Report on WG1 (International Committee for Future Accelerators) 2022-2024

The main activity of ICFA committee is devoted to the cooperation and to the exchange of information about the construction of future large accelerators. In the last years several projects have appeared at the horizon, together with the still on-going proposal for a Linear Collider in Japan, which is the subject of one of ICFA panel (IDT). Their plans and perspectives (FCC at CERN, CEPC in China) have been presented at several ICFA meetings, and are subject to continuous analysis and discussion among ICFA members.

Chairs:
up to 31.12.2023 Stuart Henderson (Jefferson Lab),
since 1.1.2024, until 31.12.2026, Pierluigi Campana (Frascati Lab)

ICFA meetings in the period considered:

29/30 March 2022, 90th ICFA Meeting, virtual
11 October 2022, 91st ICFA Meeting, virtual
28 March 2023, 92nd ICFA Meeting, virtual
16 July 2023, 93rd ICFA Meeting, in person during Lepton-Photon Conference, Melbourne, Australia
27 November – 1 December, 13th ICFA Seminar, DESY Hamburg, Germany
29 November 2023, 94th ICFA Meeting, in person during ICFA Seminar
10/11 April 2024, 95th ICFA Meeting, virtual
20/21 July 2024, 96th ICFA Meeting, in person during ICHEP Conference, Prague, Czech Rep.

Activities in 2022 were seriously affected due to COVID pandemic. Typical yearly cadence of one-two in-person meetings was substituted by remote connection. Once pandemic was over, anyhow it was decided to reduce the in person meeting to one per year, to mitigate environmental impact of long-distance flights.
Currently, all regional members are in charge and attending the meetings. Major world High Energy Physics Laboratories are represented in the Committee.

Here is the complete member list:

- P. Campana, Chair, Italy
- T. Schoerner, Secretary, Germany
- P. Sphicas, CERN Member States
- F. Gianotti, CERN Director General
- B. Heinemann, CERN Member States
- L. Merminga, USA, Fermilab Director General
- S. Dasu, USA
- N. Roe, USA
- I. Koop, Russia
- V. Obraztsov, Russia
- Y. Wang, China, IHEP Director General
- U. Egede, Other Countries (Asia/Oceania)
- G. Gil da Silveira, Other Countries (Latin America)
- B. Mohanty, Other Countries (India)
- T. Nakaya, Japan
- S. Asai, Japan, KEK Director General
- R. Teuscher, Canada
- F. Canelli, Chair of the IUPAP Commission on Particles and Fields (ex officio)

At each meeting, reports on activities from the panels were presented, together with those from the regional representatives and from the largest High Energy Physics Laboratories (CERN, Fermilab, IHEP, KEK). The current active panels are the following (with chairs):

- Instrument Innovation and Development (I. Shipsey, UK)
- Beam Dynamics (Y. He, China)
- Advanced and Novel Accelerators (P. Muggli, Germany)
- Sustainable Accelerators and Colliders (T. Roser, USA)
- Data Lifecycle (K. Lassila-Perini, Finland))
- ILC International Development Team (T. Nakada, Switzerland)

In 2024 a reorganization of panels dealing with computing, network and data preservation was performed. In particular, Standing Committee on Interregional Connectivity and Study Group on Data Preservation in High Energy Physics were concluded.

The mission of the new Data Lifecycle panel is to enhance global coordination on all aspects of the data lifecycle including acquisition, processing, distribution, storage, access, analysis, simulation, preservation, management, software, workflows, computing and networking in particle physics, with a focus on open science and FAIR practices.

In general, panel activities span through regular meetings, organization and support to topical conference in the various fields, organization of schools and awards to junior and senior scientists. Regular information about ICFA panels initiatives is conveyed through newsletters and/or regularly updated web site.

Here is a list of workshops, conferences and school recently organized (traveling restarted in 2023):
ALEGRO, Advanced and Novel Accelerators Workshop, DESY 2023
67th Advanced Beam Dynamics Workshop on Future Light Sources, Lucerne 2023
68th Advanced Beam Dynamics Workshop on High Intensity/Brightness of Hadron Beams, CERN 2023
Beam Dynamics Mini-workshop on Cold Copper Technology, Ithaca 2024
Beam Dynamics Mini-workshop on Machine Learning for Accelerators, Gyeongiou 2024
69th Advanced Beam Dynamics Workshop on Energy Recovery Linacs, Tsukuba 2024
Beam Dynamics Mini-workshop on Beam-Beam effects in colliders, Lausanne 2024
Beam Dynamics Mini-workshop on Space Charge Effects, Dongguan 2024
ALEGRO, Advanced and Novel Accelerators Workshop, Lisbon 2024

ICFA Instrumentation School, Mumbai 2023
Excellence in Detector Instrumentation School (EDIT), Brookhaven 2023
ICFA Instrumentation Awards: Early Career and Senior, 2024

In 2025, ICFA will assign through a pilot program funded by EU Marie Curie program, internships for about 30 PhD world-wide students, to be hosted in European laboratories (1.7 ME investment).

Moreover, a triennial ICFA Seminar is organised, an international exchange of information on plans for future facilities in particle physics. The seminar is attended by the directors of most of the world's major laboratories in our field, senior particle and accelerator physicists, and government science officials from several countries. The last one was held in DESY Hamburg (2023), after 7 years since the previous one due to Covid pandemic, and was attended by about 200 people. The next one is expected in 2026.

ICFA, at a level of lesser resources and political complexity, is willing to promote, and possibly optimize, the set-up of smaller programs at the differents HEP labs, both in collider-based and in physics beyond collider, to preserve diversity and also education in the field, targeting especially the young generation.

In its activity, ICFA supports access to HEP technologies in countries with developing particle physics communities. Recently, a subgroup for high-energy physics of the Asian Committee for Future Accelerators, ACFA-HEP was established. The overall aim is to strengthen HEP in the Asia/Oceania region, including the development and usage of facilities and experiments within and outside of the region. ICFA welcomed this new development and regards it as a significant step towards a stronger communication and coordination on strategic and implementation discussions in the various world areas.

Another area of intense activity is sustainability of future accelerators. In a dedicated session at last meeting, ICFA members appreciated the relevant amount of work brought by various working groups, stressing the nowadays importance of HEP sustainability and determination of carbon footprint. This activity is considered crucial for the development of future HEP large projects, and ICFA endorses an increased level of collaboration among the two panels, and looks forward for support from the community.