V. Palladino
Univ & INFN Napoli
EuCARD12 plenary
27 April 2012

WP3-NEu2012

NEutrinos for Europe in 2012

Structuring the accelerator neutrino community

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Univ & INFN Napoli
EuCARD12 plenary
27 April 2012

WP3-NEu2012

Neutrinos for Europe in 2012

Networking Activity (continuing BENE, along with EUROnu & LAGUNA-LBNO FP7 DS)

within Integrating Activity EuCARD (continuing CARE)

- It was right to set 2012 as **our target** ….. we know now even the day: **July 31 2012**
  the CERN Council Strategy update process in progress sets that for us

briefly, **the steps** of our community that have been preparing that, **were**
the strongest R&D program we could afford (HARP, HP-SPL DS, MERIT, MICE, EMMA
the final report of LAGUNA in 2010
the EUROnu (and IDS-NF) Design Studies Midterm reports early in 2011
the push of the LAGUNA-LBNO Design Study to approval in April 2011
the warmly supportive ECFA review of EUROnu (and IDS-NF) late in 2011
the evidence for a sizeable third mixing angle θ_{13} ($\nu_\mu \to \nu_e$, $\nu_e \to \nu_e$) in 2011-12

three more steps soon :1) the ν-Turn workshop at LNGS 8-10 May
2) the Eu Neutrino strategy meeting at CERN 14-16 May
3) the final EUROnu meeting in Paris 12-16 June

In July 2012, the Eu context of accelerator neutrinos options will be clearly submitted to Council
shorter term CNGS and/or CNGS like LAGUNA LongBaseNO options (plus ShortBase too)
longer term the three EUROnu options ……Superbeam/Betabeam/NeutrinoFactory
in healthy competition/collaboration with the world context of options …. Japan, US and more …..

Two differences
wrt
NEu2012 reports to EuCard 2010 & 2011

- No NEu2012 yearly workshop to summarize, today this year NEu2012 workshop will be at CERN May 14-16

- A second NEu2012 talk will follow this as a highlight talk

11:50-12:25 Report from WP3: NEU2012 V. Palladino

12:25-12:45 Beams for υ Physics: a coherent proposal ? A. Blondel

A third difference

This year, Alain and I must convince you that,
in spite of the risks mentioned Wednesday by JPK at the GB

3b – Overview of results, possible issues or improvements

• ***WP3: Structuring the accelerator neutrino community*** *(INFN, CERN, UNIGE)*

results	Possible issues or improvements
Satisfies the **network** contractual requirements.	3 milestone reports late by one year, with corresponding deliverables scheduled for July 2012.

NEu2012 is indeed satisfying its mandate

structuring the accelerator neutrino community

i.e. a coherent input to the CERN Council Strategy process

WP3 DoW: Upcoming deadlines for Task deliverables (M40) July 2012 !!!!!!

Deliverables of tasks	Description/title	Nature[1]	Delivery month[2]
3.1.1	NEU2012 Website operational	O	M6
3.1.2	NEU2012 Information and knowledge disseminated	O	M48
3.1.3	Final NEU2012 guidelines for an accelerator neutrino experiments programme V.Palladino, S. Pascoli	R	M48 Mar 2013
3.2.1	Performance analysis and physics potential of upgrades of existing neutrino facilities I.Efthymopoulos	R	M40 Jul 2012
3.3.1	Proposal of the next global accelerator neutrino facility for Europe to build or help build. A. Blondel	R	M40 Jul 2012

WP

Task 2 maturing

Task 3 maturing

Mile-stone	task	Description/title	Nature[1]	Delivery month[2]	Comment
3.1.1.2	3.1.1	Calendar of workshops & conferences concerning NEU2012	O	M6	
3.1.2.1	3.1.2	Mid-term review of NEU2012 recommendations on neutrino experiments	R	M24	Road map for a programme of neutrino experiments
3.2.1.1	3.2.1	Midterm review of NEU2012 recommendations on existing accelerator neutrino facilities.	R	M24	Road Map for upgrading existing accelerator neutrino facilities
3.3.1.1	3.3.1	Midterm review of NEU2012 recommendations on new accelerator neutrino facilities.	R	M24	Road Map to new accelerator neutrino facilities

Update of the European Strategy for Particle Physics

Timeline for Update of European Strategy

Open for Submissions on scientific issues	1 February 2012
Submissions closed for the Open Symposium	**31 July 2012**
All submissions will be made available to the speakers and the session-chairs of the Open Symposium.	
Open Symposium (Krakow, Poland)	10-12 September 2012
Submissions closed for being included in the Briefing Book to the Strategy Group	**15 October 2012**
Strategy Group meeting to draft Update of Strategy (Erice, Italy)	21-26 January 2013
Finalizing Update of Strategy by CERN Council	March 2013
Special Council Session to adopt Update of European Strategy in Brussels	May/June 2013

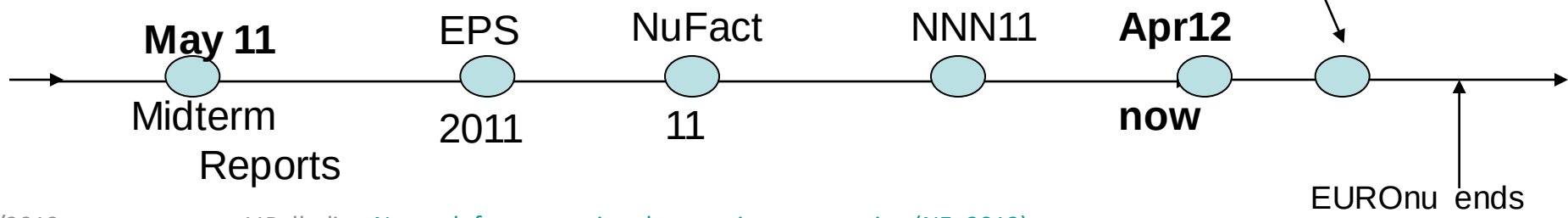
This page is maintained by Council Secretariat
» contact information

2011-12

April
May — Midterm Reports
Jun
Jul — EPS 2011, Grenoble, **July 23**
Aug — **NuFact11** UniGe/CERN
Sep
Oct
Nov — **NNN11,** Zurich
Dec
Jan
Feb
Mar
Apr

3° NEu2012 yearly meeting 14-16 May

2nd ν strategy Workshop .. town meeting … at CERN, before "Orsay" meeting



Since EuCARD review in June, a first major event in Europe in August

Reference forum of EUROnu FP7 DS and NuFact IDS

NUFACT 11

XIIIth InternationalWorkshop on Neutrino Factories, Super beams and Beta beams

Organised by : CERN - 1st, 5th and 6th Aug'11
UNIGE - 2nd - 4th Aug'11

The poster shows the two-flavour mixing of the currents Rhône and Arve in central Geneva

The NUFACT workshops on neutrino factories, beta-beam and superbeams, are now established as one of the important yearly neutrino conferences with emphasis on future projects. The main goal is to review the progress, and share the challenges, on the different studies of future neutrino oscillation facilities able to discover and study the mass hierarchy of neutrinos, CP violation in the leptonic sector and possible new phenomena. The workshops are original in that they combine the skills of experimenters, theorists and accelerator physicists.

NUFACT 11

Previous NuFact

1999 IPNL Lyon France
2000 UCBerkeley Monterey California USA
2001 Tsukuba Japan
2002 Imperial College London UK
2003 Columbia University New York USA
2004 Osaka University Japan
2005 INFN Frascati Italy
2006 UC Irvine California USA
2007 University of Okoyama Japan
2008 University of Valencia Spain http://ific.u
2009 IIT and Fermilab Chicago USA http://nu
2010 Tata Institute Mumbai India http://www.
2011 Geneva Switzerland http://NUFACT11.u

Then again a large international discussion a second time in Europe in November

Reference forum of LAGUNA and now LAGUNA-LBNO FP7 DS

NNN11 WORKSHOP

12th International Workshop on Next Generation Nucleon Decay and Neutrino Detectors
Crowne Plaza Hotel in Zurich, Switzerland
November 7 - 9, 2011

The 12th International Workshop on Next generation Nucleon Decay and Neutrino Detectors (NNN11) will be held at the Crowne Plaza Hotel in Zurich, Switzerland from November 7 to 9, 2011. The conference dinner is scheduled in the evening of 8th. Participants are encouraged to arrive on Sunday November 6th and a reception will be organized on that evening.

The primary purpose of this series of workshops is to discuss future large scale detectors for research on nucleon decays and neutrino physics. Following the successful format of the previous workshops, the workshop will consist of invited plenary talks and a small number of contributed talks addressing the following topics:

- Proton decay
- High intensity neutrino beam
- Supernova neutrinos
- Solar neutrinos
- Atmospheric neutrinos

ECFA Review Panel for future accelerator based neutrino facilities

Chair
Francis Halzen (US)
francis.halzen@icecube.wisc.edu

Accelerator specialists:
Terence Garvey (CH) terence.garvey@psi.ch
David Findlay (UK) david.findlay@stfc.ac.uk
Philippe Lebrun (CERN) Philippe.Lebrun@cern.ch

Experimental physicists
Koichiro Nishikawa (JP) koichiro.nishikawa@kek.jp
Patrick Decowski (NL) decowski@nikhef.nl
Ewa Rondio (PL) Ewa.Rondio@cern.ch

Theoretical physicists
Gianluigi Fogli (IT) gianluigi.fogli@ba.infn.it
Pepe Bernabeu (ES) bernabeu@ific.uv.es
Jukka Maalampi (FI) jukka.maalampi@phys.jyu.fi

Charge to the ECFA Review Panel for future accelerator based neutrino facilities:

to review

- **EUROnu Mid-term Report** and **IDS-NF Interim Design Report**

- concerning: scientific case, technical feasibility, risk and necessary R&D, cost and planning, organization
and to deliver

- concise written report by the end of July 2011

- oral presentation by the panel chair at ECFA-EPS joint session on European Strategy Document Update, Grenoble, 23 July 2011 in the afternoon

A rich research program in neutrino physics exploiting particle-astrophysics, accelerator and reactor experiments has made rapid progress possible; it is vibrant to date. The pioneering phase characterized by the remarkable physics return of relatively modest experiments is concluding; increasingly complex facilities are required to fill in many aspects of our still incomplete picture of neutrino physics.

