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ECFA EUROPEAN COMMITTEE FOR FUTURE ACCELERATORS

NOTES OF THE RESTRICTED ECFA MEETING
HELD IN AMSTERDAM ON 19-20 OCTOBER 2018

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LIST OF PARTICIPANTS

Chair:	J. D'Hondt	Belgium
Secretary:	C. Lacasta Llácer	Spain
Attendees:		
	C. Alexa	Romania
	S. Bentvelsen	Netherlands
	S. Boogert	United-Kingdom
	P. Campana	LNF
	P. Conde Muiño	Portugal
	M. Dam	Denmark
	E. Elsen	CERN
	B. Erazmus	EPS HEPP Chair
	R. Forty	CERN
	F. Gianotti	CERN
	E. Gross	Israel
	P. Iaydjiev	Bulgaria
	M. Jeitler	Austria
	K. Lassila-Perini	Finland
	T. Lesiak	Poland
	P. Levai	Hungary
	M. Mikuž	Slovenia
	J. Mnich	DESY
	L. Rivkin	Switzerland
	P. Schleper	Germany
	M. Šumbera	Czech Republic
	N. van Remortel	Belgium
	E. Widmann	NuPECC Deputy Chair
	G. Wormser	France
	A. Zoccoli	Italy
Apologies:		
	P. Adzic	Serbia
	D. Milstead	Sweden
	A. Masiero	ApPEC Chair
	P. Razis	Cyprus
	A. Read	Norway
	M. Shulg'ga	Ukraine
	P. Sphicas	Greece
	P. Stríženec	Slovakia

NOTES OF THE RESTRICTED ECFA MEETING
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1. ROUND TABLE DISCUSSION

(J. D'Hondt)

(Friday, 19 October, <https://indico.cern.ch/event/753418>)

Before starting the round table discussion, the chair thanked the speakers in the open session for their excellent presentations. At the opening of the closed RECFA session, the RECFA members were invited to give their comments.

Jorgen D'Hondt reminded that the discussion will focus on several topics and he suggested to start with «Computing, Outreach and Students» lead by Kati Lassila-Perini. She noted there are very positive aspects in these three domains, with a very impressive computing centre, addressing the challenges of the future and with an important commercial return, an important investment in outreach, stressing the important role of the communication team at NIKHEF and the recognition of this effort from high level. There is a high level of satisfaction among the students but she believes care should be taken on the support of the students at the beginning of their careers. While there are a number of initiatives to establish links between experimentalists and theorists, this does not seem to propagate down to the students. Jorgen D'Hondt noted that the students tend to leave the field after the PhD and this might need to be investigated. Stan Bentvelsen acknowledged that and pointed to the lack of Dutch fellowships as a possible reason for it. Roger Forty asked whether Dutch postdocs do need to go abroad for the postdoc. Stan Bentvelsen confirms this by saying that students cannot be employed by the same employer after the PhD, although extensions of a few months are sometimes allowed. There was general consensus that this is a very healthy policy. However, Kati Lassila-Perini noted that this might be a very critical point for family conciliation. Patricia Conde noted that the students talk gave the impression that there is a lack of female and gender balance. Stan Bentvelsen confirms that gender balance is a serious issue and when Patricia Conde asks whether female presence could be reinforced in outreach, Stan Bentvelsen states that this is difficult given the lack of female staff. Finally, Marko Mikuž suggested that a structured alumni group for NIKHEF might help for feedback related to diversity and career opportunities.

The following topic in the discussion was «Education, Organization and Funding». The topic was introduced by Antonio Zoccoli. He finds the situation, in general, in very good state with an increase of the budget following the tendency in other countries. However, it is unclear to him how decisions on large infrastructures are made like, for instance, the Einstein Telescope. Stan Bentvelsen replies that infrastructures are funded by the Ministry of Science and Education via the National Roadmap and there are no other instruments to find resources for large infrastructures. Future colliders might have this problem in the country if resources must come from outside CERN. The case of Einstein Telescope is a bit different since it may be hosted in The Netherlands. If this is the case, it will be handled by the Ministry of Economic Affairs. On top of that, there is a large regional lobby from where most of the funds come. There might be even more sources since it is an iconic national program. The connection between KVI and NIKHEF was also discussed. Stan Bentvelsen explained that there is little overlap in the scientific program. Guy Wormser noted that some universities are doing science in particle physics and are outside the NIKHEF partnership. Stan Bentvelsen replied that those are theory groups and NIKHEF is mainly about experimentalists and they require at least one full professor in experimental particle physics to join NIKHEF.

