

Report from the Early-Career Researcher Symposium

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Austrian Roadmap Round Table Meeting
10.06.2024

What is the ECFA Early-Career Researcher Panel?

- Created 2020 by the Plenary ECFA, officialy commenced in 2021 ([Mandate](#))
- 3 representatives per country, default mandate of 2 years (extendable by 2 years)
- Early Career:
non-permanent position / up to 8 years after obtaining PhD
- Goal: Connect ECRs together to discuss the future of particle physics and advise ECFA

Activities of the ECR Panel

- Yearly reports to PECFA
- Working groups on instrumentation, future colliders, career prospects and diversity: frequent surveys of ECR opinions
- Observers to PECFA and RECFA
- Representation of ECR interests (example): Letter to CERN council at the start of the year, urging to advance EPPSU update deadline

“We, the ECFA Early-Career Researchers Panel, on behalf of the ECR community, would like to strongly urge the Council to [...] proceed as quick a pace as possible, accelerating [...] to start the European strategy process as early as possible and conclude by early 2026.”

Letter sent to the CERN council before the council meeting on the 21.3.2024

More information about the ECR Panel Activities:

<https://arxiv.org/abs/2212.11238>

<https://agenda.infn.it/event/34841/contributions/213124/attachments/111487/159098/ECFA-ECR-panel-activities.pdf>

<https://indico.cern.ch/event/1220533/contributions/5596301/attachments/2753701/4794216/ECFA%20ECR%20Panel%20-%20PECFA%20November%202023.pdf>

Current Austrian ECR Representatives

New people to be appointed for
2025-26

→ Get in touch if interested

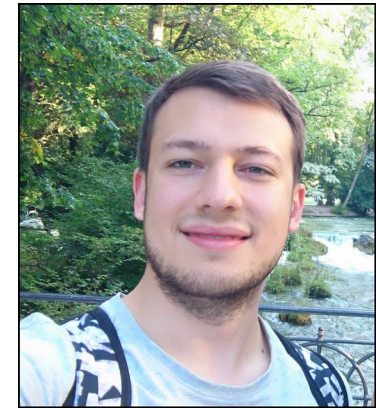
Please subscribe to the e-group:
ecfa-ecr-austria-announcements



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University of Graz – Theory
Since January '23



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HEPHY – Detector R&D
Since June '23



Maximilian Babeluk
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HEPHY – Detector R&D
Since January '24

Previous Austrian ECR representatives (21-22) :
Viktoria Hinger, Géraldine Räuber and Seán Mee

ECR Symposium on 23rd May

- 18 people in person + 6 online
- Talks by senior researchers on the particle physics landscape, future accelerators, NuPECC, APPEC and the EPPSU
- Discussion amongst ECRs in the afternoon

<https://indico.cern.ch/event/1409061/>

Many thanks to the speakers!

Jochen Schieck, Alexander Huschauer, Josef Pradler, Eberhard Widmann, Simon Plätzer

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THURSDAY, 23 MAY 2024
START: 10:00
INSTITUT FÜR HOCHENERGIEPHYSIK
BIBLIOTHEK, 1. FLOOR
NIKOLDORFER GASSE 18,
1050 WIEN

ECFA
European Committee for Future Accelerators

**EARLY CAREER RESEARCHERS IN
PARTICLE PHYSICS IN AUSTRIA**
THE LONG-TERM FUTURE OF PARTICLE PHYSICS IN EUROPE

The European strategy for Particle Physics will be updated early 2025, shaping the upcoming years for high energy physics. Since projects like the FCC will last for many years, inclusion and participation of PhDs and early postdocs is crucial. This meeting will contain talks from senior experts about current and future experiments, as well as discussion rounds to evaluate the view of the next generation of scientists. Additionally, alumni will give insight on career opportunities in industry and academia.