The program should aim for neutrino physics beyond the determination of θ_{13}, the angle connecting the solar and atmospheric oscillations. It will be determined or significantly limited by present experiments. An outstanding goal is the discovery of CP-violation in the lepton sector. This requires a big step in technical improvements and should not avoid the challenges of introducing new concepts in accelerator, beam and large detector technologies.

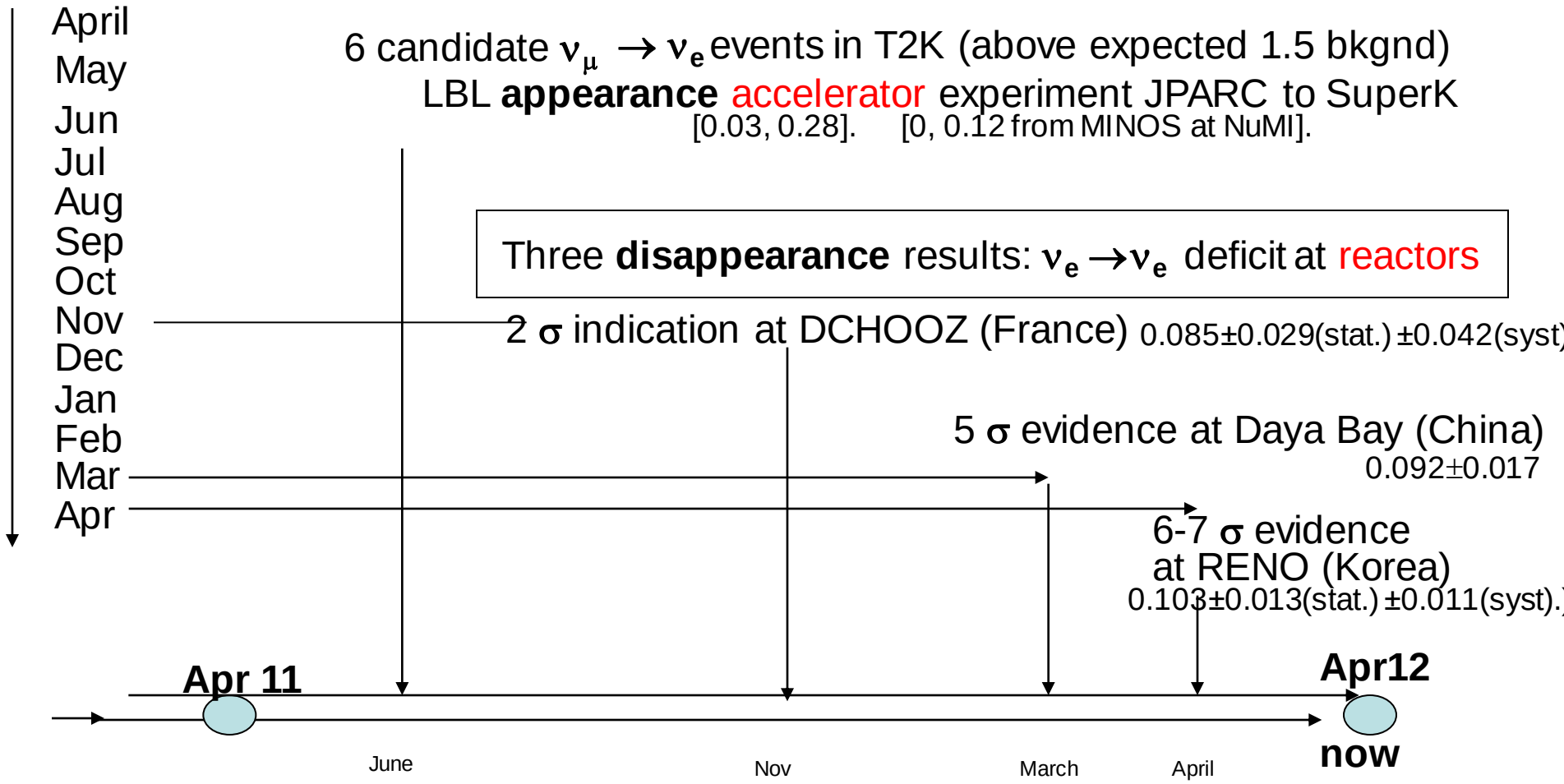
Even though it is premature to motivate future facilities on the basis of present indications (which include recent T2K and MINOS results as well as intriguing low statistics hints for new physics from short-baseline experiments and reactor data), recent developments underscore the possibility of unexpected discoveries supporting the construction of neutrino facilities with the widest science reach.

It is the committee's unanimous conclusion that both reports reviewed - the EUROnu mid-term report and the IDS-NF interim design report- made a clear case for the facilities proposed, although only the Neutrino Factory presented an end-to-end description of the road to construction. They both present a clear and in-depth description of the research and development performed so far. The community should be congratulated for the results.

No matter how it is implemented, this neutrino program presents challenges and risks that are very significant, but the scientific rewards in terms of new physics are potentially even greater.

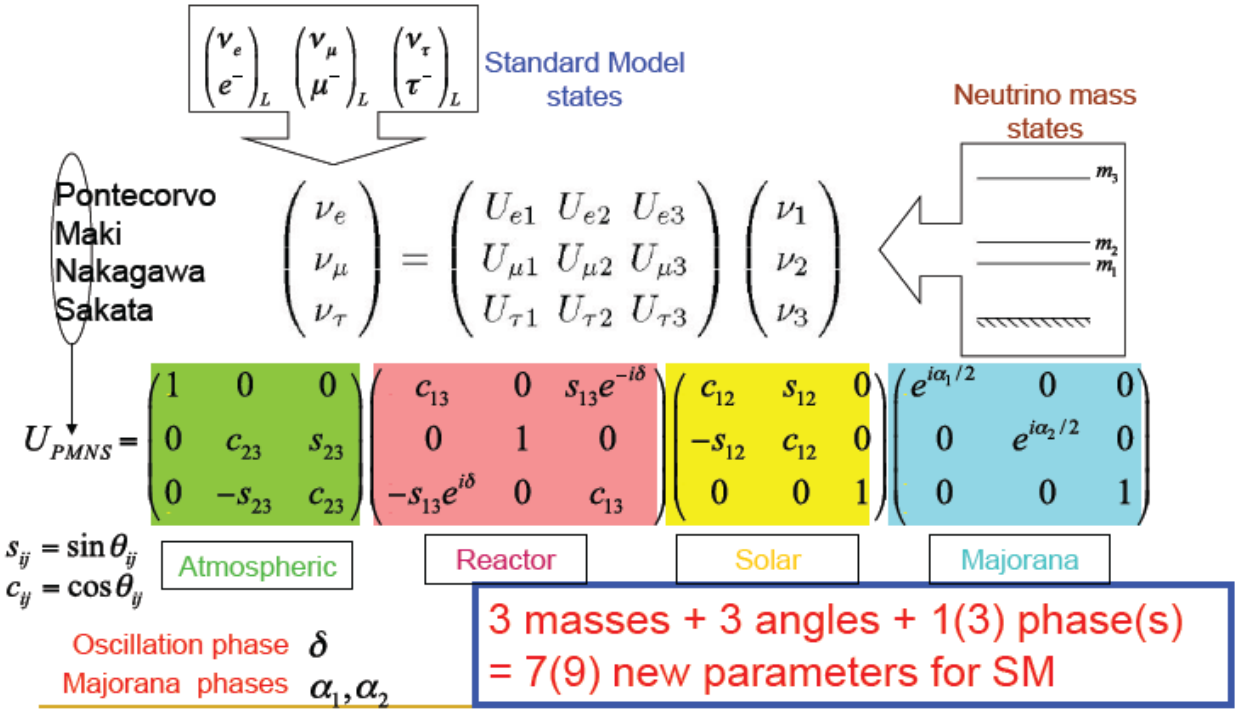
NB The proof of the pudding: four major ν physics results in the last EuCARD year !!

