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What, Why, and Who, is ICFA?

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1. Introduction

Seven years ago, as the newly installed Secretary of the International Committee for Future Accelerators (ICFA), this writer published "ICFA Demystified" (Fermilab Report, April/June 1993, p21), an attempt to explain to the particle physics community what ICFA is and does. (Writing it had the useful by-product of helping the author to also understand some of its history and functions.) Since 1993, there have been significant changes in the field of particle physics, and in ICFA; while much of the original article is still valid, other parts are no longer applicable, so that an updated version seemed appropriate. This article, while containing parts of the earlier article, now supercedes it.

2. What is ICFA?

ICFA has a connection to other international scientific bodies through this hierarchy:

- ICSU (International Council of Scientific Unions)
- IUPAP (International Union of Pure and Applied Physics)
- IUPAP Commission 11 (particles and fields)
- ICFA

Each entity in the above list in some way reports to the preceding one. There is also some linkage between these organizations and UNESCO.

ICFA is an international organization in which discussions can take place on international aspects of particle physics, in particular the large accelerators that are at the heart of this field. It has no means of ensuring that any of its resolutions are carried out, but because of its broad international representation it can act as the "conscience" of the field and its recommendations can also influence national or regional activities. One

might describe ICFA as a facilitator for the particle physics community. More formally its aims, as redefined in 1985, are as follows:

- To promote international collaboration in all phases of the construction and exploitation of very high energy accelerators.

- To organize regularly world-inclusive meetings for the exchange of information on future plans for regional facilities and for the formulation of advice on joint studies and uses.

- To organize workshops for the study of problems related to super high-energy accelerator complexes and their international exploitation and to foster research and development of necessary technology.

ICFA has no funds of its own; meetings are organized by a host institution and members' travel expenses are borne by their own institutions. Occasionally ICFA Panels have requested funds from agencies around the world for special activities such as workshops.

ICFA has connections to two regional organizations with related activities: ECFA (European Committee for Future Accelerators) and ACFA (Asian Committee for Future Accelerators).

3. Where did ICFA come from?

The origins of ICFA go back to the late 1960s; a series of East-West meetings were held in the period 1967-1976 to review future perspectives in particle physics. By the end of that period, there was a belief that the next large accelerator, after the Fermilab and CERN 400 GeV synchrotrons, would of necessity, because of its complexity and cost, be an international machine. A key meeting in ICFA's formation took place in New Orleans in 1975. Some 50 world leaders in the particle physics field passed a resolution recommending the formation of a group to study the scientific, technical and organizational problems connected with world-wide collaboration in the construction of a very large accelerator. This recommendation led IUPAP's Commission 11 to create ICFA in 1976. As might be expected, the initial decision by the U.S. to build SSC as a national machine was the subject of considerable discussion in ICFA's early days.

4. Who is a member of ICFA?

There is a formula for ICFA membership, which is approximately representative of particle physics activity in the different regions of the world. Since 1995, this has been (member numbers in parenthesis): CERN member states (3), USA (3), Japan (2), Russia (2), Canada (1), China (1), Other Countries (3). Member terms are three years, and can be renewed, generally once; term starting dates vary, in order to give

continuity. Members of ICFA are nominated by designated authorities in their regions, followed by confirmation by IUPAP Commission 11. The Chairman of IUPAP Commission 11 is an ex-officio ICFA member. The ICFA Chairman (a three year term) is chosen by the ICFA membership.

Almost from its inception until December 1992, the Secretary of ICFA was Owen Lock of CERN; the archives of the Committee are located at CERN. In 1999, Hirotaka Sugawara became ICFA Chairman, following the death of the previous Chairman, Björn Wiik. The current ICFA membership is given in the Appendix.

It is not coincidental that many directors of the world's large accelerator laboratories are members, or have been members, of ICFA. For example, the current membership includes the directors of CERN, DESY, Fermilab, IHEP (Beijing), ITEP, KEK and SLAC. Most of the recommendations about future accelerator facilities will involve existing laboratories, and any additional research for which ICFA foresees a need will almost of necessity have to be carried out at a large existing laboratory.

5. What does ICFA do?

Over the past several years, the three major activities undertaken by ICFA, which correspond to the three aims of ICFA mentioned earlier, are as follows:

ICFA Meetings

ICFA meets at a frequency (presently about twice a year) determined by the members, to consider any topic concerning future accelerators, and often related subjects like instrumentation, accelerator technology and also particle physics research and technology. Meetings often take place during major particle physics conferences, since many members would naturally be attending those conferences. At alternate meetings, invitations are extended to the directors of major particle physics labs who are not ICFA members; this allows for broader discussions. The Committee can make recommendations, although without any formal power to cause any resulting action. Nevertheless, the recommendations generally are at least seriously considered by laboratories and national funding agencies. Most recommendations are the result of a consensus among Committee members. A report of the most recent ICFA meeting, ICFA statements, current membership, and links to ICFA Panel pages, are on the ICFA web site:

http://www.fnal.gov/directorate/icfa/

ICFA Seminars

Every three years, ICFA organizes a Seminar on Future Perspectives in High-Energy Physics, at one of the major laboratories; review talks are given on the state of accelerators and particle physics around the world. The seminars typically run for several days, and have an invited attendance of 100-150, chosen from the regions of the world using a similar formula to that used for ICFA membership; science officials from governments are also invited. The sixth ICFA Seminar was held at Fermilab on 5-8 October 1999.