23 May 2024, 10:00 to 17:00
Agenda and Registration: <https://indico.cern.ch/event/1409061/>
Registration requested but not mandatory

Austrian Representatives:
Maximilian Babeluk
Yannick Dengler
Andreas Gsponer



CERN

UNI
GRAZ

HEPHY
INSTITUTE OF HIGH ENERGY PHYSICS

ECR Discussion Sessions

- 1) What directions do ECRs think particle physics should move in the future?
- 2) What is necessary for the long-term success of the particle physics field and what can we do as a community?

Particle Physics is far from complete

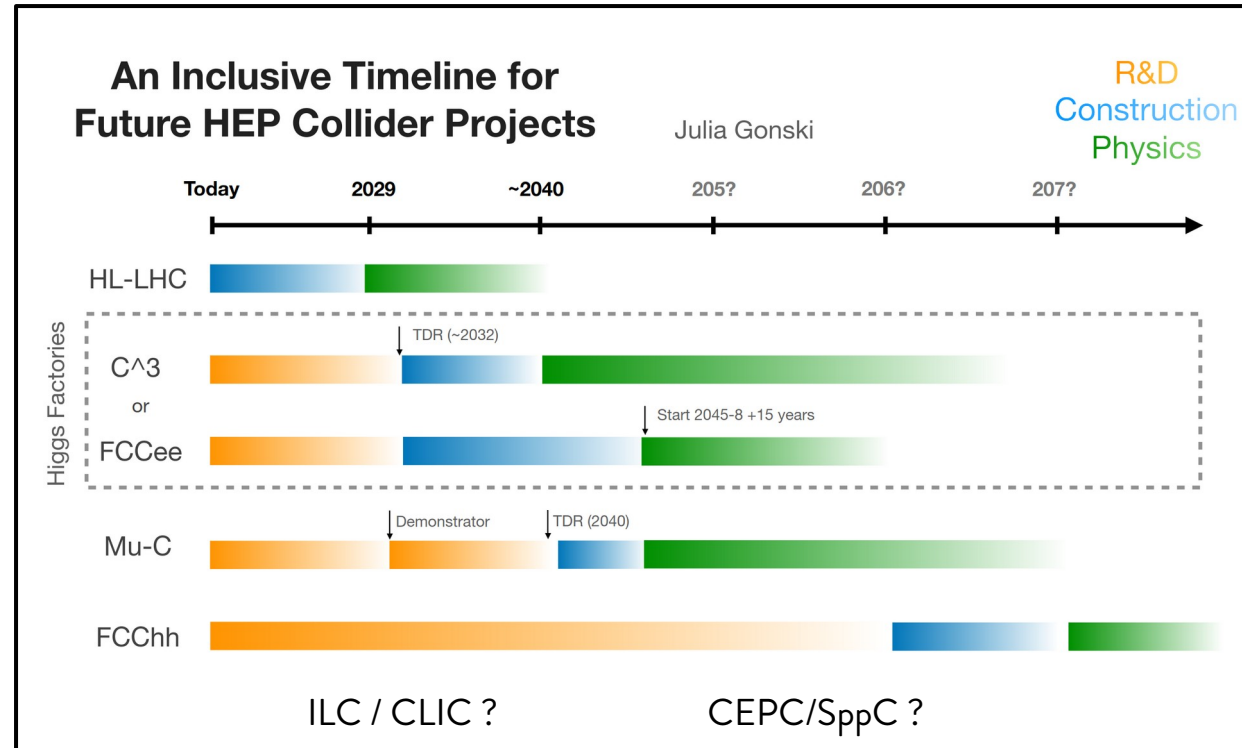
- Although the Standard Model is very successful, there is still a lot of things not understood
- Higgs physics, neutrinos, gravity
- More ideas than funding!
→ what priorities do we set?



<https://www.quantamagazine.org/theories-of-everything-mapped-20150803/>

Timeline of Future HEP Colliders

- HL-LHC continuing until 2040
- New colliders necessary:
More luminosity, more energy
- New projects estimated to start around ~2045
- Concern of ECR community :
continuity between end of HL-LHC
and new experiments
- Very long timescales : ECR
community needs to be involved from
the beginning



HEP Collider Timeline <https://indico.cern.ch/event/1288661/contributions/5435126/>

Disclaimer : Inclusion / omission of experiments do not imply (non)-endorsement by ECR community

FCC-ee / FCC-hh

- Higgs factory chosen as priority for next physics experiments
- Most ambitious project, but also highest cost
- Natural continuation of LEP/LHC
- ECR opinions :
 - Timelines are daunting
 - We should try to retain the community expertise after the end HL-LHC, and Europe should retain its leading position in particle physics
 - Decision should be taken as soon as possible!