2011-12 $\sin^2 2\theta_{13} \cong 10\%$



Meaning of θ_{13} and its size

Three Neutrino Mass and Mixing



The Mixing Matrix is indeed at least 3*3

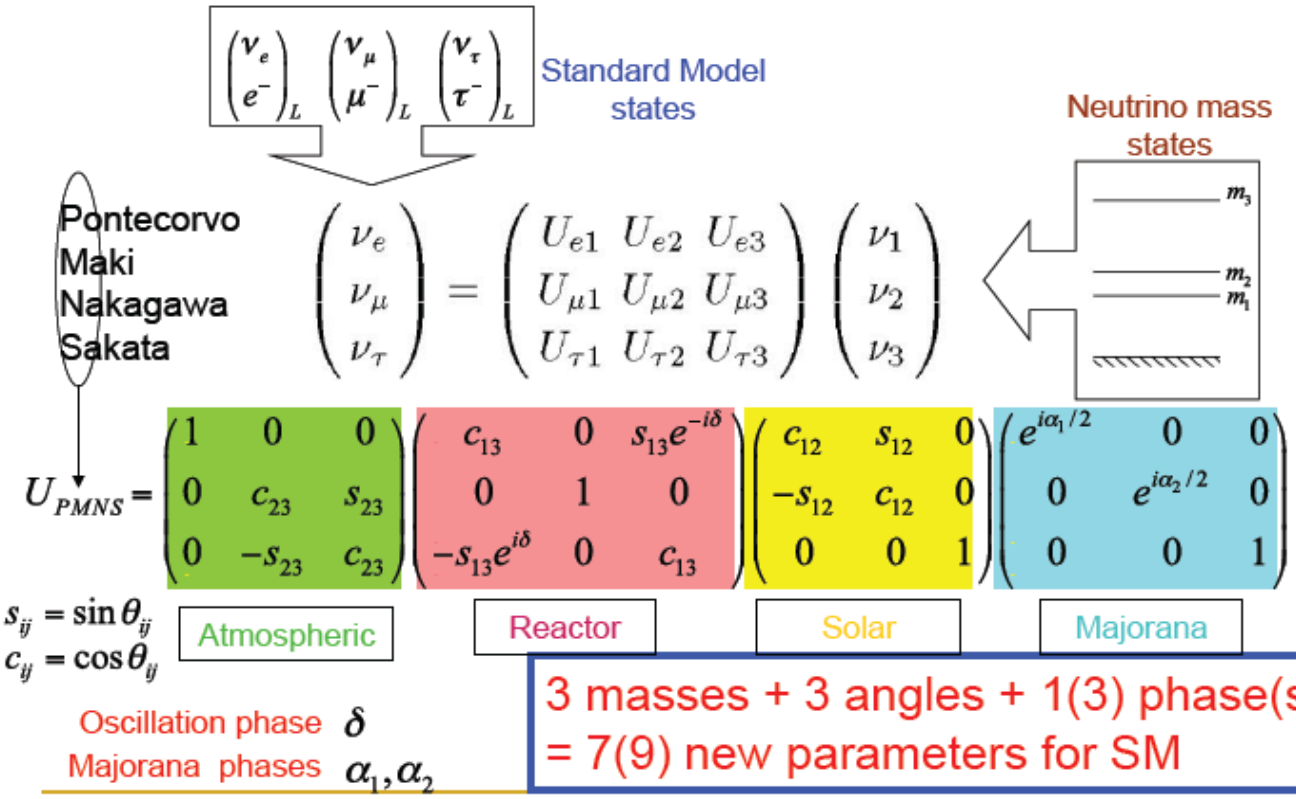
θ_{13} **being large, the far reaching CP violation phase δ can be measured !!!!!**

by ν / $\bar{\nu}$ asymmetries in appearance experiments

the future belongs to accelerator neutrinos

More (“sterile”) neutrinos?

Three Neutrino Mass and Mixing



Beyond 3 X 3

$m_\nu > 0$

ν_R must exist

ν_L only, so far

Superluminar ν evaporated, instead

EuCARD

European Coordination for Accelerator Research and Development Newsletter

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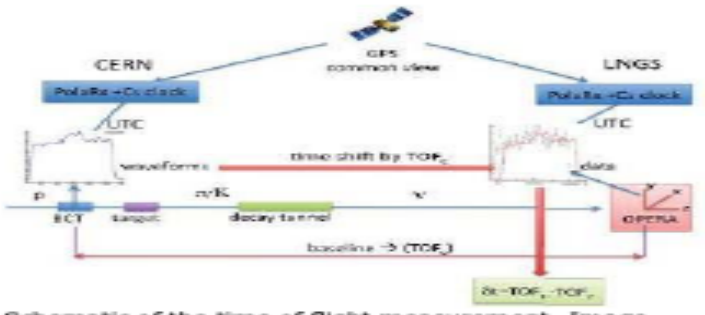
EuCARD >> News >> Newsletters >> Issue 11 >> Article 1

A word about faster-than-light neutrinos

In September 2011 the headlines read "faster-than-light neutrinos" and "could Einstein be wrong". But what were the research results behind these claims, what did the OPERA collaboration actually find and what have been the reactions from the neutrino community. Vittorio Palladino, leader of EuCARD's NEu2012 neutrino network, looks at the findings behind the headlines.

The neutrino's OPERA

With construction dating back to 2000, the "CERN Neutrinos to Gran Sasso" (CNGS) collaboration have been sending neutrinos from CERN to Italy since 2006. Protons from CERN's Super Proton Synchrotron (SPS) hit a graphite block creating a cocktail of particles, including neutrinos that travel 732 km underground to reach the OPERA detector.



Schematic of the time of flight measurement. *Image courtesy of OPERA (arXiv:1109.4897v2).*

The unprecedented long distance coupled with today's frontier technologies allow the researchers to make improved measurements of accelerator neutrino velocity: the ratio of precision measurements of the CERN to Gran Sasso distance and of the time of flight of the neutrinos (TOFu).

MINOS at Fermilab, USA, is upgrading hardware for a similar competitive measurement. Other significantly different measurements are highly desirable and will certainly in the end be the key to progress. Were a systematic error found, one presently unknown obstacle to precise measurements will have preciously been removed.

(arXiv:1109.4897v2).

*- Vittorio Palladino, INFN, EuCARD-**NEu2012** (WP3), Pasquale Migliozzi, vice-spokesman of **OPERA** and Kate Kahle, CERN, EuCARD-**DCO** (WP2).*

http://www.interferencetechnology.com/markets/nebstelecom/lead-news-item/article/neutrino-message-sent-through-ground.html

A first! Neutrino message sent through ground

Below! Discuss Related

Scientists are intrigued by the communications possibilities of exotic particles

NuMI to Minerva 1 Km

The word “Neutrino” was encrypted, sent, deciphered

Neutrino Telephone

By
Clara Moskowitz
LiveScience
updated 3/15/2012 1:38:43 PM ET

For the first time, scientists have used neutrinos – the exotic fundamental particles that routinely pass right through Earth – to send a message through the ground.

Researchers have long been intrigued by the communication possibilities of neutrinos, because these particles can easily travel through matter, including a planet, without stopping, slowing down or being misdirected.

Neutrinos are extremely tiny particles with almost zero mass and neutral charge. Thus they are impervious to electromagnetic forces and respond very weakly to gravity. They almost never collide with other particles, generally passing straight through the atoms that make up matter.

Now, scientists have successfully harnessed neutrinos to send a message from one place to another, spelling out the word "neutrino" in a particle binary code.

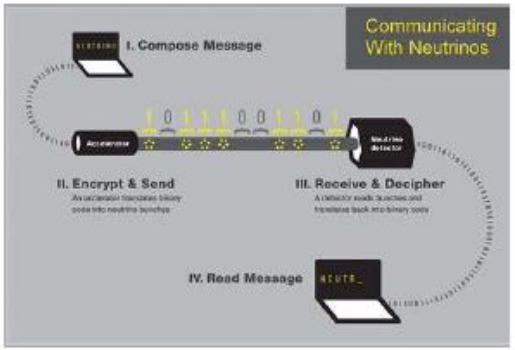
Particle telephone

The researchers used the NuMI particle accelerator at the Fermi National Accelerator Laboratory in Batavia, Ill., to create beams of neutrinos, which result when speeding protons collide into a wall of carbon atoms. (NuMI stands for "Neutrinos at the Main Injector.")

The scientists then sent this beam toward a neutrino detector about 1 kilometer (0.6 miles) away, buried in a cavern.

Because neutrinos so rarely interact with other particles, they are extremely difficult to detect. The detector, called Min different materials, including carbon, lead and iron. As the neutrinos pass through it, occasionally a neutrino will colli nucleus of one of these atoms, creating other particles that are visible to the detector.

