities?

› Goal: provide the evidence allowing future decision-making by the field

Expert panel chairs

- › Magnets: P. Ventrone (IRFU)
- › Plasma: R. Assmann (DESY)
- › RF: S. Bousson (IJCLab)
- › Muons: D. Schulte (CERN)
- › ERL: M. Klein (Liverpool)

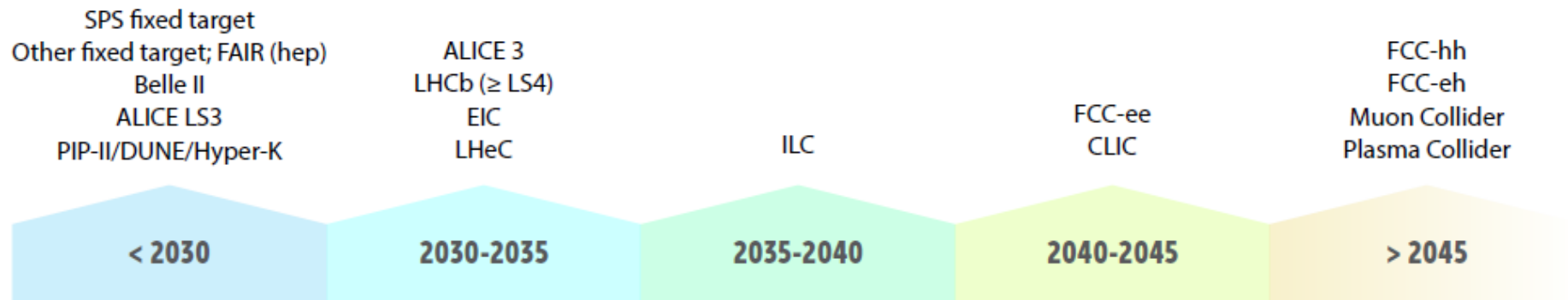
- › The five areas in the roadmap scope have produced R&D objectives and plans
- › An indicative set of resourcing scenarios has been considered
- › Several common themes and approaches emerge across the areas
- › Sustainability, timeliness and cost control are key considerations
- › Now need to move into implementation, keeping the momentum

› Roadmap will be published as a CERN yellow report in early 2022

LDG (chair Dave Newbold):

CERN
 CIEMAT
 DESY
 IRFU
 IJCLAB
 Nikhef
 LNF
 LNGS
 PSI
 STFC-RAL

Future Facilities Timeline



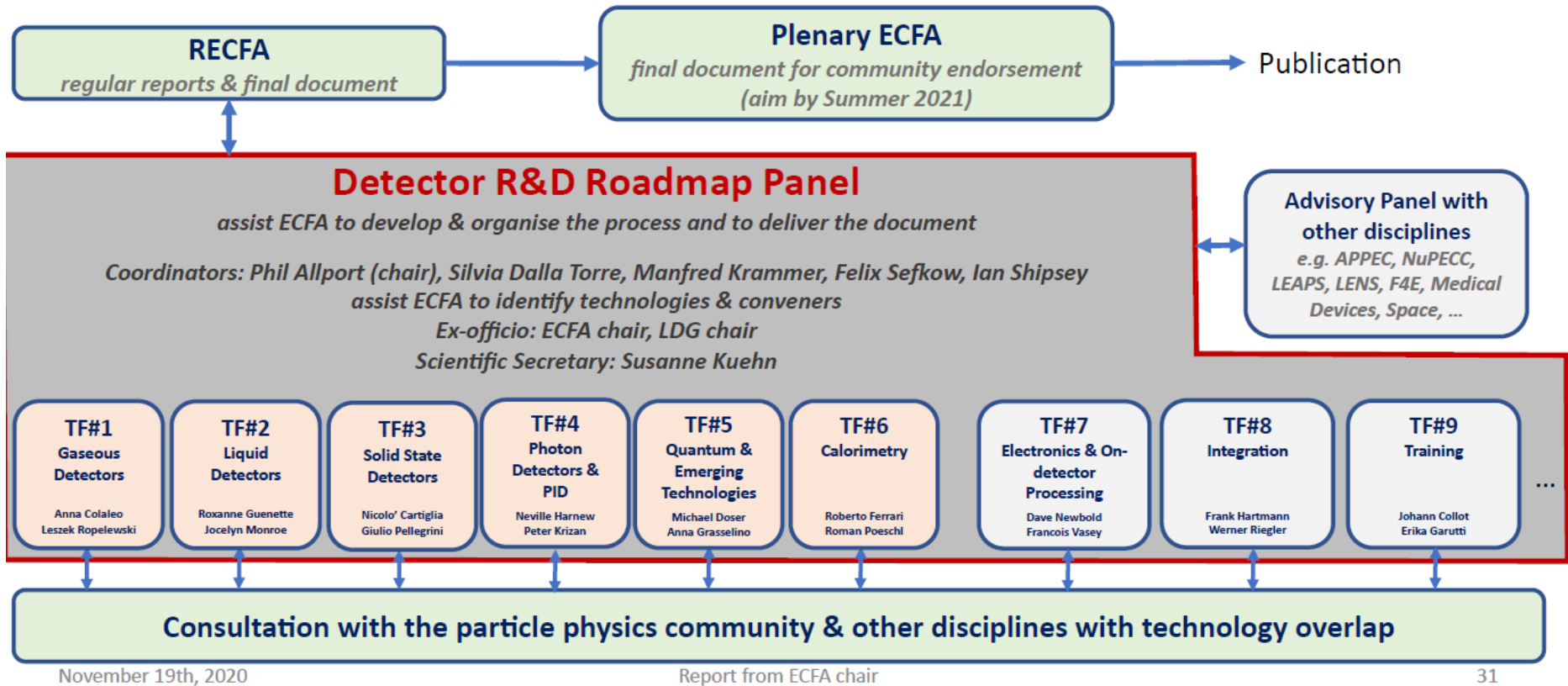
- ▶ **Detector / accelerator roadmaps have used a common timeline**
 - ▶ Highly approximate, and not to be used out of context
 - ▶ Dates represent the 'earliest feasible date', driven by both technical considerations and the processes of approval
 - ▶ The goal on both sides is that R&D shall not be the rate-limiting step