Is the FCC feasible?

- Is it responsible to build projects as large as the FCC and do we have the funding for it?
- Could the FCC dry up funding for all other particle physics?
- What is the plan B?

Joint Statement of Intent between The United States of America and The European Organization for Nuclear Research concerning Future Planning for Large Research Infrastructure Facilities, Advanced Scientific Computing, and Open Science

The United States and CERN intend to:

- Enhance collaboration in future planning activities for large-scale, resource-intensive facilities with the goal of providing a sustainable and responsible pathway for the peaceful use of future accelerator technologies;
- Continue to collaborate in the feasibility study of the Future Circular Collider Higgs Factory (FCC-ee) the proposed major research facility planned to be hosted in Europe by CERN with international participation, with the intent of strengthening the global scientific enterprise and providing a clear pathway for future activities in open and trusted research environments; and
- Discuss potential collaboration on pilot projects on incorporating new analytics techniques and

[Joint US-CERN Statement](#), 26th April 2024



Future of CERN = FCC?

*“The cost estimates in the feasibility study are subject to a large number of **uncertainties**, the effects of which are still largely unknown. **The financing plan is extremely vague** and requires a high level of **commitment from external partners**, which is neither assured nor even in prospect at the present time.*

*Under the current economic conditions, **Germany is not in a position to provide the planned funding**. In view of all these points, **the FCC has to be considered as not affordable**.*

*Hence, CERN has to **diversify its efforts and prepare for different scenarios** including one without the FCC-ee.”*

BMBF Statement in CERN Council Meeting 02/2024

Bonn, 23.05.2024

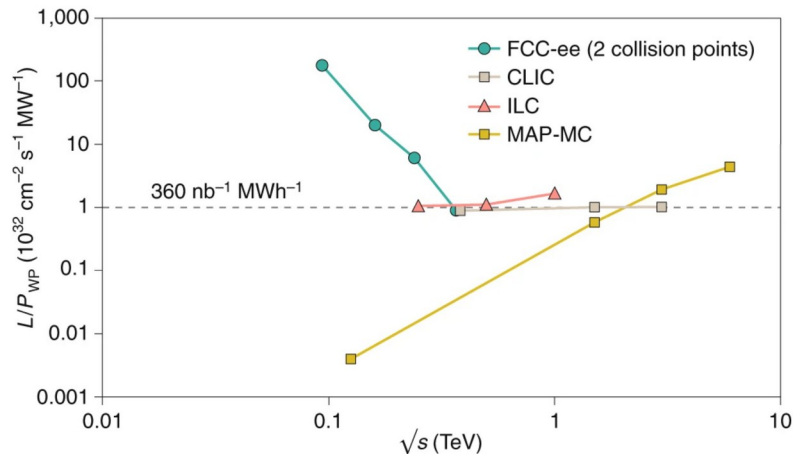
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[BMBF's current view to FC @ CERN](#), 23rd May 2024,
German Community Workshop

Other Collider Candidates

LINACs

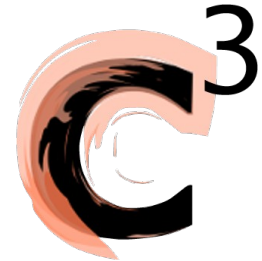
- can realize a Higgs factory at a lower cost
- possible improvements in acceleration gradient in the next 20 years?
- ILC seems unlikely to happen soon