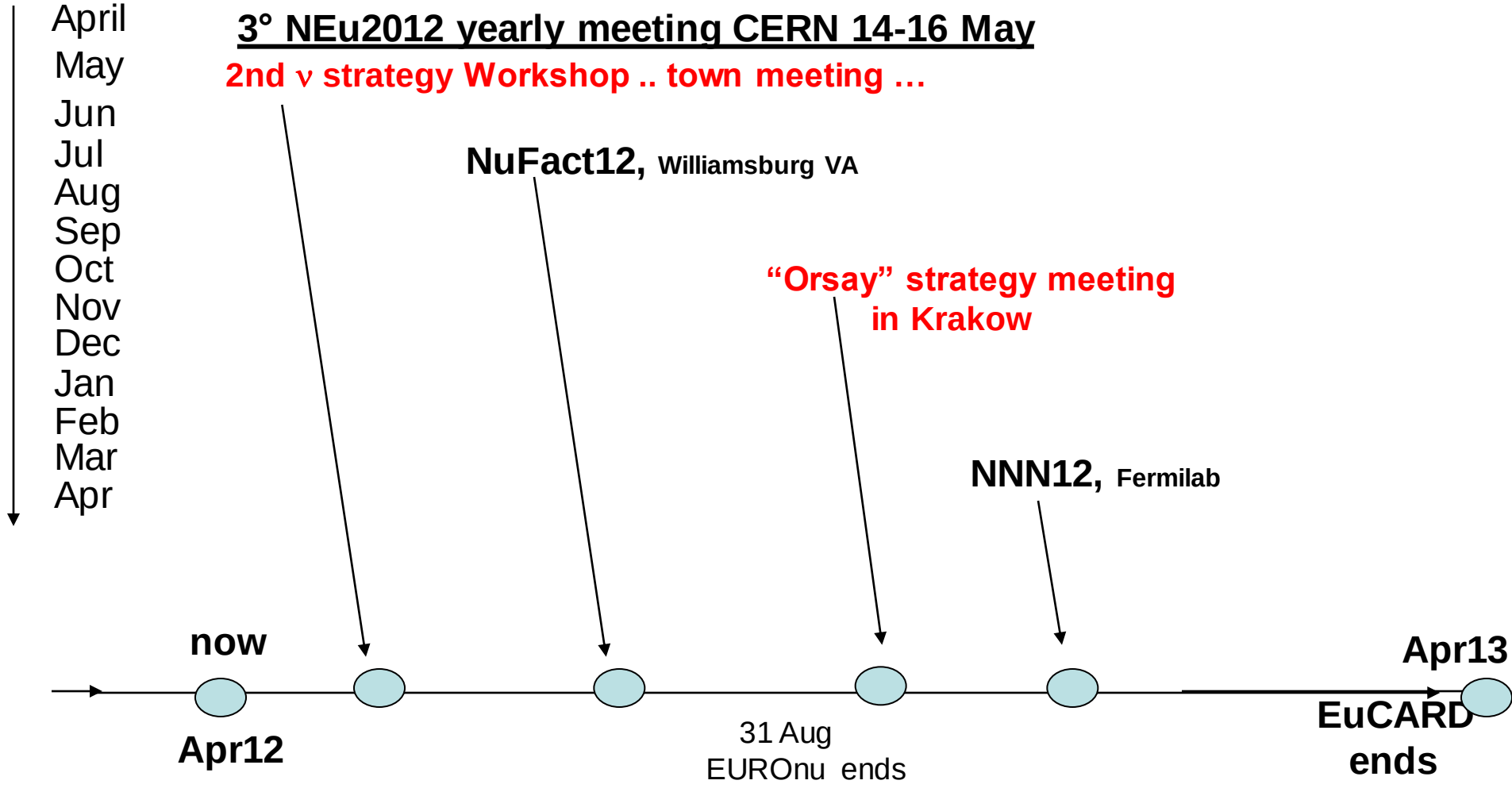
Scientists stand with the Minerva neutrino detector, located 330 feet underground Accelerator Laboratory.



University of Rochester

Scientists beamed a message through the ground using neutrinos in a binary

2012-13


April
May
Jun
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Apr
3° NEu2012 yearly meeting CERN 14-16 May
2nd ν strategy Workshop .. town meeting …
NuFact12, Williamsburg VA
"Orsay" strategy meeting in Krakow
NNN12, Fermilab
now
Apr12
31 Aug
EUROnu ends
Apr13
EuCARD ends

CERN, MAY 14–16 2012

NEUTRINO TOWN MEETING

HTTP://INDICO.CERN.CH/EVENT/NEUTRINO_TOWN

Program Committee
Sergio Bertolucci
Alain Blondel
Anselmo Cervera
Andrea Donini
Marcos Dracos
Dominique Duchesneau
Fanny Dufour
Rob Edgecock
Ilias Efthymiopoulos
Edda Gschwendtner
Yury Kudenko
Ken Long
Jukka Maalampi
Mauro Mezzetto
Silvia Pascoli
Vittorio Palladino
Ewa Rondio
André Rubbia
Carlo Rubbia
Achim Stahl
Jenny Thomas
David Wark
Elena Wildner
Marco Zito

Local organizing committee
Sergio Bertolucci
Alain Blondel (Chair)
Dominique Duchesneau
Fanny Dufour
Ilias Efthymiopoulos
Edda Gschwendtner
Patricia Mage
Federico Petrolo
Ewa Rondio
André Rubbia
Elena Wildner

EUCARD

CERN

European Strategy for Neutrino Oscillation Physics - II

14-16 May 2012 *CERN*
Europe/Zurich timezone

Search

Supported by NEu2012 - see instructions to apply

Support

A neutrino town meeting to prepare the input to the European Strategy for Particle Physics

Dates: from 14 May 2012 08:00 to 16 May 2012 18:00

Timezone: Europe/Zurich

Location: *CERN*
Room: Main Auditorium

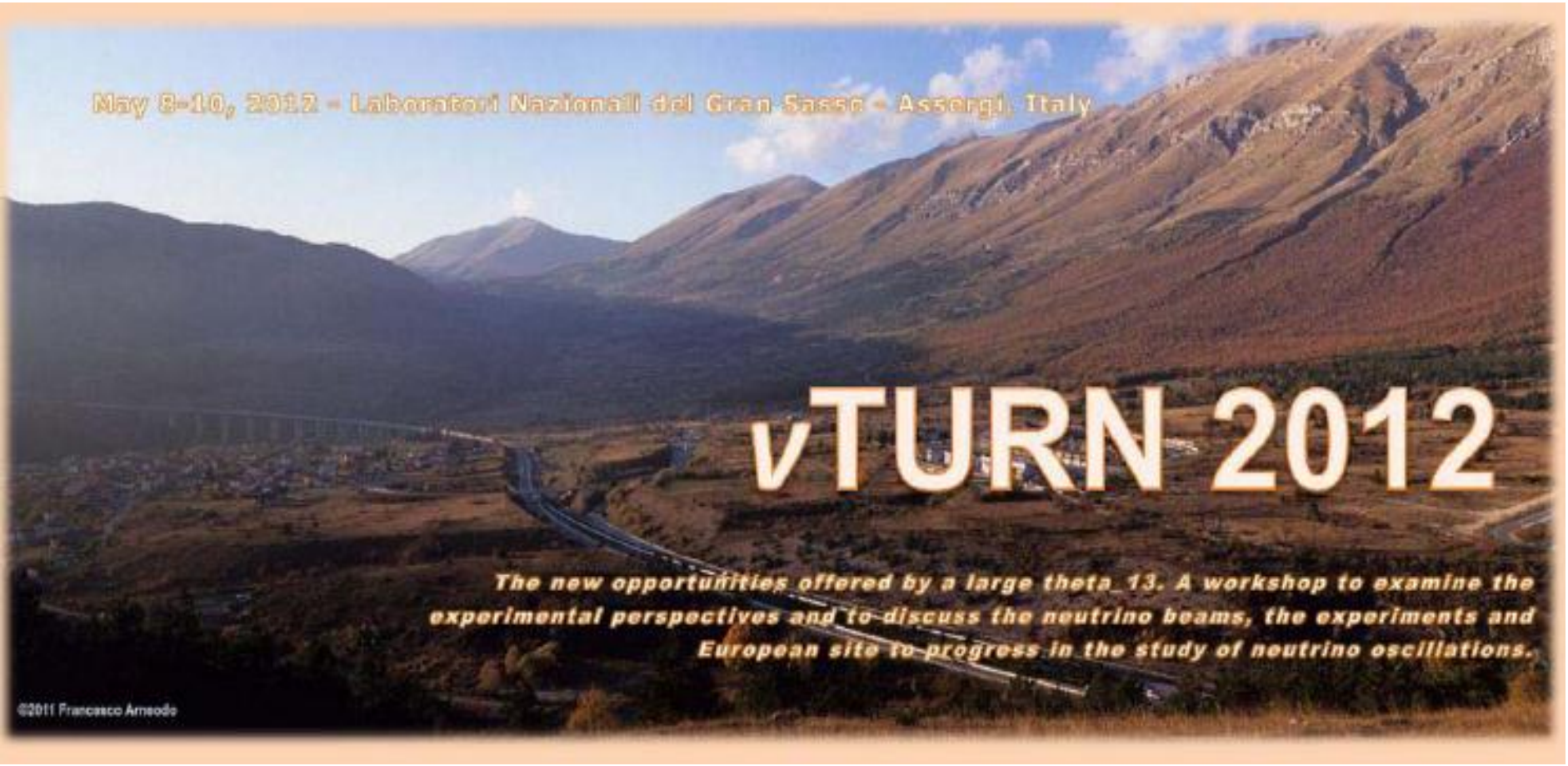
Material: Poster
invitation letter
questions to town meeting

Additional info: Should you wish to submit an abstract and do not have a CERN account, please fill in the form under: https://account.cern.ch/account/Externals/RegisterAccount.aspx

The Procedings of the first Workshop in October 2009 can be found here:http://cdsweb.cern.ch/record/1240330/files/cern-2010-003.pdf

Poster (pdf)

May 8-10 LNGS
Neutrino at the turning point



Continuation of the CNGS experimental program?