ECFA Detector R&D Roadmap

Updated European Strategy for Particle Physics

To guide the Detector R&D process in Europe, defining an inclusive Detector R&D Roadmap would be a major step and a strong ambition for the community at large, both considering focused and transformational R&D and considering emerging technologies also in adjacent fields

Organization to structure the consultation with the community



National contact for this activity: Tomáš Davídek

ECFA Detector R&D Roadmap

- 9 Task forces
- Huge work over 2021
- Consultation with HEP community

Document released on Dec 21, 2021:

<https://cds.cern.ch/record/2784893>

Next major step: Implementation.
Discussions ongoing

More details: talk by Tomáš Davídek

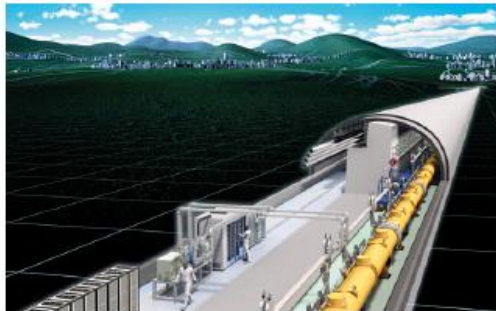


The prime vision formulated in the European Strategy for Particle Physics for a collider beyond the HL-LHC is to prepare for a Higgs Factory. At this stage, the Strategy did not make a final choice which Higgs Factory will emerge among the options being prepared by the community.

Physics, Experiment & Detector studies towards a Higgs Factory

- *ECFA recognizes the need for the experimental and theoretical communities involved in physics studies, experiment designs and detector technologies at future Higgs factories to gather. **ECFA supports a series of workshops** with the aim to **share challenges and expertise, to explore synergies in their efforts** and to respond coherently to this priority in the European Strategy for Particle Physics (ESPP).*

Goal: bring the entire e^+e^- Higgs factory effort together, foster cooperation across various projects; collaborative research programmes are to emerge



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- Setting up an **International Advisory Committee (IAC)** was agreed to be the next step with involvement of some RECFAs and European leaders of possible future Higgs factories. In addition, the (HL)-LHC community should be represented.

WG 1: Physics Potential

Convener: Juan Alcaraz (CIEMAT - Madrid), Jenny List (DESY), Fabio Maltoni (UC Louvain / Bologna) and James Wells (Univ. Michigan)

WG 2: Physics Analysis Methods

Convener: Patrizia Azzi (INFN-Padova / CERN), Fulvio Piccinini (INFN Pavia) and Dirk Zerwas (IJCLab)

[Kick-off meeting](https://indico.cern.ch/event/1033941/) to start WG1 and WG2 activities took place on 18th June: <https://indico.cern.ch/event/1033941/>

WG 3: Detector R&D

Activities will be started once the [ECFA Detector R&D Roadmap](#) is defined

- ECFA approval of the roadmap is expected on 18th Nov, followed by a presentation to Council on 10th Dec.
- It may be possible that detector R&D activities can be naturally embedded in the defined Detector R&D Themes (DRDTs) and in the emerging structures set up during the implementation process

Current plans of WG 1

- Identifying thematic areas on specific topics where concrete work should be organised, following the ECFA mandate
- Contacting experts from existing communities working for future e^+e^- colliders, LHC, Belle, ... for each of five planned working groups
- Working groups planned on:
 - Global interpretation in (SM)EFT and UV complete models
 - Flavour physics
 - Higgs, top and electroweak physics, incl. high- p_T
 - Precision calculations and theoretical, parametric and experimental syst. uncertainties
 - Direct discovery potential, incl. FIP
- In addition, a Seminar Series is planned
- **First Topical Meeting on Generators** on 9/10th November: <https://indico.cern.ch/event/1078675/>
(common workshop for WG1 and WG2)

Current plans of WG 2

- Plan to organise a series of Topical Meetings:
 - **First Topical Meeting on Generators** on 9/10th November: <https://indico.cern.ch/event/1078675/>
(common workshop for WG1 and WG2)
 - Second Topical Meeting on **Simulation**
Duration: ~1.5 days, target date: January 2022 (to be fixed in first half of November, stake holders will be consulted on exact date and content)
 - Further meetings envisaged, e.g. on reconstruction ...
- Organisation in close interaction with Software Ecosystem (KEY4HEP) representatives of the various communities (Frank Gaede ILC, Gerardo Ganis FCC-ee, and André Sailer CLIC)
- Contribute to planned Seminar Series of WG1 with some topics

ICHEP 2024 in Prague!

- ❑ **ICHEP2020 was organized by CZ HEP community**
 - Fully online
 - Enormous success
 - Moved limits → set up new standards
 - Built on enthusiasm, and hard and long work of many

- ❑ **ICHEP2024:**
 - In one year, the organization is to start
 - Time to choose two chairs of Local organization committee
 - Congress center already booked
 - Anybody wishing to help welcome!!!

B A C K U P S L I D E S