Lenny Rivkin introduced the topic «Detectors, accelerators and Technology transfer». He appreciates the increase in size of the small R&D group at NIKHEF and the impact in renewing the expertise since NIKHEF is at the backbone of these activities and has a big potential in training researchers and engineers. He is, however, worried about the CERN return being on the lower side despite of the fact that there is large potential. This is particularly true in the case of accelerators where he acknowledges the importance of the new chair in Groningen and work in some technical universities but believes their connection with NIKHEF needs to be improved. Marko Mikuž found the number of experimental thesis rather small. Stan Bentvelsen clarified that students usually are required to combine data analysis and work on hardware in their thesis. The small fraction that Marko Mikuž referred to was the thesis with no data analysis.

Michal Šumbera summarized his impressions on «Nuclear Physics and Astroparticle Physics». He was impressed by the e-EDM experiment which is well supported and funded. About KVI, he finds that the participation in NuStar and Panda experiments at FAIR is understaffed. However, there was the feeling that RECFAs cannot make recommendations outside Particle Physics. The participation in AUGER is good as is the visibility and

contribution of the NIKHEF groups. The efforts on Virgo and the Einstein Telescope are progressing well. Stan Bentvelsen believes that the resources are unbalanced with KM3NET taking the worse share. KM3NET is becoming more an engineer project at NIKHEF. Jorgen D'Hondt believes that participating in DUNE may split the community while Stan Bentvelsen replies that they do not see them as parallel activities and, in addition, they are transferring the developments made on ATLAS. Eckhard Elsen commented about difficulties of the plan, shown in one of the presentations, to use Protvino as a source of neutrinos. Stan Bentvelsen noted that the distance is about the same as in the case of DUNE. Fabiola Gianotti noted that the energy is probably too low. The three of them agreed that the idea is, in any case, in a very early stage.

Eilam Gross, about «Particle physics: experiment and theory», was impressed by the NIKHEF contribution to the LHC experiments (ATLAS, ALICE and LHCb) where they have a very good visibility and play important leading roles both in the analysis and the detector operation as well as on the detector upgrades. In the case of ATLAS, however, he misses more participation in the convenorships of the analysis groups, rather than subgroups, and believes it would be good to see NIKHEF taking more leading roles in Higgs and SUSY analysis. As for LHCb, he is impressed by the contribution in very many aspects of the experiment and by the level of involvement of students in analysis and hardware. Eilam Gross noted that, given the active contribution of the Dutch groups in the LHC experiments, he would like to see more collaboration among those groups producing some sort of combined analysis. Jorgen D'Hondt notes that this may be an issue for the collaborations. Stan Bentvelsen comments that he is trying to foster this in NIKHEF and would like to have an advice to have crosstalk among the different groups in the institute. Roger Forty notes that NIKHEF has a large potential in technical skills, however he expresses his worries about the ageing of the technical expertise in engineering. Stan Bentvelsen confirms that this is happening and engineers that retire are replaced by young persons. However, he clarified that the physicists do not pull enough on the engineering power at NIKHEF. Finally, Fabiola Gianotti suggests that we stress the fact that the NIKHEF Partnership model is a template to follow and contributes to the enforce the visibility of NIKHEF in the international scene.

In closing, Jorgen D'Hondt invited the Dutch HEP community to join the RECFA session and summarized the feedback from the Committee.

2. OPENING

(J. D'Hondt)

(Saturday, 20 October, Item 1 of the agenda, <https://indico.cern.ch/event/753433>)

Jorgen D'Hondt opened the meeting and welcomed Nick van Remortel as the new Belgium delegate in RECFA.

3. ADOPTION OF THE AGENDA

(Saturday, 20 October, Item 2 of the agenda)

The agenda (ECFA/RC/18/470) was approved.