Final

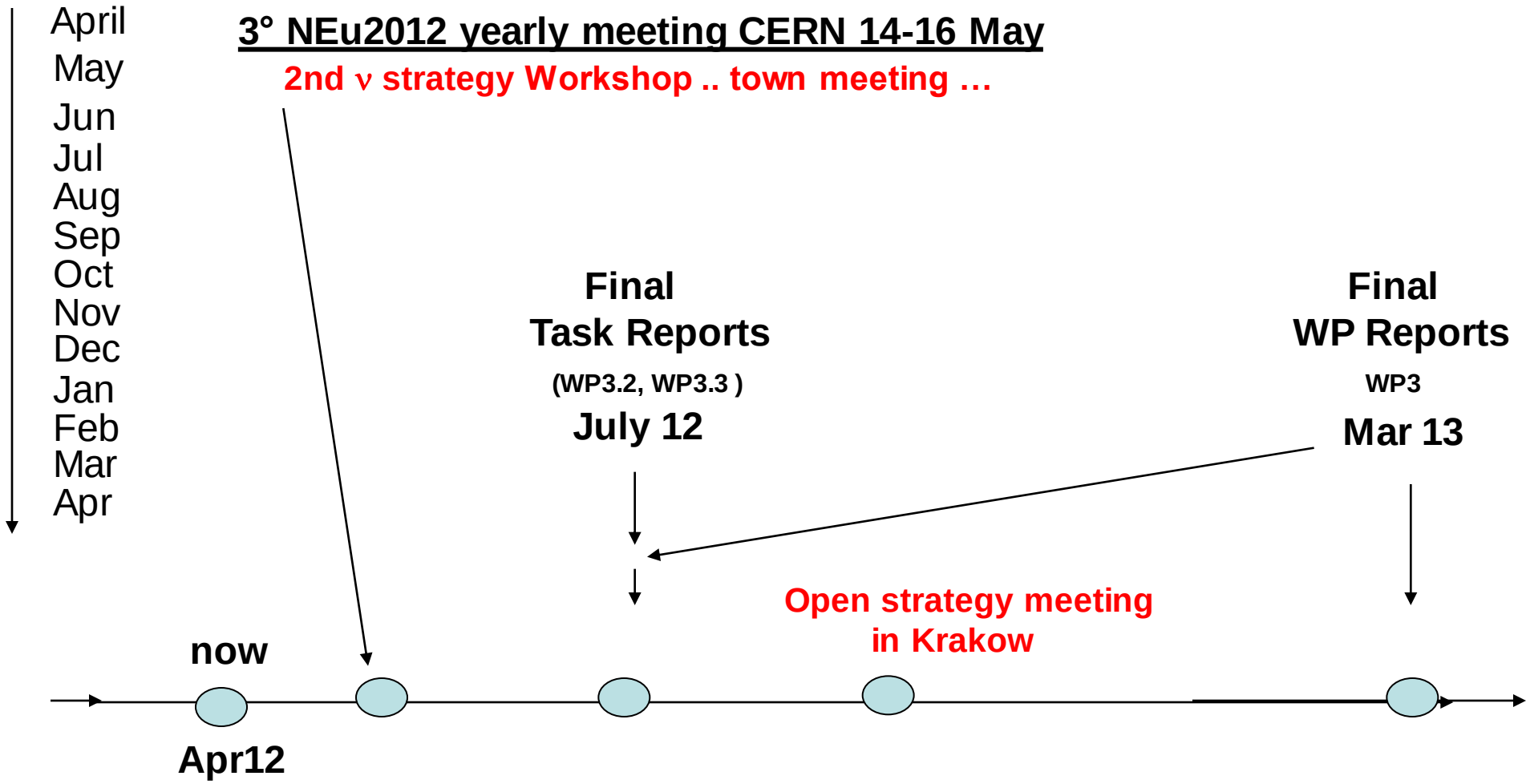
Fourth EUROnu Annual Meeting
June 12-15, 2012
APC, Paris

Home Program Registration Participants
Workshop Dinner Access Accommodation

Administrative Organization & Contact:

- Aurelia Guet (APC)
Tel. : +33 (0) 1 57 27 93 83
- Sarodia Vydelingum (APC)
Tel. : +33 (0) 1 57 27 69 35
conferences@apc.univ-paris7.fr

NEu2012 reports 2012-13



Task 2

Best use of existing facilities

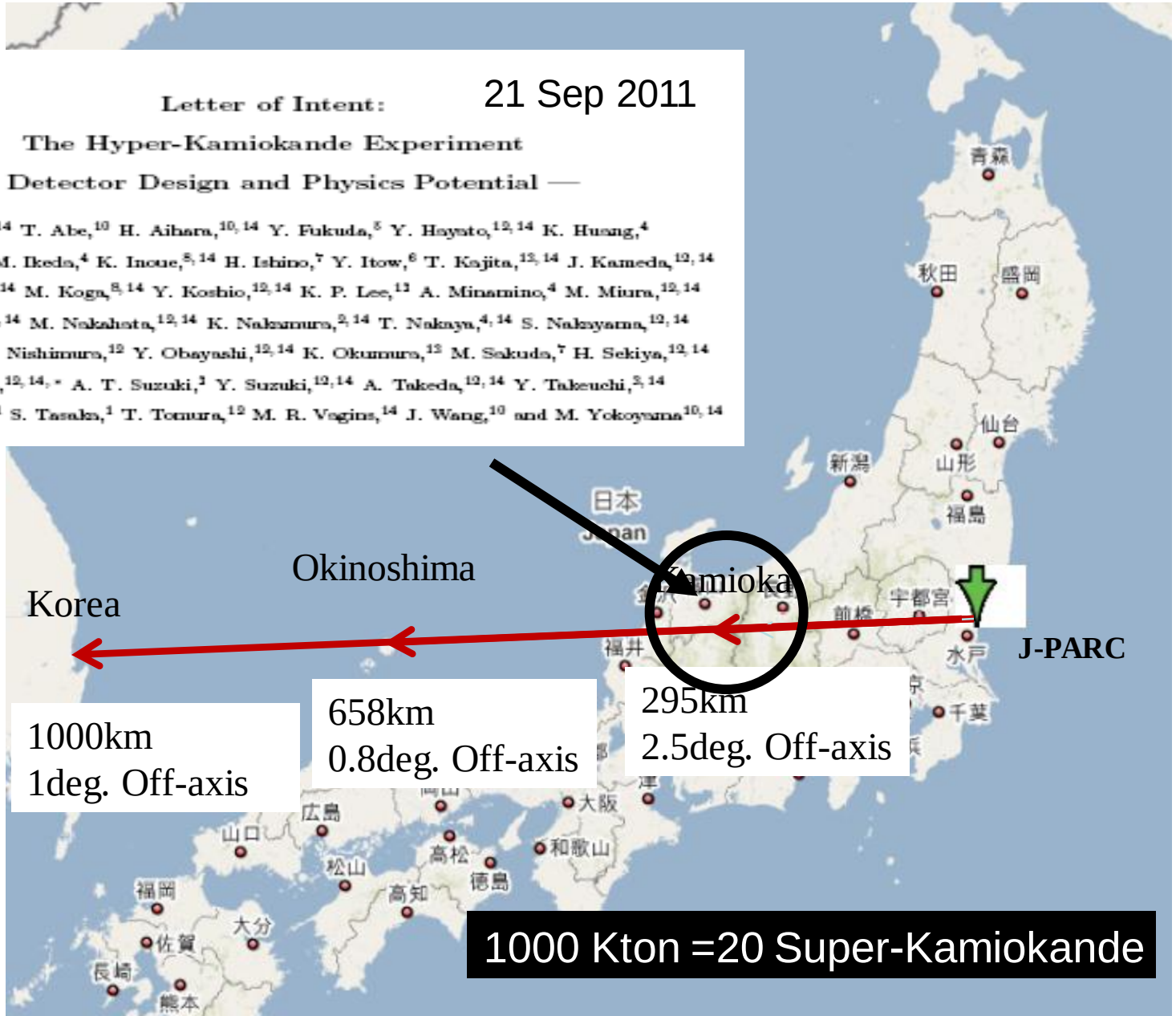
$\sin^2 2\theta_{13} \cong 10\%$ experimental rates will be viable