Luminosity as a function of power usage

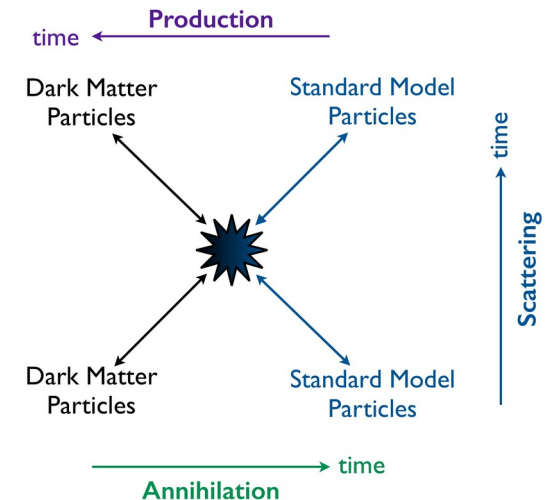
Muon Colliders

- Cost affordable way to reach the energy frontier
- Built in the US and not Europe?
- Low technological readiness



Non collider-based Particle Physics

- Large colliders: necessary to reach the energy / luminosity frontiers
- Can we achieve higher science-per-euro returns at other research fronts?
- New research avenues : Dark matter, gravitational waves, participation in neutrino physics?
- Smaller experiments: Might be more attractive to ECRs, can yield results on much shorter timescales
- The next big collider must still allow breathing room for other experiments



Ensuring the Future of Particle Physics

- 1) Societal acceptance and funding
- 2) Sustainability
- 3) Retainment of talent and training of physics community

Sustainability of Future Experiments

- Sustainability and energy efficiency needs to center-stage at any new experiments
- Compability with EU and UN sustainability / carbon neutrality goals
- Particle physics should set a good example!
- Especially relevant for large experiments such as FCC
- R&D and novel ideas needed!

FUTURE CIRCULAR COLLIDER **OpenSky Laboratory: demonstrate molasse reuse cases**

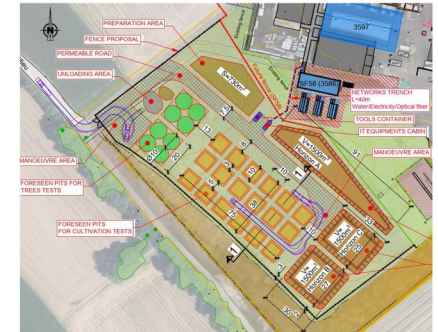
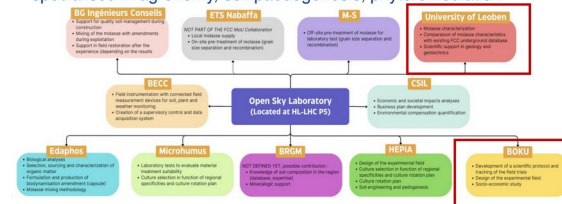
GOAL: demonstrate the feasibility to transform Molasse (excavated material) into fertile soil.

- Project launched in January 2024
- 10000 m² near LHC P5 (CMS) in Cessy, France.

Project phases:

- 1) Laboratory tests to **identify the most suitable mix** of molasse and amendments.
- 2) **Field tests** in a **controlled environment** (plants selected in function of regional specificities and possible soil reuse cases)

International collaboration with partners from academia and industry specialised in agronomy, soil paedogenesis, phytoremediation

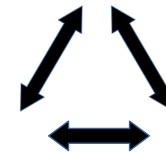


Status - March 2024:

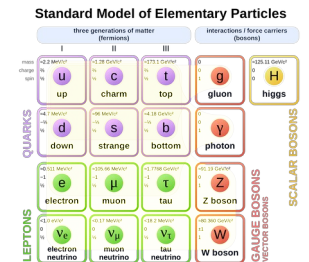
- Project approved at CERN level
- Collaboration agreements being signed
- Definition of the laboratory and field tests

Funding and Societal Acceptance

- Our field depends on the taxpayers and the greater society as a whole
- Necessity of our field and science in general needs to be communicated in an approachable way (prevent anti-science sentiments as seen during COVID)
- Outreach done by our community is crucial!
- Funding is tied to many issues faced by ECRs
- In Austria specifically, there is a lack of funding for fundamental research



