European Strategy for Particle Physics

ESG WG6 Report

Public engagement, education, communication
Social and career aspects

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Beyond Discoveries:
Particle Physics in Service of Society

The Particle Physics Community as a Model of Scientific and Societal Leadership

- International scientific collaboration as a driver for peace
- Scientific facts and critical thinking as cornerstones of truth
- Diversity, equity, and inclusion as strategy for institutional success

Let us engage with society and highlight the success of particle physics, built on these shared values.

ESG Working Group 6

WG6 members reviewed the input received and identified key topics during the month of May.

Next step: Organize the material into:

- **Guiding principles:** What should we stand for?
- **Good practices:** What works well, and how can it be sustained?
- **Recommendations:** What actions are needed, and by whom?

→ The following is an overview of the received input; need to discuss what is reasonable, useful, and relevant to retain as final recommendations

→ Work in progress — further feedback is welcome!

WG6 Composition

- M. Bombara (Slovakia)
- M.J. Costa (Spain)
- L. de Paula (Brazil)
- S. Özkorucuklu (Türkiye)
- M. Pimenta (Portugal)
- P. Van Mechelen* (Belgium)
- L. Zivkovic (Serbia)

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Engagement, Education, and Communication

General guiding principles

Outreach and Communication

- Strengthen public trust in science through outreach that fosters critical thinking, counters misinformation, and inspires future scientists.
- Shift science communication from scientific discoveries to research processes, personal stories, and the value of international collaboration and DEI.
- Expand outreach to diverse and underrepresented audiences to boost interest in STEM. Use social media to ensure a broad reach.
- Communicate effectively and transparently to build public and political support for the next European flagship project.

Training and Education

- Strengthen training in instrumentation (and thereby support a timely execution of the ESPP).
- Establish closer ties with industry.
- Integrate modern physics into school curricula.

Open Science

- Promote Open Access to scientific knowledge.
- Encourage the use of Open Data in education, outreach, and citizen science.

Some good practices

- Open Access and Open Data platforms such as the INSPIRE, HEPDATA, Particle Data Group, ArXiv, ...
  $\rightarrow$ may need a broader funding base (beyond CERN, INFN, DESY, ...)
- Accelerator Training such as the CERN Accelerator School:
  $\rightarrow$ may serve as a model for instrumentation training
- Outreach groups and initiatives such as the CERN Education, Communications & Outreach Group, EPPCN, IPPOG, Teacher & Student Forum, CERN Festival Programme, CERN Openlab, PolarQuEEEst, ...
  $\rightarrow$ these key platforms for outreach and education could be expanded and strengthened

Actionable recommendations

Coordination of Outreach, Education, and Communication

- Strengthen European education, communication, and outreach strategy, led by CERN and Member States, supported by a central office with dedicated staff and funding.
- Coordinate various outreach networks (Education, Communication & Outreach group, EPPCN, IPPOG, Teacher & Student Forum). Promote coordination with related scientific fields to improve efficiency and avoid duplication.
- Provide outreach training and create a European platform for sharing materials and best practices. Evaluate outreach impact through surveys and tracking of educational and career outcomes.
- Develop educational programmes with teachers and students to integrate modern physics into school curricula.

Training in HEP

- Develop structured European training programmes in instrumentation, including a certified curriculum (e.g. Erasmus Mundus) linked to R&D and industry.
- Establish a graduate school in instrumentation with defined certification levels linked to the training branch within the ECFA detector roadmap and to DRD Collaborations.

Social and Career Aspects

General guiding principles

Improve stability and perspectives for ECRs

- Increase awareness about employment perspectives at the earliest stages of ECR careers.
- Promote postdoc contracts of at least 3 years and increase long-term positions aligned with project timelines.
- Expand mentorship to support ECRs in career development, skills, and personal growth.
- Ensure timely decisions on flagship projects to retain attractivenes of the field to ECRs.

Recognition and evaluation

- Reassess long-term mobility expectations and foster a healthier work-life balance.
- Acknowledge contributions equally in accelerator, computing, detector, analysis, and theory. Value non-research activities (e.g. outreach, DEI, mentoring) and expand evaluation criteria beyond bibliometrics.
- Facilitate the recognition of individual scientific contributions in large collaborations and recognize the training value of smaller experiments.

Training and engagement

- Embed transferable and entrepreneurial skills in training.
- Encourage ECR involvement in instrumentation and accelerator R&D.
- Include ECRs in the organisation of collaborations, working groups, and conferences; establish dedicated ECR sessions where possible.

Diversity and Inclusion

- Promote diversity, equity, and inclusion to drive innovation and better decision-making.
- Value and recruit candidates with industry experience.
- Enforce zero-tolerance for harassment/discrimination with accessible and anonymous reporting systems.

Some good practices

- International Office at DESY: to ease the moving to a new country
- Mentoring schemes, incl. mental health mentoring, gender mentoring implemented at various institutions.
- Diversity and Inclusion programme at CERN
  $\rightarrow$ CERN should maintain its commitment to DEI policies that enrich its working environment, including support to users who originate from countries where they do not have adequate protections.
- Centres for Doctoral Training in the UK include a 6-month industry placement

Actionable recommendations

Recruitment and mobility

- Develop PhD programmes with industry placements to support career mobility.
- Create an international support body (e.g. under CERN) to facilitate researcher relocation; institutions should offer expert assistance and include relocation funding in ECR contracts.

Well-being and DEI

- Fund mental health support (if not included in standard health insurance), with targeted services for ECRs.
- Ensure institutions, conferences, and schools have clear codes of conduct and complaint procedures.
- Set up DEI Offices with appropriate resources.
- DEI Offices should monitor progress via surveys and ECR-inclusive committees; publish regular reports.
- Enable individuals with diverse disabilities to engage in science and outreach by providing tailored accessibility tools.

ECR engagement

- Provide funding for ECFA ECR Panel activities, including community-building and professional development.
- Ensure transparent selection and balanced representation in the ECFA ECR Panel across countries and research areas.

Summary

Most salient topics (according to me)

Instrumentation & link with industry

- Strengthen training in instrumentation, and in transferable and entrepreneurial skills.
- Establish closer ties to industry, including industry placement of PhD students and hirings from industry into instrumentation jobs.

ECR career perspectives

- Short-term contracts, frequent relocations, and uncertain job perspectives weigh in on ECR's mental health and work-life balance.
- Activities in computing, accelerators, instrumentation not always well recognized.
- Not clear whether these practices ensure that we keep the best talents in the field.

Feedback welcome!

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