can still learn with conventional **$\preccurlyeq$ 1 MW** υ beams

Japan, USA, Europe

<u>while</u> novel υ beams mature

Japan : choosing one of Three Possible Scenarios

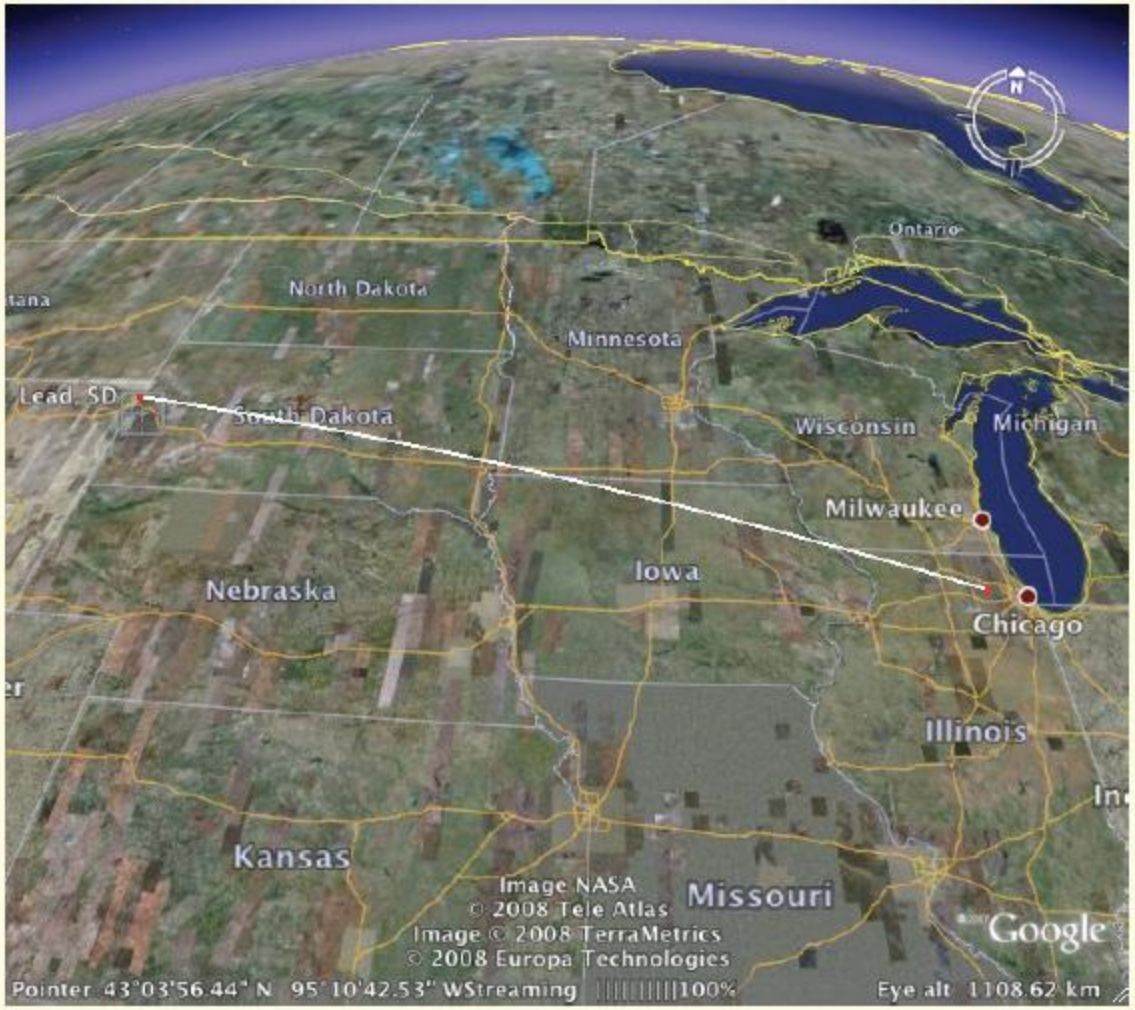


US LBNE = Long Baseline Neutrino Experiment

NuMI

Fermilab to Homestake DUSEL (1290km)

35 Ktons
Li Argon
Detector



Attractive project marching through its milestones

but

plagued by

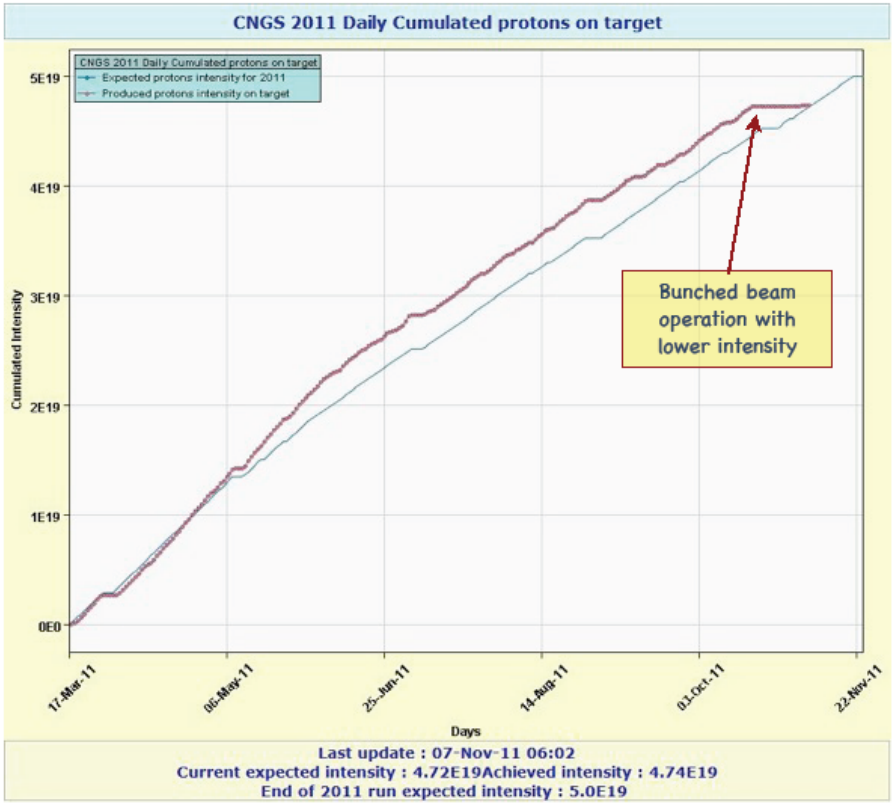
DOE

uncertainties

CNGS beyond expectation

CNGS : Operation (1)

Year	POT
2008	1.78×10^{19}
2009	3.52×10^{19}
2010	3.48×10^{19}
2011	4.74×10^{19}
Total	**13.52×10^{19}**
2012 (expected)	4.50×10^{19}
Total (end 2012)	**18.02×10^{19}**



CNGS: room for improvement

CNGS Technology @ 700 kW

- **Limitations:**
  - key elements of the secondary beam line: **target, horns, beam windows**
  - **layout** and **RP** considerations, SPS RF and beam extraction system
- **SPS upgrade:**
  - limitations : RF power and beam extraction system
  - Possibilities will be studied within the LHC Injector Upgrade project (**LIU**)
    - **750kW** may be reachable, if not understand bottlenecks and mitigation options

Int. per PS batch	# PS batches	Int. per SPS cycle	200 days, 100% efficiency, no sharing	200 days, 55% efficiency, no sharing	200 days, 55% efficiency, 60% CNGS sharing
		[prot./6s cycle]	[pot/year]	[pot/year]	[pot/year]
2.4×10^{13} - Nominal CNGS	2	4.8×10^{13}	**1.38×10^{20}**	**7.6×10^{19}**	**4.56×10^{19}**
3.5×10^{13} - Ultimate CNGS	2	**7.0×10^{13}**	2.02×10^{20}	1.11×10^{20}	6.65×10^{19}

M.Meddahi, E.Schaposnicova - CERN-AB-2007-013 PAF

750kW design limit for the target

working hypothesis for RP calculations

LAGUNA-LBNO – FP7 Design Study

LAGUNA-LBNO consortium

13 countries, 45 institutions, ~300 members

France
CEA
CNRS-IN2P3
Sofregaz*

Germany
TU Munich
University Hamburg
Max-Planck-Gesellschaft
Aachen(**)
University Tübingen(**)

Switzerland
University Bern
University Geneva
ETH Zürich
Lombardi Engineering*

Finland
University Jyväskylä
University Helsinki
University Oulu
Rockplan Oy Ltd*

CERN

Poland
IFJ PAN
IPJ
University Silesia
Wroklaw UT
KGHM CUPRUM*

Greece
Demokritos

Spain
LSC
UA Madrid
CSIC/IFIC
ACCIONA*

United Kingdom
Imperial College London
Durham
Oxford
QMUL
Liverpool
Sheffield
RAL
Warwick
Technodyne Ltd*
Alan Auld Ltd*
Ryhal Engineering*

Romania
IFIN-HH
Bucharest

Denmark
Aahrus(**)

Italy
AGT*

Russia
INR
PNPI

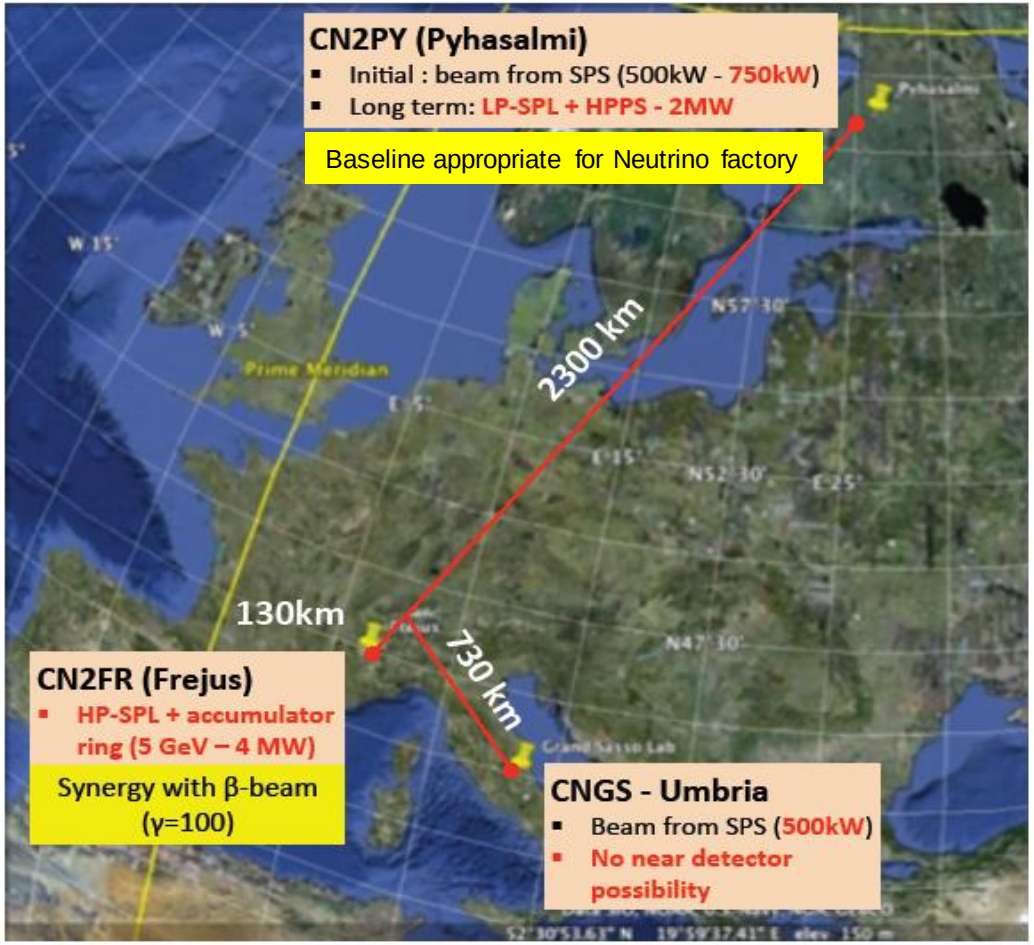
Japan
KEK

(*=industrial partners
**=associated)