 Bundesministerium
Bildung, Wissenschaft
und Forschung



Talent Retainment

- Ensuring a long-term supply of adequately trained physicists and keeping them (in Austria) is a prerequisite for a successful particle physics programme
- Two main drivers of talent loss:
 - Lack of long-term planning
 - Inadequate work-life balance

Results of the 2022 ECFA Early-Career Researchers
Panel survey on career prospects and diversity

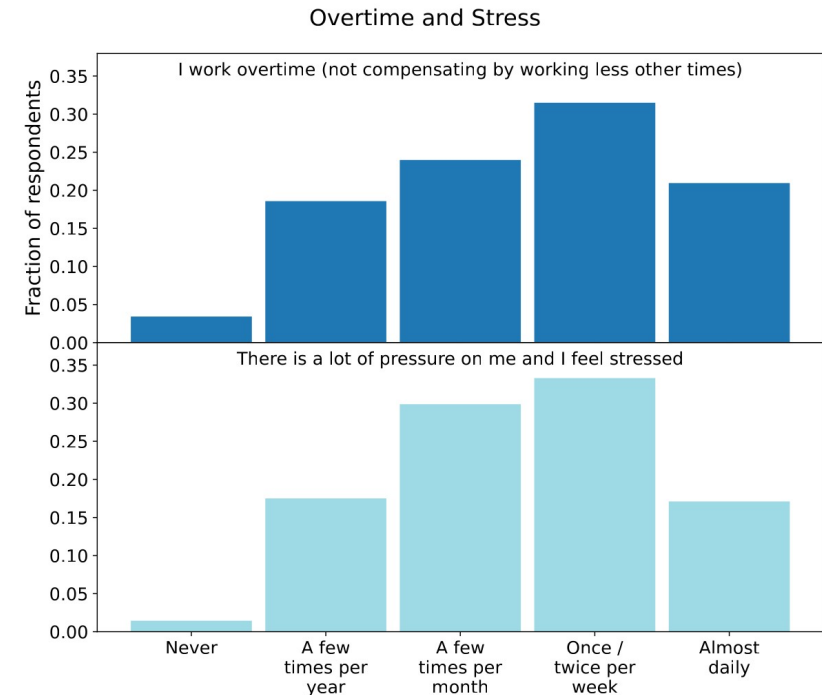
The ECFA Early-Career Researchers Panel: Career Prospects and Diversity
in Physics Programmes Working Groups

April 3, 2024

<https://arxiv.org/pdf/2404.02074v1>

Work-Life Balance

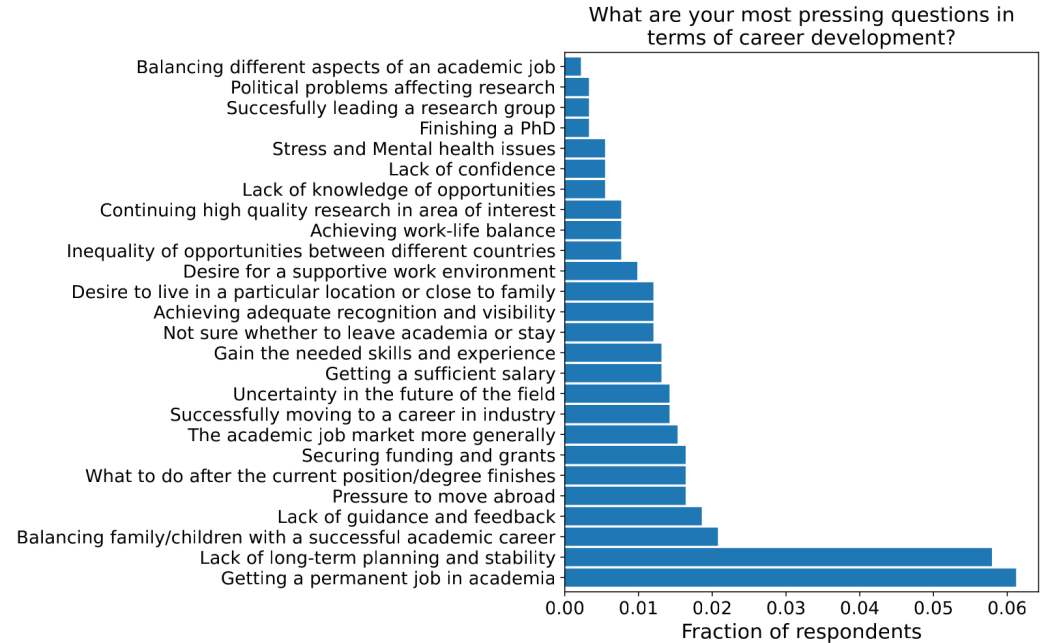
- Stress and poor work-life balance are a general issue in academia
- Majority of ECRs report working overtime and feeling stressed more than once a week.
- PhD Students in natural sciences work 14 hours of overtime per week on average in Austria ([Forschung und Lehre, 2/19](#))
- Senior researchers and supervisors should aim to set good examples and aid in preventing stress / burnout



