Minutes
ICFA Meeting
24 August 2025
Agenda: https://indico.fnal.goiv/event/67207

Present:
- ICFA members: P. Campana, F. Gianotti (part-time), P. Sphicas (part-time), B. Heinemann (part-time), R. Teuscher, G.G. da Silveira, Shoji Asai, T. Nakaya (part-time), J. Cao (part-time), N. Roe, Y.-K. Kim, S. Dasu, U. Egede (part-time), T. Schörner (secretary), Marcelo Munhoz (part-time)
- for the ICFA panels (part-time): K. Lassila-Perini, T. Nakada, S. Söldner-Rembold
- guests (part-time): J. List, J. Jaeckel, K. Jakobs, M. Spiropulu, J. Osterhoff (replacing P. Muggli)

Not present: B. Mohanty, I. Koop, V. Obratsov, Y. He, P. Muggli, T. Roser

1) Welcome and Charge

Pierluigi opens the meeting, welcomes the participants and introduces today's agenda.

2) Physics Session

In three physics presentations (slides on the ICFA agenda) Jenny List (DESY), Joerg Jaeckel (Heidelberg) and Jens Osterhoff (Berkeley) give overviews of the LCF@CERN proposal, of non-collider physics ("physics beyond colliders") and the status of PWA for HEP research, respectively.

Concerning J. List's presentation, there are some questions from the participants:
- Young-Kee asks about the LCF running scenarios and in particular the technology for the upgrade to 550 GeV, and the cost. Jenny answered that the 5.5 BCHF upgrade cost is only for the cryo-modules (plus cryo-power, RF power etc.).
- Sridhara asks about the situation if CEPC goes forward – then the 550 GeV would be an attractive option, for 13.X BCFH. Jenny adds that the sum is for the low power option, still.
- Fabiola comments about slide 23 and questions the affordability without major contributions from outside the CERN budget. She remarks that the cost estimate shown does not include the two detectors and the territorial implementation. Fabiola acknowledges the benefits of the staged approach. Jenny adds that a fully stripped-down version (one IR etc.) would come out at roughly 6.5 BCHF.
- Tatsuya comments that the Chinese option would still leave room for a discussion on the best start-up scenario of the LCF in Europe – CEPC would not automatically mean a start at 250 GeV in Europe. In addition, Europe should be extremely vigilant on the cost – even for a LCF@CERN the cost is twice the cost of the LHC!
- Pierluigi asks about the tunnel size – the diameter is around 6 m, but the machine will need modulators – where are they? Jenny answers that this is a long story – in particular, it has been shown from successful EU-XFEL running that there is no need to regularly access the RF so that the modulators can well be placed under the machine itself. Second, Pierluigi asks about the source and lumi challenges to the LCF machine. How much time will be needed to clarify these two points? When will one be sure that these challenges can be met? Jenny answers that these issues are very actively studied e.g. in the ITN, at the ATF etc. The positron source will need thorough engineering for which there were no resources in the past years. But several reviews showed that the engineering issues can be solved – there are no fundamental concerns about the physics. The timing depends on the resources.

Also for Joerg's presentation, questions are raised:

- Sridhara asks about the use of dipole fields for the axion search experiments. Joerg answers that you want a dipole field because the polarisation of the laser should be parallel to the magnetic field to maximize interactions.
- Paris asks about the 1/f plots with values going beyond the Planck scale – where does this come from? Joerg answers that this is purely phenomenological, with the only assumption that it is dark matter.
- Young-Kim states that the AEGIS experiment is under construction at Fermilab, using a 100 m shaft.
- Pierluigi asks about the complementarity of experiments in the 1/f versus mass front. Joerg comments that in fact, if a signal is seen, different technologies can disentangle models.

After Jens' presentation, the following questions and comments are raised:

- Young-Kee asks about PETRA IV injection – is the PWA injector the baseline? Beate answers that this will be decided at a review in 2026.
- Shoji asks about the timescale for collider applications? Jens answers that for HALHF there is a realistic timeline before construction of 10-15 years including a test facility – which might be too much for a Higgs factory. For the 10 TeV – the timeline is similar to that of FCC-hh or so. A more concrete date can be mentioned by 2028 or so.
- Shoji also asks about the emittance issues related to the sources. Jens answers that for HALHF the emittance requirements are not tremendous and has also been demonstrated. For the 10 TeV, this is R&D, and alternative – non-plasma-based – sources are investigated.
- Tatsuya also asks about the staging issues related to emittance. Jens comments that energy spread is a main issue in the staging, but 0.1% has already been demonstrated at DESY, and some amount spread is required for stabilisation. For emittance, jitter tolerance in the transverse direction is important, and all will depend on how well one can match the various stages to each other. Jens also comments that the energy double option using plasma will reduce the lumi at the end, as a trade-off. So that might make the scheme less attractive.

3) Strategy developments and lessons learned from ESPPU so far

In this part of the meeting, Karl Jakobs and Maria Spiropulu are talking about the status of the European strategy process and the US report on "Elementary particle physics: the Higgs and beyond", respectively.

