THE CENF-ND

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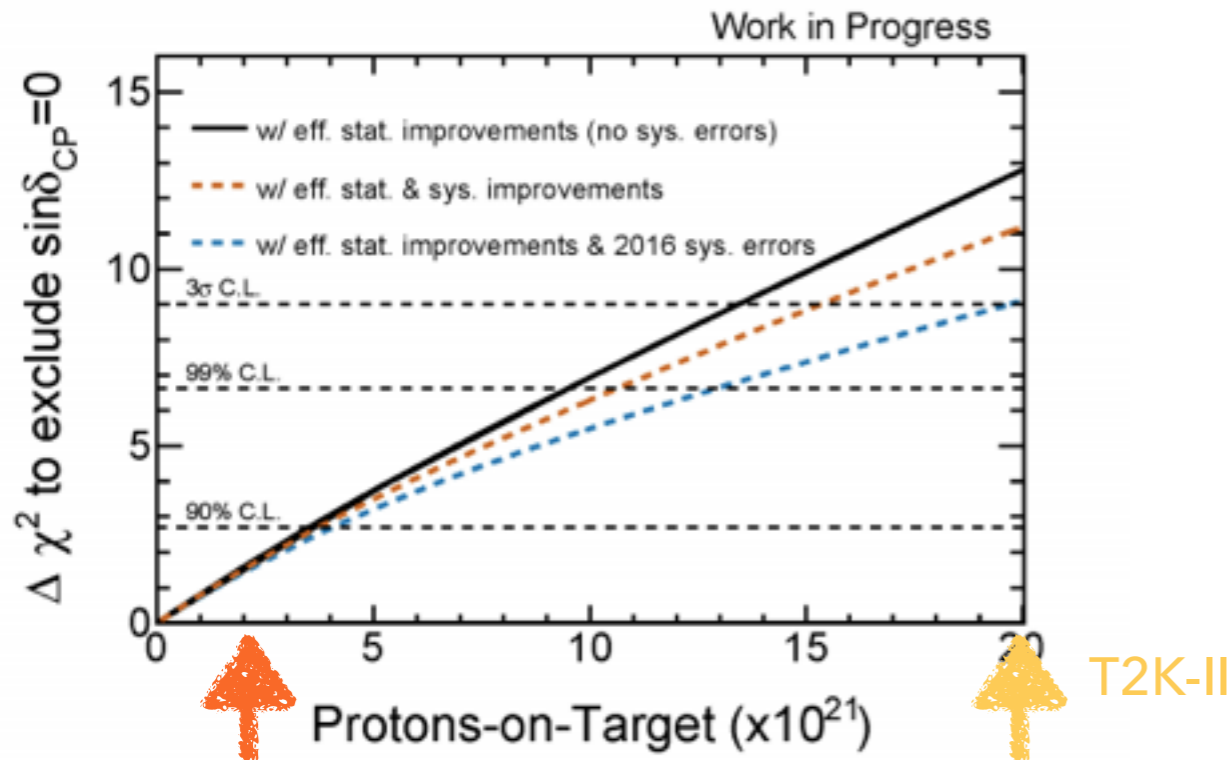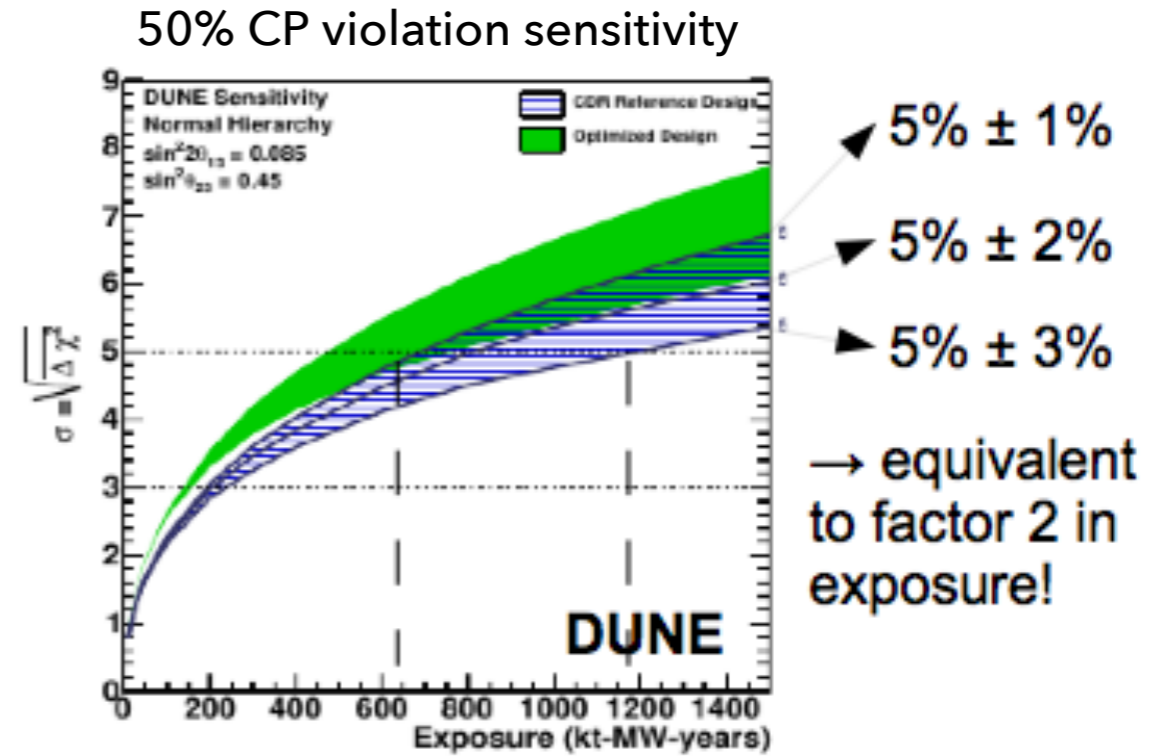
LBN EXPERIMENTS AND NEAR DETECTORS