4. APPROVAL OF THE DRAFT NOTES OF THE MEETING HELD IN BRATISLAVA ON 18-19 MAY 2018

(C. Alexa)

(Saturday, 20 October, Item 3 of the agenda)

(ECFA/RC/18/469/Draft)

Most of the comments implemented. New version to become available shortly to be approved in our next RECFA meeting.

5. DEBRIFING DISCUSSION ON THE VISIT TO THE NETHERLANDS

(J. D'Hondt)

(Saturday, 20 October, Item 4 of the agenda)

Jorgen D'Hondt goes through the slides that summarize the discussion held during the round table.

When discussing the conclusions on «Education, Organization and Funding», the issue of KVI was raised again by Eckhard Elsen and while Michal Šumbera was in favour of having a small mention of it in the letter, Jorgen D'Hondt disagreed given the little scientific overlap and so did Stan Bentvelsen. Peter Schleper, however, was in favour of finding a “middle way” to have a short mention of KVI to avoid giving the impression of ignoring or leaving aside KVI.

Lenny Rivkin suggested to mention KVI in the context of accelerators and applications and this was agreed by all.

Concerning the difficulties finding resources for experiments outside CERN, Stan Bentvelsen stressed that this applies not only to future colliders but also to Common Funds and/or M&O of other collaborations outside CERN, like Virgo, KM3NET, etc. Marko Mikuž asks whether having the experiment being recognized by CERN would help, but Fabiola Gianotti replies saying that most of these experiments are already recognized by CERN.

On the «Computing/Outreach/Education» when mentioning the computing centre return, Lenny Rivkin suggested to remove the word commercial, as it appears on the slides, to emphasize that the return goes beyond this. Eckhard Elsen notes that since we have the European link here, they are developing the newest technologies for computing and the sentence on the slides does not reflect the current efforts realized. Stan Bentvelsen notes that this is an important issue since they need new funds from 2019 and are having discussions on how to deal with SKA. Eckhard Elsen suggests to show it as a combined centre for LHC and SKA, which might have more benefits and might be easier for the funders. Fabiola Gianotti asks whether there are statistics on the career of the PhD students that go outside for a post-doc like how many come back, stay away or leave the field. S. Bentvelsen replies that there are very small numbers and they are not able to trace all the PhD students that are formed in NIKHEF. There are about 100 PhD students and NIKHEF can only offer two positions a year. Half of the students leave the field and a sizeable fraction goes abroad for a post-doc. Peter Schleper notes that the ratio of PhD students and the positions offered is not very encouraging for the students finishing the PhD and that could explain the large fraction of them that leave the field. Stan Bentvelsen and others reply that this is similar in other countries and stress that this (Particle Physics) is in general a very insecure career path. Jorgen D'Hondt believes that the actual ratio is not that low and encourages NIKHEF to verify the actual numbers and the situation.

When discussing the «Detectors, accelerators and Technology transfer» Marko Mikuž asks, concerning the CERN return, what happens to the numbers shown on Friday if the host countries (Switzerland and France) are excluded. Fabiola Gianotti replies that care should be taken when renormalizing since, while services might be more favourable to the host countries, the procurements are more open. Numbers shown in the slides refer to procurement. Concerning accelerator research, Lenny Rivkin noted that we should not say that this research is “absent”. RECFA should, rather, turn the sentence into positive trying to link existing activities, although

not mentioned during the open session, with NIKHEF activities. Stan Bentvelsen points out that it is difficult to link them together since their technical skills are not oriented to particle physics. Guy Wormser notes that instrumentation-only thesis should also be encouraged. Jorgen D'Hondt agrees but notes that “the other” experimental thesis have also sections related to instrumentation. Pierluigi Campana comments that, with the technical expertise in NIKHEF, and given the possible funding problems in the future, it would be wise to consider applications with higher impact in society. He also asks whether NIKHEF has a Knowledge Transfer office. Stan Bentvelsen replies that NIKHEF is too small for that and does not have a specific office. However, they have good connections with universities that do.

