SPC meeting

Agenda

1. Review of Nufact2016 organization: Jacques Dumarchez (10min)
2. Nufact2017 at Uppsala proposal, official decision: Mattias Blennow (10min)
   - new WG conveners from Asia
3. Report in International Neutrino Summer School (10min)
4. Discussion on the Nufact Workshop
   - Scope
   - Name & logo of workshop
   - committees etc...
   - Relation with International Neutrino Summer school
   - frequency, following workshop.
- AOB?

WG1: Neutrino oscillations

- WG conveners
  - Mark Hartz (Kavli IPMU/TRIUMF)
  - Francesca Di Lodovico (QMUL)
  - Alex Himmel (Duke)

Proposal from IHEP

Miao He (何苗)

WG2: Neutrino scattering phyisics

- Gabriel Perdue (FNAL)
- Marco Martini (CEA-Saclay)
- Hide Tanaka (ICRR)

WG3: Accelerator

- Jingyu Tang (IHEP)
- Chris Densham (STFC/RAL)
- Ben Freemire (Illinois Inst. of tech)

From KEK?

WG4: Muon

- Angela Papa (PSI)
- Robert Craig Group(Virginia/FNAL)
- Hai-Bo Li (IHEP)

MyeongJae Lee

CAPP, Institute for Basic Science, Daejeon, S. Korea, COMET

WG5: Neutrino beyond PMNS

- Pilar Coloma (FNAL)
- Sanjib Kumar Agarwalla (Inst. Of Phys., Bhubaneswar)
- Walter Marcello Bonivento (INFN Cagliari)

Continue!

Frequency (and scope) discussion

TAKASHI KOBAYASHI

KEK/J-PARC

Important discussion during this NuFact

Frequency: Yearly? Once/2years?...

- Important discussion topics in recent NuFact SPC meeting
- There are reasonable arguments for keeping/reducing frequencies
- We (SPC) decided to decide during this NuFact 2016, in the SPC meeting scheduled on Friday Lunch time
  - NuFact2017 is already decided to be held.
  - Discussion is on after NuFact2017, whether we have NuFact2018?
- Frequency discussion closely related to the scope of the WS (and the name)
  - Need to discuss in parallel
- We would like to hear your thought during this meeting
  - Come to talk to us
  - Send us e-mail
  - **Will have special discussion session on this issue**
    - **Aug.25Thu, 17:00**
    - **All participants of NuFact are invited**

NuFact

The **Rencontres du Vietnam** on

NuFact 2016

is the **eighteenth** in a series that started in 1999 as an important yearly workshop with emphasis on future neutrino projects.

The main goals of the workshop are to review the progress on studies of **future facilities** able to improve on measurements of the properties of neutrinos and charged lepton flavor violation as well as new phenomena

Unique opportunity to discuss PHYSCS AND TECHNICAL CHALLENGES of future accelerator-based neutrino&muon experiments

The NuFact16 workshop is divided into five Working Groups covering the following topics:

- Working Group 1: Neutrino Oscillation Physics
- Working Group 2: Neutrino Scattering Physics
- Working Group 3: Accelerator Physics
- Working Group 4: Muon Physics
- Working Group 5: Neutrinos Beyond PMNS

Scope of this workshop

- Future Accelerator-based experiments Using Neutrino beams & muon beams,
  - including beam dump and collider searches for heavy neutrinos and LFV processes
- Covering both
  - theoretical aspects
  - supporting measurements
- And technical challenges to realize the future projects mainly on accelerator & beam
  - Detector focused meeting is NNN
- Reasonable mixture of
  - Review of present cutting edge experiments
  - Next generation experiments
  - Future projects → Decreasing

Scope of these Workshops

- Review of theoretical studies of neutrino and muon physics.
  - current status
  - future directions
- Review of current experimental studies of neutrino physics.
  - accelerator-based neutrino experiments
  - associated beam dump and collider searches
- Review of current experimental studies of muon physics.
- Preparations for near-future experimental studies of neutrinos and muons
  - Design of conventional super-beams
  - Design of associated detectors
- Preparation for future muon-sourced neutrino facilities
  - Accelerator and beam design
  - Detector considerations
  - Associated R&D program

Special Characteristics of the Workshop

- Rotation across world regions (Europe, Americas, Asia)
- Continuity of questions addressed :
  list of questions is transmitted from one year to the other
- Format encourages original and new contributions
- Emphasizes common issues among various experiments and fields of expertise accelerator, experimental and phenomenological aspects are shared.
- Continuity of Working group conveners
  rotating assignment on a 3-year basis
- Written proceedings