▸ Near detectors have a key role to control the systematics uncertainties and reach the very-few % level aimed by future LBN experiments
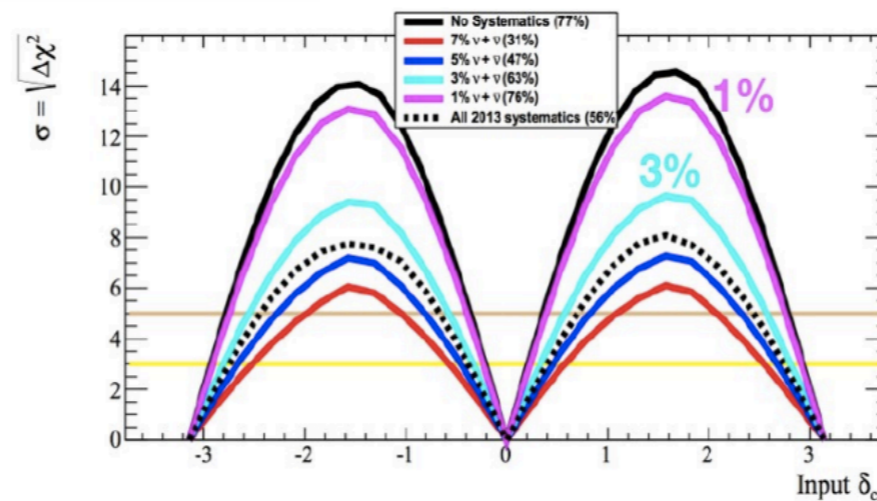

50% CP violation sensitivity

now @ T2K

T2K-II

from DUNE CDR

HyperK (nuFACT 2015)

MOTIVATION

▸ LBN experiments (T2K, HK, DUNE) are currently working on the design of their near detector, in general with tight schedule

  ▸ T2K/T2K-II : upgrade of ND280 by 2020

  ▸ DUNE : ND design determined by the end of 2017

▸ A good understanding and modelling of neutrino interaction is essential to control the systematics uncertainties affecting the oscillation measurements

▸ European Institutes have:

  ▸ great expertise in ND

  ▸ deep know-how in neutrino detector technologies and phenomenology

  ▸ large participation in LBN experiments or interests in joining

THE CENF-ND

A collaborative effort toward the design of a Near Detector for the new generation of neutrino oscillation LBL experiment

https://twiki.cern.ch/twiki/bin/view/CENF/NearDetector

▶ The forum is a new project of the Neutrino Platform and the EP-NU group

▶ Close collaboration with (support to) the LBN experiment and other WGs as NUSTEC: some of the studies are already ongoing inside the collaborations, the aim is to participate to the existing works, not doubling the effort

▶ The aim of the forum is strength the european effort in its contribution to ND activities, attract new institutions and provide support for R&D

Europe can contribute to build a common knowledge perform some experimental R&D, to assist DUNE and T2K/HK in the definition of the best ND configuration

CERN can be an hub for such European activities.