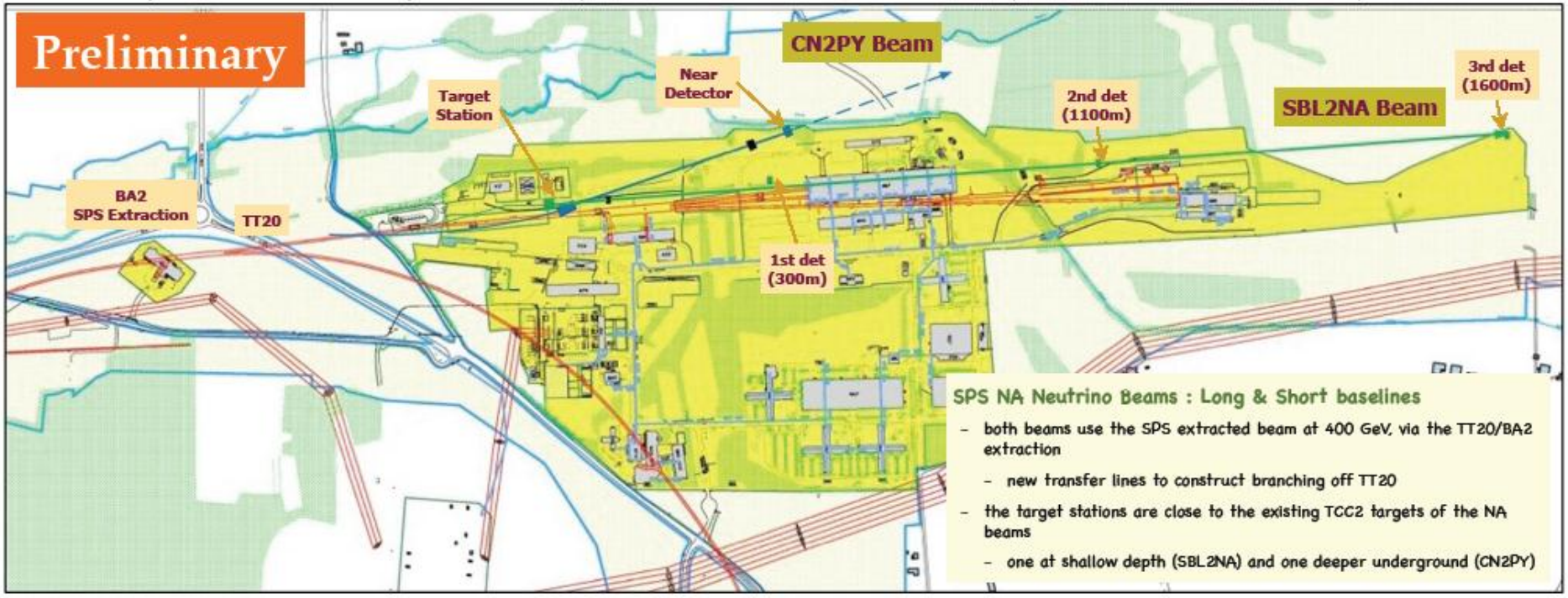
a new large υ cavern is needed

LAGUNA_LBNO / FP7 Design Study (2011-2014)

- New design study, extending that of LAGUNA, **including the neutrino beams from CERN**
- Beam options for **unique physics** opportunities in Europe
- Profit from **experience** gained with the CNGS operation
- **Incremental** approach with competitive physics goals at each stage
- **Synergy** with other ν-beam options under study: β-beam, NF
- Collaboration in a **global** scale, profit from know-how in other ν-beam facilities in US and Japan



NA Long & Short Baseline ν beams within LAGUNA-LBNO



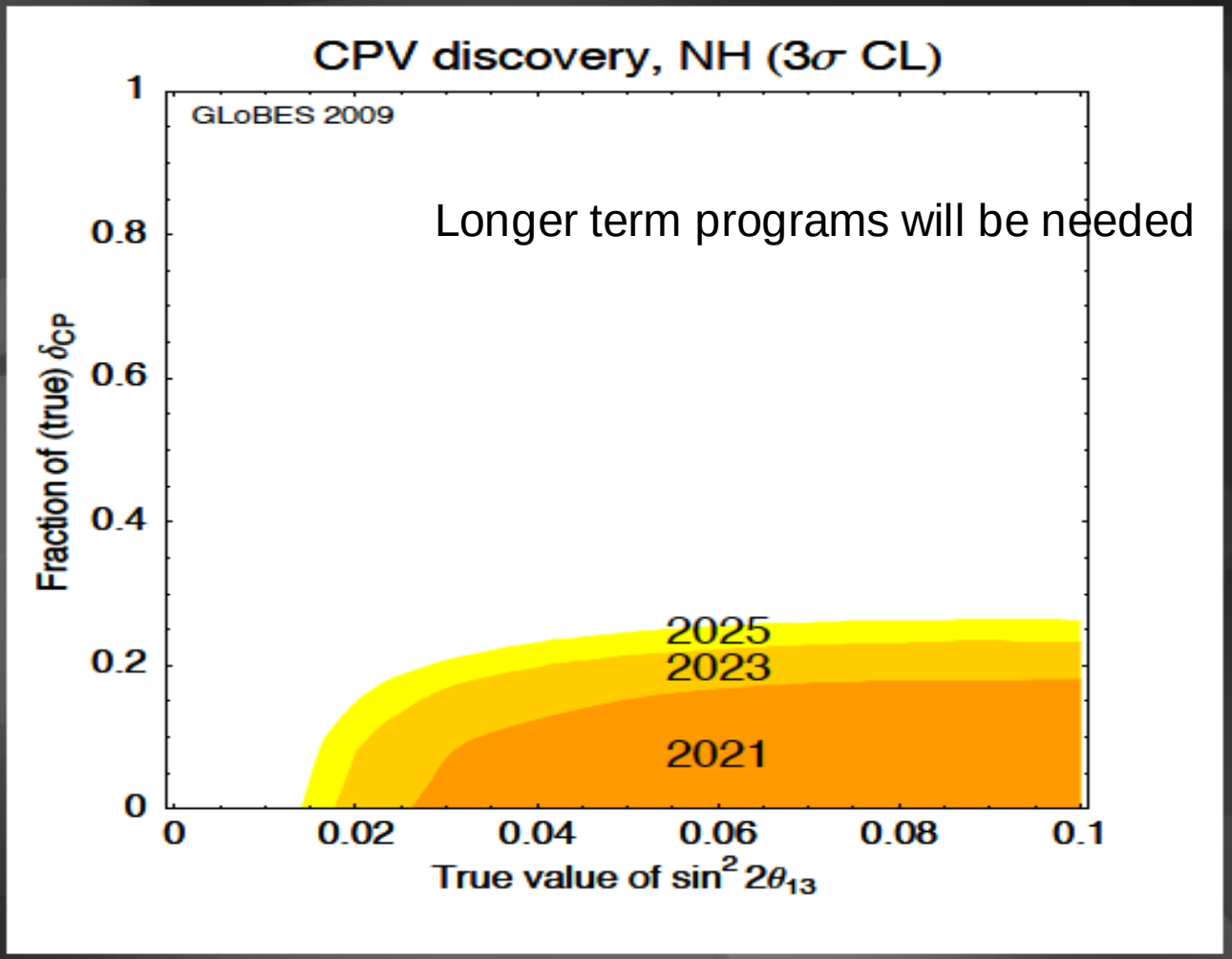
- **CN2PY Beam layout parameters**
  - 10 degr downwards slope to point to Finland
  - 15.1 deg angle wrt North Area beams
  - target station at ~34m underground
    - 20 m deeper than the existing TCC2 targets
    - ~6m of concrete shielding around to allow 2MW operation
  - decay pipe ~300m long
  - near detector at ~360m, 98m underground, within the CERN area

- **Short-Baseline beam**
  - horizontal (or slightly upwards) beam line
  - short decay pipe followed by the beam dump
  - target station at ~10m underground, adjacent to existing TCC2 target station
  - possibilities for detectors at 300, 1100, or 1600m
    - profit from existing infrastructure, including cryogenics
  - detector position and on/off axis location depending on physics

Task 3
Road map to new facilities

if we just run planned facilities

includes T2K and Project-X with 1.7 MW beams



Huber et al.