Questions are raised to Karl's presentation:

- Shoji asks for the cost of the LEP3 project and the necessary gradients. Karl answers that the cost level is around 3.8 BCHF, depending on the number and type of experiments. The RF gradient is the same taken for the FCC-ee (which entails a huge history of studies, LEP3 is not at the same level). Fabiola complements that the costs have been obtained by extrapolation from FCC-ee – so they have large uncertainties.
- Tatsuya comments that non-collider and fixed-target experiments also come with significant costs – will these be affected in the national planning by the new collider flagship projects? Karl answers that a flagship collider is the highest priority, but some complementary programme at CERN needs to be maintained. But one also needs to consider that national labs in the entire world could and should contribute to the physics beyond collider programme. Fabiola adds that CERN supports a strong programme beyond the LHC, which will be expanded in the future with the SHiP experiment at the new, high-intensity beam-dump facility at the Noth Area.

4) Regional and Lab Reports

CERN

Fabiola Gianotti presents the slides attached to the agenda.

- Pierluigi asks about the amount of resources for non-collider projects. Fabiola answers that most of the investment is in the upgrade of the accelerator facilities and related experimental areas. For instance, the planned upgrade of the North Area has a cost of almost 200 million Swiss Francs.

Europe and ECFA

Paris Sphicas presents the slides attached to the agenda.

USA

N. Roe presents the slides attached to the agenda.

- Pierluigi asks about cuts beyond CMB-S4. Natalie answers that the issues with NSF are not only budgetary but also related to the maintenance of the infrastructure at the South Pole that has seen an accumulation of deferred maintenance. In terms of budgetary constraints – it is a difficult time in the US.
- Tatsuya picks up on a few physically interesting issues (Hubble puzzle, DE evolution). Is there any coherent plan to follow up? Natalie answers that DESI proposed an extension of the current survey, and DESI-2 has been proposed. Also, a project called Spec-S5 for installing a larger primary mirror and focal plane on two telescopes in Chile(Blanco) and Arizona (Mayall). So on the spectroscopic side, a lot is happening, and on the imaging side, Rubin will start operation. Also new HEP-related experiments like LEGEND and CUPID supported by DOE NP are taking up speed.

Canada

Richard Teuscher presents the slides attached to the agenda.

Latin America

Gustavo Gil da Silveira presents the slides attached to the agenda. It must be noticed that the program of setting up a LACFA structure is getting momentum.

China

Jun Cao presents the slides attached to the agenda.

- Pierluigi asks about the geological study that will end in 2025 – is this still considering several sites? Jun answers that the thorough study that will finish is the one for the Henan candidate site.
- Tatsuya asks about an update on the cosmic ray observatory LHAASO. Jun answers that the observatory is very productive.

Japan and IDT

Shoji Asai presents the slides attached to the agenda.

- Sridhara asks about the non-linear collimation. Shoji comments on the magnetic fields that provide the collimation and at the same time reduces the impedance of the overall accelerator.
- A tentative coordination among world laboratories hosting muon facilities is ongoing, comprising JPARC, PSI, TRIUMF, FNAL.

Oceania, Australia and Asia beyond China, Japan and India

Ulrik Egede presents the slides attached to the agenda.

- Pierluigi asks about process of establishing ACFA-HEP. Ulrik answers that this is still nascent – ACFA-HEP is not yet quite there as a politically influential body. However, there is participation, which is a good start. But still, in a number of countries there is only a very low level of activity.

5) ICFA Panels

ICFA Data Lifecycle panel

Kati Lassila-Perini presents the slides attached to the agenda.
ACTION ITEM: ICFA to issue a statement on the recommendations.
ACTION ITEM: Kati to submit the recommendations on arXiv.

ICFA ANA panel

Jens Osterhoff presents the slides for ANA on behalf of Patric Muggli.

ICFA IID panel

Stefan Soeldner-Rembold presents the slides attached to the agenda.

- Young-Kee asks about the instrumentation awards – would the panel also consider the prize winners to give presentations at major particle physics conferences, not only at TIPP etc. ("preaching to the choir"). Stefan says that the panel can consider this.
- Stefan comments that the panel would appreciate if the labs could contribute to raising the recognition of the awards in general. This is also a question of resources.

ICFA sustainability panel

Thomas Schörner presents the slides prepared by Thomas Roser attached to the agenda.

- Young-Kee states that it would be interesting to have sustainability reports from all the various labs around the world, in order to compare. Also, the methodology of establishing these reports could be made transparent and compared, in order to learn from each other.

ICFA Beam Dynamics panel

Thomas Schörner presents the slides prepared by Yuan He attached to the agenda.

ICFA IDT

Tatsuya Nakada presents the slides attached to the agenda.

- Young-Kee comments that in view of more global projects in the field of Higgs factories, the model of IDT probably needs to be reconsidered. Tatsuya adds that many years ago, the technology choice was made in a global fashion, without any discussion on the location of this technology. Also, the idea of a body like FALC as a discussion place for funding agencies might need to be revisited.
- Pierluigi comments that from his point of view the concept of the "global project" for ILC specifically suffered from the lack of a host lab.
- Pierluigi summarises that the IDT discussion needs to be taken up in the future by ICFA thoroughly, in view of the current situation, which is quite different from the past.