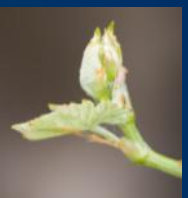
K. Long, 1 July, 2010

Imperial College London

ECFA review panel: for future large infrastructures for neutrino oscillation experiments

— possible way for ECFA to help in the coordination of neutrino activities



Question 4

What is the view of the SPC on the merit of a European strategy in this phase of neutrino experimentation and whether it should have a place on the future CERN road map?

No global strategy exists concerning accelerator-based neutrino facilities.

In Europe, in line with the recommendations of the 2006 Strategy for Particle Physics, a number of R&D efforts have been undertaken to understand by 2012 the feasibility of the major options and their cost. Establishing an agreed R&D strategy supported by a medium-term road map and a review process, would be highly desirable. This should include specific aspects for Beta Beam and Neutrino Factory,

CERN, as the European particle physics organisation, should play an important role in the process leading to the definition and implementation of the European strategy with respect to a ν-physics programme. A targeted contribution from CERN on specific aspects related to the development of intense neutrino beams, for which CERN has unique expertise, would provide vital support to the European ν-physics community, allowing it to achieve its goals.

SPC meeting, 16.03.2010

A possible contribution by ECFA to the solution is

An expert panel set-up by ECFA who reviews the scientific issues of the intermediate and final reports by the EUROnu and IDS-NF, and reports to ECFA.
Review reports will become publically available.

- Would this be welcomed by the community?
- Panel has an European mandate but should have an international composition!
- What is the relation with the other regions (US and Asia)?

Should we do more?

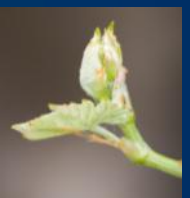
ECFA - European Commitee for Future Accelerators

Time line

-First discussion: RECFA meeting in Moscow, Oct 2009
-Idea of setting-up a review panel presented by Ken Long:
RECFA meeting in Brussels, Feb 2010, positive reaction
-Start contacting with neutrino communities for their reactions
-Start testing the reaction from the other regions
-If reactions are positive, presentation of a concrete plan:
RECFA meeting in Sofia, May 2010
-Ask for an endorsement to set-up a review panel by Plenary ECFA in Frascati, July 2010
-If endorsed,
Nominate the panel members and chair for an endorsement by Plenary ECFA at CERN in Nov 2010

Community consultation; steps taken:

- EUROnu:
  - Concept explained to Management Board
    - Welcomed proposed review panel
  - Concept presented to delegates at EUROnu costing w/s, CERN, 15/16 March 2010:
    - Positive reception
  - Note:
    - Formally, EUROnu reports to the Strategy Session of CERN Council:
      - So, if the review of the IDR and EUROnu interim reports is deemed to be a success and the process moves on to the review of the RDR and the EUROnu final reports, it will be important that the review is included as part of the Strategy Session of CERN Council reporting process
- IDS-NF
  - Concept explained to Steering Group
    - Proposed review panel was welcomed
      - Comment:
        - » Ensure review panel is manifestly international
  - Concept presented to IDS-NF plenary meeting, FNAL 08—10 April 2010
    - Positive reception
- Neu2012 (NA in EUCARD IA)
  - Concept presented by T. Nakada to Neu2012 community
    - Positive reception

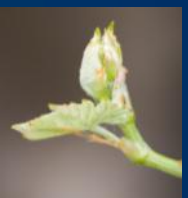


Conclusion:

community welcomes proposed review panel.

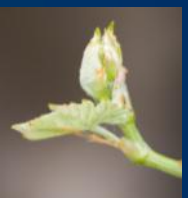
Issues:

- ECFA intention is that review panel shall be:
  - International:
    - European initiative; but international in scope and influence
  - Composed of internationally recognised leaders in the field
- Not sufficient for this to be the intention, nor sufficient even for it to be true in practice, unless:
  - The international community recognises the panel as international and 'heavy weight'
    - i.e. essential that there be 'buy in' from:
      - International neutrino community;
      - 'Stakeholders':
        - » e.g. laboratory and funding-agency directors
    - Implies:
      - Care in establishing principle with stakeholders prior to launch of initiative
      - Broad consultation to define composition of panel:
        - » Including appropriate cross membership (e.g. ICFA, ACFA, …)