[Results from ECFA ECR Survey \[p.25\]](#)

Lack of Long-Term Planning

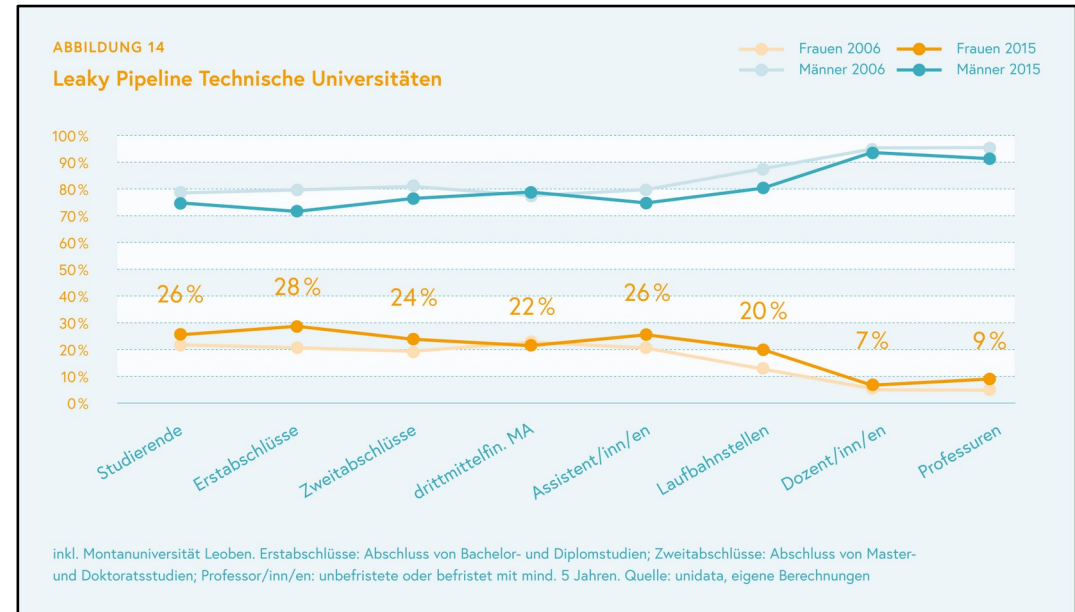
- One of the leading factors for people leaving academia and going to industry
- Disproportionately disadvantageous to people taking career breaks, e.g. starting a family
- Where possible, provide longer contracts



[Results from ECFA ECR Survey \[p.32\]](#)

Diversity and Inclusion

- Diversity and inclusion needs to be understood not something “forced upon us”, but driven by the community itself
[APPEC, ECFA, NuPECC Charter on Diversity](#)
- Gender balance, especially for senior positions
- Improve workplace culture, support/outreach at early career stages, breaking of stereotypes



Leaky Pipeline at Austrian technical universities
["Gleichstellung in Wissenschaft und Forschung in Österreich."](#)

Studie im Auftrag des BMBWF, Wien (2018).

Stay in touch:

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(needs a CERN account)

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