These features lead to very creative workshops

Important good (recent?) feature: Questions

- List of questions are given at the beginning of the WS
  - Mostly homework from the last NuFact
- Discussion try to answer questions
- Discussions on the questions will be reported at the end
- New/Updated questions for the next NuFact (Homework)

Nufact history

- 2016(Vietnam) 123
- 2015(Rio) 123
- 2014(Glasgow) 124
- 2013(IHEP) 149
- 2012(W&M/J-lab) 143
- 2011(CERN/Geneva) 191
- 2010(Tata) 149
- 2009(FNAL/IIT) 197
- 2008(Valencia) 163
- 2007(Okayama) 148
- 2006(Irvine) 179
- 2005(Frascati) 187
- 2004(Osaka) 154
- 2003 (New York) 170
- 2002 (London) 161
- 2001 (Tsukuba) 165
- 2000 (BNL) 161
- 1999(Lyon) 120

DUNE/LBNF developed

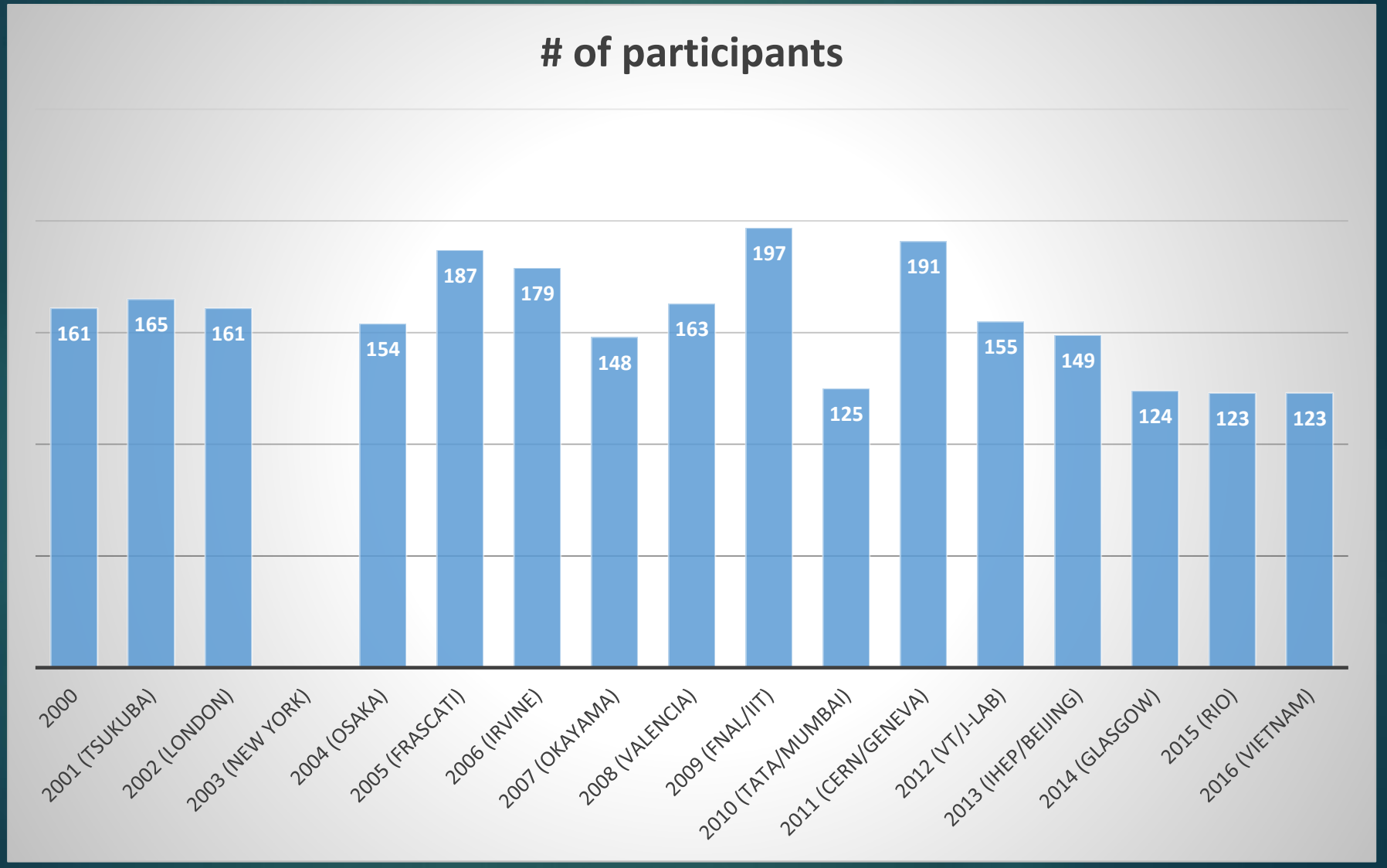
HK development

θ_{13} large → CPV w/ conv. Super beam

Neutrino factory for 1e-5 θ_{13}
"untimate" CPV
→ **Nufact WS**
Huge detector for CPV
HK, UNO, LBNE, LAGUNA, DUNE,
→ **NNN WS**

Oscillation discovery

of participants



Region	nufact10 (india)	nufact12 (us)	nufact08 (spain)
Europe	36	36	106
Asia*	17	16	20
N. Amer.	26	86	34
S. Amer.	0	1	1
Africa	0	1	1
India	70	1	3
Total	149	143	163

Meetings that still have links to attendees ... and out-of-region-attendees

nufact02	162	(London)	
nufact05	187	(Italy)	
nufact06	179	(US)	
nufact07	140	(Japan)	- 69 outside Asia/India
nufact08	163	(Spain)	- 55 outside Europe
nufact09	197	(Chicago)	- no institution info
nufact10	149	(India)	- 62 outside India/Asia
nufact11	191	(Geneva)	- 80 outside Europe
nufact2012	143	(US)	- 55 outside US

Jeff Nelson's analysis

Related conferences

- Neutrino conference
  - ~1week/2years
  - Accelerator-based, telestrial, astroparticle
  - Main focus on physics results
  - Future program is secondary
- WIN
- NuFact
  - ~1week/year
  - Future, accelerator-based neutrino experiments
  - Both technical challenges & physics
- Neutrino oscillation workshop (NOW)
  - ~1week?/2year?
  - Neutirno oscillation (acc, telestrial, …)
- Next generation Nucleon decay and Neutrino detector (NNN)
  - ~4days/year
  - Main focus on Next generation large detectors
    - Cover accelerator & non-accelerator, astroparticle
    - Also focus on technology development

Related conferences

- Large neutrino infrastructure
  - 2days/2014,2015,2016