When discussing «Nuclear Physics and Astroparticle Physics» Guy Wormser notes that KM3NET is a unique experiment in the sense that, in the context of Particle Physics, does not have direct competitors. RECFA could encourage NIKHEF to try and have a more defined physics roadmap within KM3NET that better defines the path towards ORCA or ARCA. While in the context of technology one can contribute equally on both experiments, from the physics point of view they are different. Jorgen D'Hondt replies that there are grants given to individuals that cover the physics goals. He suggests to encourage NIKHEF to finish the construction and setup with its partners and to find measures to attract new researchers to exploit the investment. Finally, Stan Bentvelsen suggest that RECFA makes a statement about gravitational waves in the letter since this is, by far, the biggest activity in the Partnership.

During the summary of «Particle physics: experiment and theory» discussion yesterday, Guy Wormser and Eilam Gross noted that the preparation for the upgrade of the HL-LHC detectors is impressive. Eilam Gross emphasized the contribution of NIKHEF's technical departments to this success. Stan Bentvelsen believes it would be useful to make this clear in the statement and to suggest investments to keep the resources in the technical department.

6. REPORT FROM THE CHAIRPERSON

(J. D'Hondt)

(Saturday, 20 October, Item 5 of the agenda)

Jorgen D'Hondt goes through the slides. When showing the calendar of visits for 2019 he notes that a possible back-up to Cyprus could be Greece.

When Jorgen D'Hondt finished with the slides about the Working Group on software skills a discussion started on whether a second iteration of the survey is needed. Kati Lassila-Perini expressed her concerns about whether to include PhD students in the census or not. Lenny Rivkin noted that this was not required when the request for information was sent and not all of them included PhD students. Manfred Jeitler pointed out that a clear "classification" is needed to interpret the census data. A distinction should be made on physicists using or developing software for Monte Carlo simulation, data acquisition or anything specific to detector operation. Roger Forty noted that he would rather not launch a second completely new survey. He would prefer to call for a few clarifications, for instance whether for CERN (his case) would have fellows included (students in other places). A second point of clarification would be to just request software engineering background, removing the "or equivalent" part of the sentence, and have a second account for physicists developing software. Eilam Gross expressed his doubts about the whole process and asked whether we are just trying to determine the software support that different institutes or laboratories have. Jorgen D'Hondt replied that this tries to go beyond support. Guy Wormser noted that, probably, support is the least important aspect of the survey. The original idea, he believes, was to identify the resources available in the community to face the new challenges of the data size in future experiments. In this context, PhD students should not be included since they are focused in today's problems rather than in solving future challenges. Jorgen D'Hondt concludes by saying that clarifying the distinction between software engineers and data scientists is feasible and we should allow to provide an explanation of the numbers given. The information on the education we provide to our physicist in software engineering and data science would also be very useful. Eckhard Elsen notes that whatever the result of the poll is, it already gives the message that the current very large investments are missing some coherence and just follow the needs as they come. He wonders whether the time has arrived to create centralized institutes of advanced software development in Europe to give better structure to the money that we already have. There are some initiatives like this in the United States already. Lenny Rivkin adds that this is a very important point but could be extended to other fields as well.

When showing the data of participation on the survey of Recognition, Jorgen D'Hondt notes that the number of students is rather small which suggests a need of a stronger communication with the community to reach the younger people. Antonio Zoccoli stressed that a clear message must be sent to include PhD students.

When Jorgen D'Hondt shows the proposed programme for the first ApPEC-ECFA-NuPECC joint seminar, Stan Bentvelsen wanted to clarify which is the targeted audience of the seminar. Jorgen D'Hondt replies that, at least in this very first one, the seminar is targeted to science policy makers, i.e. scientists, rather than to the funding agencies.