ICFA is sometimes asked to sponsor conferences or workshops on accelerator or particle physics. Although ICFA has no funds, its sponsorship can sometimes assist the conference / workshop organizers in obtaining funds from appropriate agencies.

ICFA Panels

Several years ago it was realized that there are accelerator and particle physics topics of a technical nature where international discussion is valuable, and where expertise beyond that of the ICFA members is needed. Because of this, ICFA panels on specific technical topics were set up; each has about 16 members, allocated by world regions similarly to ICFA membership. Panel members are appointed by the ICFA chairman following a recommendation by the panel chairman. Panels meet as frequently as the members decide, and reports on their activities are given at ICFA meetings. They organize schools and workshops on their specific topics and often put out bulletins, newsletters and other records of their activities. The following are the current panels, with their missions and current chairmen:

- Instrumentation, Innovation and Development
  (Chairman – Albert Heinrich Walenta, Siegen)

  Mission: To stimulate world inclusive involvement in the innovation and development of new instrumentation for experiments at future accelerators.

  This Panel runs instrumentation schools about every two years in and for developing countries, (for example, Mexico 1997, Istanbul 1999, South Africa 2001), produces the Instrumentation Bulletin and a Catalogue of relevant detector and instrumentation subjects.

- Beam Dynamics
  (Chairman –Kohji Hirata, KEK)

  Mission: To encourage and promote international collaboration on beam dynamics studies for present and future accelerators.

This Panel produces the Beam Dynamics Newsletter, and organizes workshops on advanced beam dynamics topics. It has three working groups, on future light sources, tau-charm factory, and high brightness hadron beams.

- Advanced and Novel Accelerators
  (Chairman – Wim Leemans, LBNL)

  Mission: To extend and support the international collaboration and communication in the field of new acceleration techniques.

- ICFA Standing Committee on International Connectivity
  (Chairman – Matthias Kasemann, Fermilab)

  Mission: To monitor and review interregional connectivity, high energy physics requirements and make recommendations for network improvements.

  This Committee's monitoring of communications performance now extends to 72 countries.

6. What has ICFA done lately?

Much of ICFA's attention over the past few years has been given to consideration of a future e^+e^- linear collider. The Committee has expressed support for such a facility, and following a suggestion by Albrecht Wagner, has set up a Task Force to study a "Global Accelerator Network". This would be a global collaboration to design, construct, commission and operate a large new accelerator facility; it is based on the experience of large detector collaborations. The multiple tasks involved would be carried out to a large extent in the home institutions of the collaboration; active remote participation from laboratories dispersed around the world would rely on the increasing ability to access, monitor, and control activities from a distance. The ICFA Task Force report is expected in early 2001.

The Global Science Forum (an OECD body, and successor to the Megascience Forum) has set up a Consultative Group in High Energy Physics; this government-level body will make recommendations to member governments by mid-2002 on the future of the field. ICFA has been invited to send a representative to its meetings and to provide input.

The concept of a committee like ICFA, with international membership representing the activity in a particular field of physics, has in the past few years been recognized as a valuable model for other fields. The International Union of Pure and Applied Physics (IUPAP) has recently formed similar committees for other branches of physics.

Some years ago, ICFA produced the "ICFA Guidelines for the Interregional Utilization of Major Regional Experimental Facilities for High Energy Particle Physics Research" (which can be found on the ICFA website). In recent years, IUPAP has adapted these guidelines for use in other large-science fields.

ICFA has followed developments for possible future large accelerator facilities, at its meetings and at the triennial ICFA Seminars; these facilities include muon colliders and neutrino factories, and very large hadron colliders. In addition, it regularly receives reports on the state of particle physics in the major labs and regions of the world. In early 1994, immediately following the termination of the SSC project, ICFA held additional meetings, and was active in urging that the world particle physics community unite in support of the LHC.

7. Summary

ICFA plays an important role as a forum for discussions transcending national or regional boundaries on the future of high-energy accelerators and their associated particle physics, detectors and technology. It is probably true that, to paraphrase an old expression, if ICFA didn't exist, something very similar would have to be invented. As appeared to be true in the 1970s, projects in our field are becoming so large and costly that no single country or group of countries can carry them out alone; more and more international discussion and cooperation is needed. This will be especially relevant if the next major accelerator is a linear e^+e^- collider in the hundreds of GeV energy range.

APPENDIX

ICFA MEMBERSHIP
(October 2000)

CERN Member States	
	L. Foa
	L. Maiani
	A. Wagner
USA	
	E. Beier
	J. Dorfan
	M. Witherell
Japan	
	S. Komamiya
	H. Sugawara
Russia	
	M. Danilov
	N. Dikansky
Canada	
	R. Carnegie
China	
	H. Chen
Other Countries	
	Z. Aydin
	W. Namkung
	A. Zepeda
IUPAP Commission 11	
	P. Kalmus