  - Future projects with large infrastructure (accelerator/detector)
- NuInt
  - ~4~5days/18month
  - Neutrino interactions
- Neutrino beam instrumentation workshop (NBI)
  - 3~5days/ (2014/2012/2010/2006/2005/2003/2002/2000/1999)
- High Power Targetry Workshop (2014, 2016, 2018,..)
  - "brings together scientists and engineers from the international community for particle accelerator targets. Applications include neutrino facilities, neutron facilities, muon facilities, radioactive ion beams (RIBs), materials irradiation facilities and precision experiments for rare processes."
- The international workshop on future potential of high intensity accelerator for particle and nuclear physics (**HINT**)
  - Yearly so far
  - http://j-parc.jp/pn/HINT2016/
  - Intensity frontier flavor physics (μ, ν, K, n, Nucl., B, tau)
  - Technical challenges (targetry, …)

Name&Logo?

- we changed the scope of the meeting significantly to focus on 'superbeams'
- but it is clear that the name remaining the same has got a number of people confused.
  - ➔ May need to change the name to reflect the change of scope better ?
- Neutrinos at Future Accelerators (NuFaC) etc.. etc…
  - ➔ not using the pi-mu-nu logo anymore. Need to find a new one.
  - ➔ alternatively advertise officially the change of scope in international bodies
  - ➔ or organize a merger with NNN workshops? (not trivial, overlap only is Long Baseline beam)

4. Relations with International bodies: Meeting was initially endorsed by international committees such as ECFA or ICFA

I remember going to ECFA every year to report and getting re-endorsed.

This ceased to be with the NUFACT scoping study in 2006

→ should we re-instate sponsoring by these bodies?

→ can the ICFA neutrino panel be of some help in this?

5. Advisory committee : Nufact meetings till 2005 (6,7?) had an Advisory Committee in addition to the program committee

This body was unresponsive and did not serve at giving advice

However it ensured official recognition and once in a while a proposal of a speaker.

➔ I would suggest re-instating an advisory committee among the well known
physicists, connecting to NEUTRINO international committee etc..
Involving lab directors and neutrino collaboration leaders, but also *independent* high level scientific personbalities.