Jorgen D'Hondt presents the slides explaining the idea of creating a working group «Higgs physics with e^+e^- colliders in parallel and beyond the HL-LHC». Guy Wormser believes that the idea implicitly assumes that the ILC is not happening. If this is not the case he considers it a very good initiative. Fabiola Gianotti notes that the proposal might interfere with the role of the PPG. Joachim Mnich agrees with Fabiola Gianotti and believes it is not the role of ECFA to create a body which might seem like a parallel structure in competition to the strategy. Jorgen D'Hondt claims that the working group should feed in information to the PPG, regardless of having the ECFA label on it. Stan Bentvelsen believes, given the broader nature of the PPG, that this group would be very useful given the importance of the topic. Eilam Gross notes that since Jorgen D'Hondt is in the PPG, he could initiate this idea there. Jorgen D'Hondt defends that this process would be very transparent because the output of the working group would be made available to the community at large. Fabiola Gianotti insists in that this initiative should come from the PPG. Jorgen D'Hondt agrees to discuss it in the next meeting of the PPG. Peter Schleper expresses that, beyond this formal discussion, there is a need of an objective comparison of the future possibilities and ECFA can raise it within the PPG. Jorgen D'Hondt notes that the label, ECFA or PPG, is less important than the fact that the report goes to the full community and should be available before the Open Symposium. Antonio Zoccoli notes that this work needs to be harmonized with the other projects and topics in the PPG. Jorgen D'Hondt concludes that he will bring to the PPG the wish of ECFA to address this topic.

7. REPORT FROM CERN

(F. Gianotti)

(Saturday, 20 October, Item 6 of the agenda)

LHC is at the end of Run II, the proton-proton run will finish soon and has been very successful. The original goal was to provide an integrated luminosity of 60 fb^{-1} to both ATLAS and CMS. CERN is confident that 65 fb^{-1} can be reached. As for LHCb, the goal was to provide 2 fb^{-1} . As of today, 2.4 fb^{-1} have been delivered. LHC succeeded to have a special, large β run at injection energy (900 GeV in the centre of mass) for the study of elastic scattering in the very

forward nuclear-Coulomb interference region by Totem and ALFA. In a few days the Heavy Ion run will start which will be concluded at the beginning of December. This will be the last activity before Long Shutdown 2 (LS2). All in all, it has been a very successful year for the LHC.

The first of the two prototypes for DUNE (proto-DUNE), a standard single-phase liquid Argon TPC, is taking test-beam data at the CERN neutrino platform. The second prototype, a dual-phase TPC, will not be ready to take beam data before LS2 but will record cosmic rays, which will allow to validate the construction process and thus provide important input for the DUNE Technical Design Report (TDR) to be released in the middle of 2019.

AWAKE managed to accelerate electrons from an injection energy of about 20 MeV to 2 GeV over a 10 m plasma cell. This corresponds to a gradient of 200 MV/m (the goal of AWAKE is a gradient of 1-few GV/m).

Concerning geographical enlargement, Fabiola Gianotti reports that Serbia is transitioning from Associate Member to Full Member and Croatia is becoming Associate Member. Estonia has applied for full membership. The Council has put in place a working group to review some aspects of the Geographical Enlargement procedures and the current policy, which was approved in 2010.

In September 2018, the Council launched officially the update of the European Strategy process with the formal appointment of the PPG and the ESG.

Fabiola Gianotti also commented on the CERN position with respect to Alessandro Strumia's talk at the «Workshop on High Energy Theory and Gender» in September 2018. She emphasized that CERN's position is reflected in a statement on CERN's public web page. A. Strumia has been temporarily suspended, while an internal investigation is being carried out, for his offensive attacks to named individuals during his presentation, which violates CERN's Code of Conduct.

Finally, Fabiola Gianotti reported on CERN's plans of building the Science Gateway, a new educational and outreach facility that will greatly expand CERN's educational offer for the general public of all ages. It will be located in a new building complex close to the Globe. The project will also allow to strengthen the collaboration with educational activities in Member and Associate Member States. Science Gateway will be entirely funded with donations. The

building will cost about 65 MCHF and the content about 14 MCHF. So far, CERN has managed to secure 55 MCHF from external donations for the building, which will allow to start the construction soon, and a couple of millions for the content. In September the Council approved the project implementation plan presented by the Management. The contract with the main architect and the consultants will be submitted for approval to the Finance Committee in December. The building will be “filled” as the funding arrives. There is already a lot of material at CERN that can be moved there, like the Microcosm. The centre will also have a large auditorium with about 1000 seats, that will also be used to host big HEP conferences. The auditorium will be divisible and easily reconfigurable.

