IUPAP Neutrino Panel

Nigel Smith
Executive Director

And thanks to Ken Long for slides
Provenance:
A little history: the ICFA Neutrino Panel
ICFA Neutrino Panel

News

Roadmap for the international, accelerator-based neutrino programme (April 23, 2017)

Mission

To promote international cooperation in the development of the accelerator-based neutrino-oscillation program and to promote international collaboration in the development of a neutrino factory as a future intense source of neutrinos for particle physics experiments.

Panel

- Membership
- Email the panel
- Terms of Reference
- Meetings
# ICFA Neutrino Panel – Membership

## Members

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
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<tbody>
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<td>Andre de Gouvea</td>
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<td>University of Goias</td>
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<td>Stephen Geer</td>
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<td>Kenneth Long</td>
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<td>Sam Zeller</td>
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ICFA Neutrino Panel’s contributions

• Initial consultation with the neutrino community:
  – Asia: Kavli IPMU, Kashiwa, Japan on the 13th November 2013
  – Europe: University of Paris Diderot on the 8th to 10th January 2014
  – Americas: FNAL, 30th January 2014 to the 1st February 2014

• International Meetings for Large Neutrino Infrastructures
  – Jointly organised with APPEC, APPIC (and Neutrino Panel)
    • 23—24 June 2014, Paris
    • 20—21 April 2015, FNAL
    • 30—31 May 2016, KEK

• Presentations to peers at:
  – Neutrino 2014: to explain activities of the Panel
  – Neutrino 2016: to solicit input on the roadmap discussion document

• And, of course, presentations to stakeholders (ICFA, ECFA, ...)

ICFA Neutrino Panel’s contributions

• Initial report from the ICFA Neutrino Panel
  1405.7052v1
  – Made the case for an energetic future programme and pointed out the opportunities
  – Recorded the peer-group consultation carried out the Americas, Asia and Europe (roadmap foundations)

• On the complementarity of Hyper-K and LBNF
  1501.03918
  – Reviewed the complementarity of the J-PARC/Hyper-K and LBNF/DUNE programmes
  – Made the case for the scientific benefits of mounting the two experiments

• Roadmap for the international, accelerator-based neutrino programme: Discussion document
  – Reviewed the accelerator-based neutrino programme, including the supporting experimental, R&D and theory programmes
  – Presented interim conclusions and recommendation for discussion by peers and stakeholders

• Roadmap for the international, accelerator-based neutrino programme
  1704.08181
  – Revised the Roadmap discussion document in line with comments received
  – Presented final conclusions and recommendations
The accelerator programme; part of the field of neutrino-physics

• Eloquently argued by neutrino-physics community
  – Consensus:
    • Also argued by funding agency representatives and ‘decision makers’

• Essentially the same point was made in:
  – KEK (3rd Large Neutrino Infrastructure meeting)
  – ECFA
  – Neutrino (’14) ‘16
  – And in discussions within the Panel

• ICHEP’16 discussion with IUPAP C11 Chair & co-chair:
  – Develop proposal for a new ‘neutrino Panel’ to take an ‘holistic’ view:
    • Consider synergy/impact of particle, astroparticle and nuclear physics
Neutrinos: synergies and impact

• Physics programme of large “far” detectors:
  – Neutrino oscillations (accelerator and non-accelerator); astroparticle physics

• Accelerator-based long-baseline and short-baseline oscillations:
  – Impact on astrophysics and cosmology (MH, CPiV, mixing parameters)
  – Requires sufficiently precise knowledge of nuclear physics of neutrino-nucleus scattering

• Astroparticle physics experiments, e.g. ICECUBE, ANTARES, ...
  – Exploit knowledge of properties of neutrinos from terrestrial measurements
  – Deliver measurements of oscillation parameters, PINGU, ORCA sensitivity to MH

• Reactor, solar and atmospheric neutrinos:
  – Give best constraints on, e.g. $\theta_{12}, \theta_{13}$

• Direct mass measurements and neutrinoless double-beta decay:
  – Nature of the neutrino; clear impact on particle physics and cosmology
  – Require good understanding of nuclear matrix elements
  – Next generation likely to require very large detectors (with commensurate scale of investment)

• Growing interest in nuclear-physics aspects of neutrino-nucleus interactions:
  – International collaboration, NuSTEC:
    • NuSTEC White Paper: Status and Challenges of Neutrino-Nucleus Scattering 1706.03621
    • PP/NP theory/phenomenology/experiment discussions in, e.g., Spain, UK ...