6. Organize meeting further ahead in time As Tord Ekelof commented 'you are late!'

Headline of arguments

- Reduce
  - Many neutrino related workshops and schools
    - "Bamboo shoots after rain 雨後の筍(1998)"
    - Sharing role with other workshops/conferences?
- Keep
  - Provide unique precious opportunities to discuss future accelerator-base experiments with theorist/experimentalist/accelerator/beam
  - With present scope, fields are rapidly developing

Concerning the frequency of the meeting:

- Some (not all) possible options
  - continue yearly
  - reduce frequency to once every 18 months
  - reduce to once every two years in opposition of phase with Neutrino conference.
- different opinions in the SPC on this subject:
  - some concerned that yearly frequency is too high to be sustainable
  - some concerned that switching to two years repetition will endanger the meeting without answering the reasons for loss of attendance.
- the mission of NUFACT is very differerent from that of the neutrino conference. It is focused on ***new ideas*** concerning ***neutrino experiments with accelerators***
  - The meeting should continue to see ahead in this field.
- Present organization is very efficient, based on 3yr rotating mandate of conveners.
  - What would be the impact of changing frequency of nufact?

Open for discussion!

- Opinons on
  - Scope
  - Structure (WGs)
  - Operation
  - Frequency
  - Whatever!
- We like to hear opinions from audience

Spare

Proposal for WG5

The nufact15 'legacy paper' recommends that

-- that Nufact continues its role as craddle of ideas for accelerator based neutrino sources

-- discusses the creation of a 5th working group to attract new theoretical ideas

e.g. Enrique Fernandez suggested a «theory» working group

more discussions with Enrique and others have led to the suggestion of a working group on

'Neutrinos Beyond PMNS'

In the tradition of the NUFACT meetings this would involve experimenters as well as theorists

WG5, ‘Neutrinos Beyond PMNS’

TOPICS and QUESTIONS *could* cover the following :

-- general discussion, motivation and, possibly, rationalization of models beyond PMNS

-- experimental searches for right handed neutrinos

- -- nuclear decays and galactic emissions (no emphasis)
- -- short baseline oscillations
- -- observation of neutral decays in beam dump experiments and neutrino beams
- -- observation in e+e- Z and Higgs factories (or e-e- -> W-W-?)
- -- observation at hadron colliders LHC, HL-LHC and SppC and FCC-hh
- -- unification of interpretation framework

-- other beyond PMNS, NSI, etc.

Recommendations for future NuFact Workshops

The NuFact Workshop series has proven once more, at Rio 2015, to be popular and lively. It has become home of **physics with accelerator neutrinos** not only in looking toward the future with neutrinos from accelerated muon beams but also in critically examining the experimental study of neutrino physics with conventional accelerator neutrino beams and understanding the limitations such beams bring to the physics analysis.

The proposal is that since the study of neutrino mixing is of great current interest NuFact will continue yearly and rotate regularly among three regions; Asia, Europe and the Americas. Although increasing local attendance in emerging countries is a major goal, targeting large labs and universities is also important

The organization of the INSS Neutrino School, associated with the NuFact workshop will be encouraged.

WG1 has become the opportunity where K2K, MINOS, OPERA, T2K, MINERVA, SHINE, NOVA as well as others, such as those interested in beam dumps searching for RH neutrinos can discuss their current and future prospects. With yearly advances in the field and including T2HK and DUNE considerations, this working group will be able to provide a regular reevaluation of how a neutrino factory neutrino beam could extend these future prospects.

WG2 looks at all neutrino nucleus interactions, with a good link to the dedicated NuInt Workshop, and focuses on oscillations. It is important to understand the limitations in this study due to conventional neutrino beams. The quantitative advantage of a neutrino factory beam in reducing systematics on oscillation measurements from this source will be continuously reevaluated.

WG3 has been most significantly affected by the recent shift in personnel and financial support away from muon-based neutrino beams. Advances in this direction will now require more time. For this reason, we propose that the focus of WG3 alternate yearly with the emphasis on neutrinos from muon beams one year and on conventional neutrino beams the next. This emphasis in alternate years on conventional neutrino beams could also provide a link to the broader accelerator neutrino community and to the technically dedicated Neutrino Beam Instrumentation NBI Workshop series. An extra convener from the team of the new FNAL line to S Dakota and/or the T2HK line is proposed.

The WG4 community remains symbiotic and welcome in the forms it will decide yearly.

WG5, concentrating on Neutrino Theory, has been advocated by E. Fernandez a former WG1 convener. He will be invited, along with other potential conveners, to make a proposal to initiate this WG if not in NuFact 2016 then for NuFact 2017.