8. REPORT FROM DESY

(J. Mnich)

(Saturday, 20 October, Item 7 of the agenda)

XFEL is pursuing commissioning towards the full performance that will be reached next summer. Joachim Mnich reported that the University of Hamburg has been awarded the four clusters of excellence that were proposed. Two of them, on physics, were a joint proposal between the university and DESY. One on photon science and the second on Particle and Astroparticle Physics. This will provide funding for the coming years but, more importantly, reputation for physics in Hamburg. In general, the field was rather successful with 3 out of total 57 clusters in Particle and Astroparticle: Hamburg, Munich and Mainz.

9. REPORT FROM FRASCATI

(P. Campana)

(Saturday, 20 October, Item 8 of the agenda)

P. Campana noted that the preparation work in DAΦNE for the next round of data taking of SIDDHARTA2 is ongoing. The most important is the construction of the new focusing quadrupoles at the interaction point that should be completed by January next year. The PADME installation was completed at the end of July and since October the detector is running at full luminosity. Work required to double the BTF line finished in July. Some work on the upgrade of the modulators is to be finished during the technical stops during Christmas. The second beam line will, therefore, be available for users before summer.

P. Campana reported that a bid was sent out in July for the PROJECT OF THE building of EuPRAXIA@SPARC_LAB and they received the answer of five large engineering companies. The bid will, hopefully, be assigned by the end of the year and the project should be finished by the summer as specified in the contract. A scientific committee, chaired by P. Muggli (Munich & CERN) working in AWAKE, is being set up for the review of the CDR.

Results of measurements on the current plasma unit in SPARC_LAB in July show an accelerating gradient in excess of a few hundred of MeV/m. It is higher than conventional acceleration but still below the GeV/m goal of plasma beam driven acceleration.

The plan to transform DAΦNE into an accelerator test facility after the end of its operation in collider mode was submitted to INFN and was valued favourably. A workshop will be held on December 17th in Frascati to discuss the interest of the community.

10. INFORMATION FROM APPEC AND NUPECC

(E. Widmann)

(Saturday, 20 October, Item 9 of the agenda)

Eberhard Widmann goes through the slides. Highlights of them are that NuPPEC has celebrated its 30th anniversary in October at ELI-NP and that a new EU project has been granted (Strong2020). The project is coordinated by Barbara Erazmus for the Strong Interaction Hadron Physics community that prepared the application. CERN is a partner, participating as a TNA (Transnational Access) facility and in the development of future fixed-target experiments (ALICE and LHCb).

NuPPEC has setup a working group to provide input to the European Strategy for Particle Physics. Their input will be based on their Long Range and the document will be delivered in the next two months.

Eckhard Elsen asks whether detector developments at ALICE, NICA, etc. are not explicitly mentioned since they are going to happen anyway. Eberhard Widmann replies that what he meant on the slides by detector developments were developments for smaller experiments within the Strong2020 framework. Barbara Erazmus added that, within Strong2020, they search for synergies with ALICE and LHCb, not only in detector development but also on data handling and analysis.

Peter Levai asks whether Strong2020 will be only project integrating from low to high energy, providing access to the facilities, etc. or if there are other proposals. Eberhard Widmann replies that, within NuPPEC, there are two of those projects, the other one is ENSAR, which is a nuclear structure physics collaboration.

11. STATUS EUROPEAN PARTICLE PHYSICS STRATEGY UPDATE

(J. D'Hondt)

(Saturday, 20 October, Item 10 of the agenda)

Jorgen D'Hondt goes through the slides on the status of update of the European Particle Physics Strategy. He confirms that the four names we nominated for the Physics Preparatory Group (PPG) were accepted by CERN Council. They were: S. Bentvelsen, P. Sphicas, M. Zito and A. Zoccoli.

As for the EPS-HEP/ECFA joint session in July 2019, the proposal for the title is "Europe and its strategy for particle physics". R. Forty noted that this title might give the impression that the process is already finished and suggests to include "towards" in the title. We all agree.

12. SUMMARY AND LIST OF ACTION ITEMS

(J. D'Hondt)

(Saturday, 20 October, Item 11 of the agenda)

Jorgen D'Hondt shows the slides with the actions set in the last meeting in ALBA. It is all done. He also went through the action list coming from this meeting.

13. ANY OTHER BUSINESS

(J. D'Hondt)

(Saturday, 20 October, Item 13 of the agenda)

There being no further business, the meeting was adjourned at 12:15.