

Minutes**96th ICFA Meeting
20/21 July 2024, Prague**

Present in Prague: Natalie Roe, Sridhara Dasu, Ulrik Egede, Tsuyoshi Nakaya, Gustavo Gil da Silveira, Shoji Asai, Tatsuya Nakada, Yuan He, Richard Teuscher, Paris Sphicas, Yifang Wang, Pierluigi Campana, Thomas Schörner, Maxim Titov (part-time), Beate Heinemann (Sunday), Fabiola Gianotti (Sunday), Lia Merminga (Sunday), Florencia Canelli (Sunday part-time)

Remote participation: Brigitte Cros (part-time, for Patric Muggli), Kati Lassila-Perini (part-time), Thomas Roser (part-time), Bedangadas Mohanty, Ian Shipsey (part-time), Caterina Bloise (part-time)

Not present: I. Koop, V. Obraztsov

1) Welcome and tour de table

Pierluigi opens the meeting and welcomes in particular the new committee member Bedangadas Mohanty (India) and the new Beam Dynamics panel chair Yuan He.

2) Panel reports (see slides on the web - only salient points, questions and relevant discussion items are recorded)**ANA panel (Brigitte Cros for Patric Muggli)**

- ANA community needs funding (goes in the direction of demonstrators)
- ANA might in future request ICFA endorsement for EU funding application (e.g. ERC synergy grant applications)
- ALEGRO2025 will be organized in the US (endorsement will be requested)

Questions:

- Sridhara asks about the timeline of ANA panel activities and the interplay with the ongoing EPPSU process.
- Yifang: A 10 TeV collider pre-CDR – how serious is this? Brigitte: Try to identify key elements that could compose such a machine – want to see first whether it works on paper and do simulations. If no showstoppers, go for the real thing. Currently not definite answers for everything – just an overall idea in mind. This also requires more people and resources. Yifang: What is the timeline for this? Brigitte: Not yet – it requires funding, before that no realistic timeline can be given.
- Tatsuya: Might be interesting to mention that within the LC community a global vision is being developed, starting from a 250 GeV Higgs factory and then go through upgrades, including PWA. Maybe we should have a discussion on whether the 10 TeV vision can be married to the 250 GeV starting point machine. Brigitte: That is something that is done in parallel among the various groups – but e.g. the HALHF people are involved in the LC vision.
- Sridhara: The Snowmass process discussed the ee lumi at 10 TeV as the main problem (power etc.). Also the positrons are an issue.
- Tatsuya points out that also particle and energy recovery is a path to pursue.

Beam dynamics panel (Yuan He)

- Paris: Where does machine learning help with beam dynamics? In making simulations faster – or where? Yuan: Not only for simulation, also for operation (fast feedback etc.). Maybe it is not very precise, but speed would be excellent.

IID (Ian Shipsey)

- Pierluigi: Why not address early-career researchers beyond the Ph.D. with these internships, but Ph.D. students? Ian: This is geared towards less developed countries

- we considered it more important to give the opportunity for the youngest researchers to do their Ph.D. at CERN etc. The programme will cover the entire costs, but the degree comes from their initial home institution.

- Paris: Funding for the Indian school - what is the funding model? Ian: Professors from developed world pay their own travel, they receive accommodation and food for free. Students come from less developed host nations or other countries, they receive the travel and food and accommodation - this takes the lion share. Students from the first / developed world - here the home institution covers the travel. The sum is roughly 100k. Raising the money has been done by individual contributions from contributing labs. Also funding from rich individuals might help, but it is difficult to base the model on chance contributions.

Data lifecycle panel (Kati Lassila-Perini)

- Thomas: Transverse activities - how to encourage? You also mention them on the DPHEP slide p8 ... Kati: Many experiments do their own things - and here DPHEP is excellent exchange forum!
- Thomas: Will there be inputs to the European strategy process on the "data" topic(s). Kati: Would like to take ICFA's advice on this - what does ICFA say?
- Ulrik: Have you considered coordination on FAIR principles in terms of metadata: PDG, HFLAV, etc.? Is this coordinated, is there awareness? Kati: Not yet considered - but interesting thought.
- Pierluigi: How to relate to activities e.g. in ECFA? Paris: JENA with 5 working groups. Kati: We are aware of the existence of JENA - not found time yet to dig into that.
- Gustavo: DPHEP workshop - when? Kati: Will happen before CHEP - end of September 2024 or so.