The 3 EUROnu options

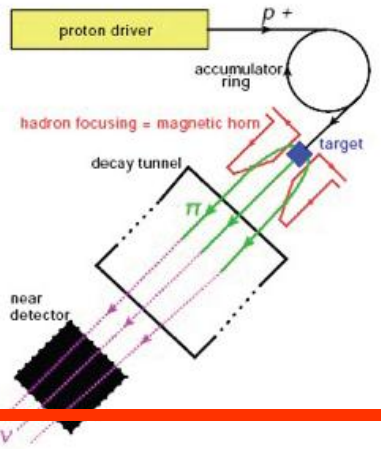
Our chairman (ESS) may be a player too

EUROnu / FP7 - Design Study

- Three neutrino beam facilities under study

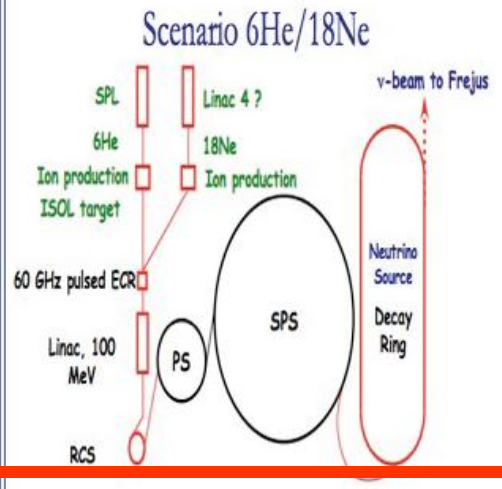
- Super beam : CERN ⇒ Frejus(FR)

- 4MW proton beam from CERN HP-SPL @ 5 GeV
- 130 km baseline
- 440 kT fm detector



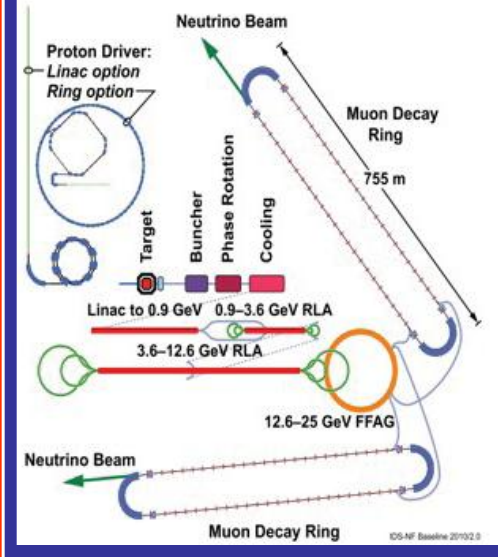
- β-beam : CERN ⇒ Frejus(FR)

- ion production options:
  - He^6/Ne^{18} - Li^8/B^8
- γ=100



☞ talk by : E. Wildner

Neutrino Factory - IDS/NF



☞ talk by : K. Long

- Deliverable : comparison evaluation based on **cost, physics reach**
  - use CERN as example site for localization dependent costs

Europe

Two main lines of long term attack

use of the lower neutrino rate ($10^{18\text{-}19}$/year) and energy (sub-GeV) of
Betabeam + Megaton ("Hyper-Kamioka")

$\beta \Rightarrow \nu_e$

low density detector of very large mass (0.5-1 Mt)
and volume (0.5-1 Mm^3)

non magnetic
(a **Water** Cerenkov detector,
or possibly, again Li-Argon),
a few **100 Km** away

use of the high neutrino rate (>10^{20}/year) and energy (10-50 GeV) of
Neutrino Factory + LMD ("Hyper-MINOS")

$\mu \Rightarrow \bar{\nu}_e + \nu_\mu$

large but not huge (**50-100 Kt**),
necessarily magnetic
(a dense magnetized **Iron** detector,
or, possibly, Li-Argon),
a **few 1000 Km** away.

Two main lines of long term attack

use of the lower neutrino rate ($10^{18\text{-}19}$/year) and energy (sub-GeV) of
Betabeam + Megaton ("Hyper-Kamioka")

$\beta \Rightarrow \nu_e$

low density detector of very large mass (0.5-1 Mt)
and volume (0.5-1 Mm^3)

+ sub-GeV Superbeam

scientific sinergy

a few **100 Km** away

use of the high neutrino rate (>10^{20}/year) and energy (10-50 GeV) of
Neutrino Factory + LMD ("Hyper-MINOS")

$\mu \Rightarrow \bar{\nu}_e + \nu_\mu$

large but not huge (**50-100 Kt**),
necessarily magnetic

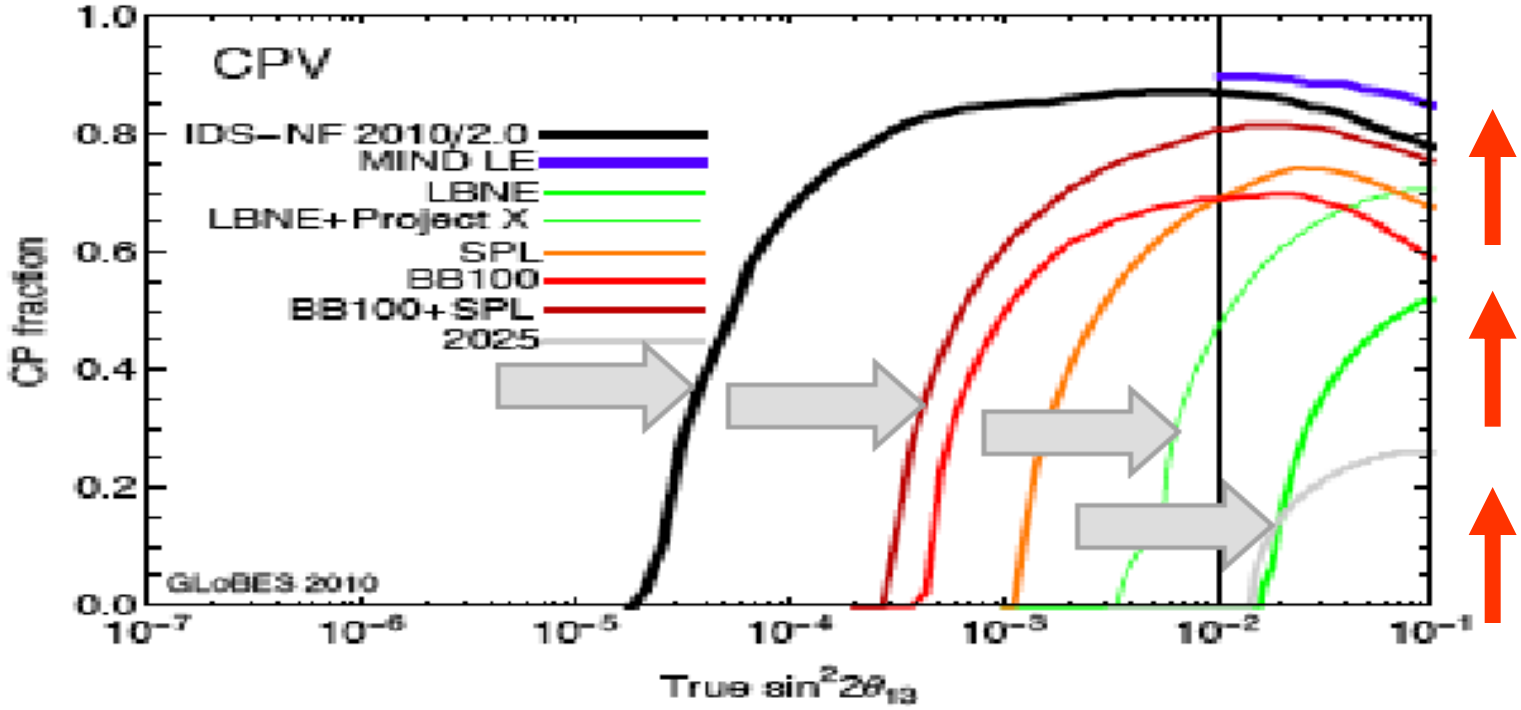
+ multi-Gev Superbeam

technical sinergy

ECFA Panel: υFactory, Betabeam, Superbeam

CP-violation reach

complexity, risk, cost



No matter how it is implemented, this neutrino program presents challenges and risks that are very significant, but the scientific rewards in terms of new physics are potentially even greater.

V. Palladino
Univ & INFN Napoli
EuCARD12 plenary
27 April 2012

Thank you

- It was right to set 2012 as **our target** ….. we know now even the day: **July 31 2012**
  the CERN Council Strategy update process in progress sets that for us

briefly, **the steps** of our community that have been preparing that, **were**
the strongest R&D program we could afford (HARP, HP-SPL DS, MERIT, MICE, EMMA
the final report of LAGUNA in 2010
the EUROnu (and IDS-NF) Design Studies Midterm reports early in 2011
the push of the LAGUNA-LBNO Design Study to approval in April 2011
the warmly supportive ECFA review of EUROnu (and IDS-NF) late in 2011
the evidence for a sizeable third mixing angle θ_{13} ($\nu_\mu \to \nu_e$, $\nu_e \to \nu_e$) in 2011-12

three more steps soon :1) the ν-Turn workshop at LNGS 8-10 May
2) the Eu Neutrino strategy meeting at CERN 14-16 May
3) the final EUROnu meeting in Paris 12-16 June

In July 2012, the Eu context of accelerator neutrinos options will be clearly submitted to Council
shorter term CNGS and/or CNGS like LAGUNA LongBaseNO options (plus ShortBase too)
longer term the three EUROnu options ……Superbeam/Betabeam/NeutrinoFactory
in healthy competition/collaboration with the world context of options …. Japan, US and more …..