Towards the terms of reference:

- **Noting the timescale defined by the Strategy Session of CERN Council, the ECFA review panel will:**
  - **Receive IDS-NF IDR and EUROnu interim report, supported by appropriate presentations from the proponents**
  - **Review and comment on the IDS-NF IDR:**
    - **The robustness of the physics case;**
    - **The specification of the baseline for the Neutrino Factory;**
    - **The analysis of cost and schedule presented in the IDR; and**
    - **The plans of the IDS-NF collaboration for the RDR.**
  - **Review and comment on EUROnu interim report:**
    - **The strengths of the super-beam, beta-beam, and Neutrino Factory facilities**
    - **The development of baseline super-beam and beta-beam facilities;**
    - **The plans of the EUROnu collaboration for the completion of the study.**
  - **Report to ECFA:**
    - **Also to ICFA etc. if successful in forming such partnerships**



ECFA review panel for: future large infrastructures for neutrino oscillation experiments

Overview:

The ECFA review panel on 'Future infrastructures for neutrino oscillation experiments' will receive the Interim Design Report (IDR) from the International Design Study for the Neutrino Factory (the IDS-NF) and the mid-term report from the EC FP7 EUROnu Design Study. The IDS-NF IDR will cover the physics case for the facility and present the baseline for the accelerator complex and the neutrino detectors. The EUROnu Design Study is addressing future super-beam and beta-beam facilities in addition to coordinating the European Contributions to the IDS-NF. The EUROnu mic-term report will therefore describe the work of the EUROnu collaboration on the physics performance of the various facilities and describe the conceptual design of the accelerator complex and neutrino detectors appropriate to each of the facilities. In the case of the Neutrino Factory, the EUROnu mid-term report is likely to be include a review of the IDS-NF IDR in addition to detailed descriptions of the work of EUROnu on the design of the Neutrino Factory.

Terms of reference

The ECFA review panel will note the timescale defined by the Strategy Session of CERN Council for development of the future neutrino-physics programme in Europe [1]. On the basis of the IDS-NF IDR and the EUROnu mid-term report and appropriate presentations from the IDS-NF and EUROnu collaborations, the review panel will:

- Review and comment on the IDR prepared by the IDS-NF collaboration. In particular, comment on:
  - The robustness of the case for high-sensitivity searches for leptonic CP violation and the high-precision measurement of the parameters of neutrino oscillations;
  - The specification of the baseline for the Neutrino Factory accelerator facility and neutrino detectors defined in the IDR;
  - The analysis of cost and schedule presented in the IDR; and
  - The plans of the IDS-NF collaboration for the preparation of the Reference Design Report (RDR) for the facility.
- Review and comment on the mid-term report prepared by the EUROnu collaboration. In particular, comment on:
  - The strengths of the super-beam, beta-beam, and Neutrino Factory facilities in addressing the key issues in the physics of neutrinos in the next decade;
  - The development of baselines for the super-beam and beta-beam accelerator complexes;
  - The development of baseline neutrino detector systems for the super-beam and beta-beam facilities; and
  - The plans of the EUROnu collaboration for the completion of the study and the preparation of a final report in which the performance, cost, and schedule for the implementation of the various facilities is compared.

The ECFA review panel will prepare a written report summarising its conclusions and documenting any comments on the work of, or recommendations for, the IDS-NF and EUROnu collaborations. The panel will report to the Chairman of ECFA and present its conclusions to ECFA as deemed appropriate by the ECFA Chairman.

Once the review of the IDS-NF IDR and the EUROnu mid-term report is complete, it will be necessary to consider how the role of the panel should be revised and whether its mandate should be extended. Consideration of the future role of the panel will need to include assessment of how the review process is received and the needs of the community.

Representation:

While the ECFA Neutrino Panel formally reports to the ECFA Chairman, it is important for the panel to be international in both scope and influence. The panel members must therefore be independent experts of international reputation, covering the necessary expertise in experimental techniques, accelerator science, neutrino detection systems, particle theory and phenomenology, and project management. In addition, the panel should include representatives from international community.