IDT (Tatsuya Nakada)

- Yifang: How are prices between different countries normalized / calibrated, e.g. for cavities that are produced in three different places? Tatsuya: The best practice currently includes only one industry inquiry, but experience from different countries will be taken into account. That means effectively that we assume similar prices for Europe and US.
- Pierluigi: Cost review - site-independent analysis? Isn't that strange? Green field is different from e.g. CERN? Tatsuya / Shoji: No, not too different, minor differences - the big factors like tunnel and accelerator are similar across countries.
- Yifang: How about contingency? Tatsuya: No contingency given, but errors / uncertainties.
- Paris: How about the sharing of costs for one third of the accelerator for each of the three world regions - are the production costs in the various world regions very different, or are they really comparable as implied? Tatsuya: Not too different - this forms part of the uncertainty. Paris: How about the tunnel, environmental rules, debris transportation etc.? Tatsuya: We can provide these numbers in the ILC framework. We can't provide numbers for XYZ being built at CERN - that is the mandate we had. But the numbers will be provided in such a way so that you can apply an easy algorithm to apply it for CERN. E.g. CLIC could provide the corresponding numbers for CERN.
- Paris: Does Tatsuya's step 1 mean that Japanese government would also consider an ILC outside of Japan? [Here a longish discussion ensued.]
- Paris: Is the second beam delivery system for ILC costed? Tatsuya: We can provide guideline numbers, but no full costing is done.

3) Regional, country and lab reports (see slides on the web - only salient points, questions and relevant discussion items are recorded)

Japan and KEK (Shoji Asai, Tsuyoshi Nakaya)

- Pierluigi: How about the vertex detector? Shoji: vertex detector has been switched off during large parts of the spring / summer run 2024 because of the high backgrounds. The backgrounds are however bad / worst during injection time – also beam-beam interactions are worst then. But solving the sudden beam loss and injection problems will probably allow the vertex detector to be switched on.
- Ulrik: Is there enough community (size) in Japan to justify an ILC in Japan (e.g. only 10% in Belle II). Shoji: this is one reason for a global project – e.g. KEK does not have enough accelerator scientists for satisfying the ILC needs.
- Paris: 900 HEP people in Japan – where are they beyond Belle II, ATLAS, HyperK? Tsuyoshi: 900 includes students and also retired people (not theory, but accelerators for HEP – but here not engineers, these are outsourced). The rest is in muon community (KOTO), RIKEN and elsewhere.
- Paris: When does the JAHEP strategy process conclude? In time for EPPSU? Tsuyoshi: In early 2025 we will have a first preliminary report (on colliders!) to the EPPSU. Until the end of 2025, everything including JPARC etc. will be ready.

Canada (Richard Teuscher)

- Pierluigi: Accelerator physicists – are there any outside of TRIUMF? Richard: Canadian Light Source – this has expertise. And there is a fusion Tokamak with specific expertise. Among the TRIUMF people there is accelerator interest for high-energy future colliders.
- Sridhara: Is the community growing in Canada? Richard: Yes, but not the funding. There is an envelope that is capped.

Latin America (Gustavo Gil da Silveira)

- Tatsuya: How does the collaboration with astroparticle physics look like? Gustavo: there are collaborations with e.g. CTA, but there are not more cross-discussions, even if the LA forum brings also this in. But it is difficult to have overlap!

Asia, Oceania, Australia (Ulrik Egede)

- Ulrik: the funding agencies don't care very much about long-term projects – you have to do the full argument for a long project over and over again.
- ACFA-HEP can be a discussion place for smaller countries and be used as arguments for their FAs, and also Japan and China can discuss there.
- Pierluigi: Size of the community in Australia? Ulrik: Academics, postdocs, students – maybe 150, plus a few in accelerators, synchrotrons, ...

CERN (Fabiola Gianotti)

- Tatsuya: Science Gateway – experience is that some things / experiments were broken; it is a large effort to maintain things and keep everything alive. Fabiola: Not everything is yet fully commissioned, and the personnel is limited, and CERN was really swamped by the massive numbers of visitors. It is still the commissioning phase.
- Lia: congratulations to Fabiola on the Gateway – this is amazing!
- How about FCC funding? Fabiola: Funding model will only be ready in 2025 – maybe second half. Statement by Germany – if you look carefully at it – says “Currently, we think it is ...” – currently! And: Germany was very prudent also at the time of the LHC approval, and some numbers on operating costs presented at German town meeting were wrong. And: any new machine with upgrades will be comparable in cost – ILC beyond 250 gets expensive, CLIC at 3 TeV beyond 20 billion. Beate: The part of the German statement that says “currently without external contributions” is important; and BMBF understands that CERN needs a follow-up project.