• ...
Proposal for a cross-committee neutrino working group

The International Committee for Future Accelerators, a standing committee of C11, set up a Neutrino Panel in 2013 with the mandate to “…promote international cooperation in the development of the accelerator-based neutrino-oscillation programme …”. The Panel has produced a roadmap for the accelerator-based programme, completing its mandate. The field of neutrino physics is much broader than the accelerator-based programme, its impact running from particle physics to nuclear physics, astronomy, astrophysics and cosmology. This breadth of impact, combined with the wide variety of techniques used and the close relationship between nuclear, neutrino and astro-particle physics calls for a working group with a commensurately broad remit. We therefore propose that a working group be established to promote cooperation in the study of the properties of the neutrino, its interactions with nuclear matter and the development of neutrinos as a probe of the Universe.

The ICFA Neutrino Panel       17 April 2017
J. Cao, A. de Gouvea, D. Duchesneau, S. Geer, 
R. Gomes, S.B. Kim, T. Kobayashi, K. Long, 
M. Maltoni, M. Mezzetto, N. Mondal, 
M. Shiozawa, J. Sobczyk, H.A. Tanaka, 
M. Wascko, G. Zeller

Conceived as cross-committee Panel:
• C4: Astroparticle-physics  
• C11: Particles-and-fields  
• C12: Nuclear-physics
IUPAP Neutrino Panel
Proposal for a IUPAP inter-commission Neutrino Panel

Sao Paulo, Brazil, October 9th
IUPAP-General Assembly

Proponents:
Alinka Lépine-Szily (C12)
Karl-Heinz Kampert (C4)
Michael Spiro (WG10)
Joachim Mnich (WG1)
Juan Fuster (C11)

Council was pleased to endorse the initiative to create a Neutrino Panel as a combined effort under the supervision of the C4, C11 and C12 Commissions together with the WG1, WG9 and WG10 Working Groups. The C11 Commission will take the role as the coordinating Commission of the action. The suggested mission of the Neutrino Panel is:

To promote international cooperation in the development of an experimental program to study the properties of neutrinos and to promote international collaboration in the development of future neutrino experiments to establish the properties of neutrinos.

Council recommends that:

The 29th General Assembly RESOLVES to establish the Neutrino Panel, composed of nominees of C4, C11, C12, WG1, WG9 and WG10, under the supervision of those Commissions and Working Groups and coordinated by C11. The panel will continue to the 30th General Assembly, to which it will report.

The 29th General Assembly DELEGATES to the Executive Council the authority to approve the mission of the Neutrino Panel and the membership of the Panel.
Setting up the IUPAP Neutrino Panel

• H. Schellman (Oregon State), Chair IUPAP C11:
  – Leading on setting up the new panel

• In consultation, nominated co-chairs of the panel are:
  – Takaaki Kajita (ICRR)
  – Manfred Lindner (MPIK, Heidelberg)
  – Nigel Smith (SNOLAB)

• Next steps:
  – Co-chairs will consult with IUPAP and the neutrino community to:
    • Nominate panel members;
    • Define terms of reference and modus operandi for the new panel

• This is our Panel: critical to engage with the co-chairs:
  – Make the success of the Panel a vehicle to enhance our field!
Where are we now?

• Several discussions held between co-Chairs, Heidi and Ken Long regarding process and names
• Wishes of Commissions to be respected r.e. members
• Looking for appropriate distribution, geographic, gender, area
• Target timescale for panel to be constructed to align with input to EU Strategy meetings (mid-October?)
Some questions and comments we are discussing

- Take a broad approach - physics first
- Do we aim to establish the panel for longer term - rotation over three years? Need a clean exit, or aim for an established panel to support international projects?
- Not a review panel. Not responsible for funding, or national - not a peer review panel, but a voice of peers.
- Connect to ApPEC, APIF, EU Strategy. Funding agencies? DOE were interested...
- Develop mandate with community. Roadmaps vs competition - what is the scope? Promote R&D projects, don’t coordinate. Do no harm - protect small stuff
- What is the community size?