ECFA (Paris Spicas)

IHEP / China (Yifang Wang)

- Pierluigi: BEPC – how long will data taking continue? Yifang: Up to at least 2030 – after that still in discussion about possible future. One idea is to have another update with crab cavities for higher lumi at 2 GeV (low energy).
- Pierluigi: Is BEPC running compatible with CEPC construction /operation – is there enough personnel? Yifang: Yes!
- Paris: Scintillator glasses – this is really something. What is the price, and is radiation tolerance not an issue? Yifang: Yes, tolerance is still an issue. Cost is not an issue – less than one dollar per cc. Manufacturers with “same” recipe still arrive at very different parameters – so need to better understand material etc. (purity of raw material etc.). This might also help with the radiation issues.
- Beate: PWA – staging for both electrons and positrons? Yifang: Yes – but start with electrons.
- Beate: Schedule for CEPC? Yifang: Still the same – expect the decision process to start in 2025, and conclude in 2026. But it has not yet started (same status as in April meeting).
- Fabiola: Is there a deadline from the government for submitting the EDR or so? Yifang: we put our own deadline for mid-2025 (parts of machine EDR, detector TDR).
- Lia: Update on Shanghai free-electron laser? Yifang: Big trouble! Geological problems during digging – soil is very soft. Secondly, difficulties with SRF modules / cavities – they have not yet decided which cavities they want to buy. And management is continuously changing etc. – human complications etc.
- Lia: There is currently only one niobium vendor in the world – in China. Tatsuya: There is a small vendor in Japan. Lia: A vendor in US now refuses to sell (raw material from Brazil) – reasons unknown. This is significant risk – some countries cannot simply buy from China – e.g. India. They are contributing RF cavities for PIP-II – so this needs to be addressed. Pierluigi: There is a shortage of several materials. Yuan He: Now two vendors in China – also the second vendor is now validated for 1.3 GHz cavities. Have bought several tons of material from him. There might be some operation proof next year. Gustavo: There is an attempt in the US to re-establish the contact to Brazil. Ulrik: same for niobium – this is listed on the list for critical materials! Lia: give countries like Brazil to develop their capabilities, and encourage vendors to invest in this because we will need a lot of the stuff. Fabiola: Also important is the beam pipe manufacturing – the only supplier in the US terminated their production line. CERN has therefore decided to build a dedicated facility and insource the process. Beate: Superconducting cables are also an issue – there is now one new vendor in China that is being tested; but also CERN is trying to enable itself.

FNAL / DoE / US (Lia Meringa)

- Fabiola: CMB-S4 – high priority of P5, and now South Pole does not fly. What is the impact on physics when moving to Chile? Natalie: Will get to science goals slower in Chile, but can be okay. So going back to all Chile option – takes longer and will cost more. Looking at ways of making it more competitive (camera etc.) and cost-effective. Going back to the drawing boards and back to the agencies in about a year from now or so.

C11 (Florenca Canelli)

- Florenca is stepping down in autumn as C11 chair, followed by Marcelo Munhoz (USP); membership will probably not change much, but details depend on the IUPAP meeting in China later in 2024.
- IUPAP was very involved in two proclamations (on i) international decade starting 2024 on sustainable science and ii) international year 2025 on quantum technologies)

- ICHEP2024 was endorsed as type A with 1350 participants, LHCP Boston as type B. Boston was also asked for an analysis of the visa situation for the US.
- Review on HEP infrastructures – suggest to look at the relevant presentation given in the C11 session. There is a concern that the support for necessary infrastructures is decreasing while the needs are increasing.
- The authorship topic (review in 2005) will be taken up again in a dedicated meeting.

4) Sustainability Session

The LDG working group (Maxim Titov)

- Thomas: Are there other impact categories beyond GWP being considered? Maxim: Yes, currently investigating which are to be considered.

The ICFA Sustainability Panel (Thomas Roser)

- Pierluigi: It might be dangerous to take the CO2 intensity as a direct comparison measure between projects. Thomas: CO2 intensity is only one of several categories in the comparison / selection of future projects.
- Pierluigi: What is the true impact of our community on a global scale? Figures to be sorted out
- Fabiola: CERN publishes an environmental report every two years, covering emissions (all scopes 1-3) and 10 other impact categories. Could ICFA make a proposal for a clean and systematic way on how to do this? Thomas: Different labs do it very differently. Within the panel, we tried to focus on energy efficiency usage – not on carbon-neutral energy sources (no influence on that, this is a political topic, rather). And the tools for efficiency comparisons are not very far developed, but one can still exchange the various experiences. Yes, ICFA could play a very useful role here by making the connection between various labs (maybe even all accelerator labs).
- Beate: Many of the cited labs are not pure HEP labs, already – so that is a start.
- Beate: Energy production is not on our control – but waste heat usage is. That can be an important aspect.
- Maxim: It would be important to connect the various labs – information flow and coherence need to be fostered.
- Yifang: We should all try to limit our emissions – but we should not commit to becoming neutral, because in the end our research is useful towards the overall goal of neutrality (e.g. synchrotron light sources for battery research).

5) Executive Meeting

Not recorded for these minutes.