THE CENF–ND ORGANISATION

▸ Even if US and Japanese experiments are conceptually different (baseline, on/off axis, detector target) several problematics are common:

  ▸ Flux: how well can we measure it? which are advantages and limitations of different approaches (hadron production experiments, low-nu method, elastic scattering,..)

  ▸ Cross-section models: Which measurement a ND can do to improve the current knowledge?   are there any other studies on existing data that can be performed to improve current Montecarlo generators

  ▸ Near-to-far extrapolation: likelihood fit, bayesian probability, covariance matrices, are those method robust? pro and cons?

THE CENF–ND ORGANISATION

▸ Steering group: P. Sala (CERN/INFN-Mi), S. Bordoni (CERN),
                    A. Weber (U. Oxford/RAL), M. Zito (CEA)

▸ WG1 - Flux : M. Diwan (BNL), B. Popov (LPNHE, Paris)

▸ WG2 - Cross-section (TH): M. Martini (CEA,Paris), F. Sanchez (IFAE, Barcelona)

▸ WG3 - Cross-section (Exp): S. Bolognesi (CEA,Paris), TBD

▸ WG4 - Sensitivity studies: L. H. Whitehead (CERN), D. Meloni (Roma 3)

▸ WG5 - R&D : E. Radicioni (INFN-Ba), T. Lux (IFAE, Barcelona)

THE CENF—ND ORGANISATION

▸ The main idea is that WG 1-4 will perform physics studies on the topics they are concerned and from there they would derive the detector requirements (vertex, energy resolution, neutron tagging, …)

▸ Detector requirements and suitable technology can then be discussed and developed in collaboration with the WG5

▸ Studies and possible R&D can be also be proposed at today, to address known issues in detector developments
    ▸ **small R&D** (with **no need of beam time**) can be organised within the Neutrino Platform with the PLAFOND project
    ▸ For **larger R&Ds** a **request to SPSC** has to be submitted

CENF–ND TWIKI AND MAILING LIST

▸ **Twiki-pages** and mailing-lists have been prepared for both general announcements and each working group

  ▸ https://twiki.cern.ch/twiki/bin/view/CENF/NearDetector

  ▸ https://twiki.cern.ch/twiki/bin/view/CENF/NearDetectorWG#

▸ **Mailing lists:** CENF-ND-Wg#@cern.ch

▸ The **list of participants** can be found in the e-group page if you have a CERN account or in attachment to the WG twiki-page. (See also supplementary slides)

> Please, start to use those utils to be in contact, post material, organise meetings

IN PRACTICE

▸ Timescale and deliverables are decided by the WGs

  ▸ Given the heterogeneity of the membership and the need to appropriate the existing knowledge, the first steps could be to summarise the existing studies for the topic of interest of the WG

  ▸ A short description of the interest, expertise of each member/group would be welcome

  ▸ A close collaboration with the other WGs and in particular with the WG2 is encouraged

▸ The General CENF-ND (Marco Z. , Alfons W., Paola S. and S.B.) will act as steering group. General meetings (with a less frequent regularity) will be organised and WG are invited to summarised the work.

MEETING FREQUENCY

▸ WGs meeting frequency decided by each WG

▸ monthly general CENF-ND (e.g. end of the month)

by Vidyo

▸ We would like to organise a CENF-ND meeting at CERN before the Christmas' break.

▸ Format of the meeting : 1 day/ 1.5 day to be defined

OTHER NEEDS

▸ We are investigating the idea to have disk-space on the Neutrino Platform cluster.

  ▸ should define our requests: space, software to be installed..

▸ Indico sub-category and Vidyo room are already set for CENF activities:

  ▸ Indico: https://indico.cern.ch/category/9460/

  ▸ Vidyo-room : CENF-ND

Let us know if you have any other need

CONCLUSION

▶ The CENF-ND forum has started in early July and has now about 80 members

▶ The aim is to support the Neutrino community in building the new generation of LBN experiment

▶ The effort aim also to strength the European participation. However American and Japanese colleagues are welcome and some of them already participating

▶ Do not hesitate to promote the initiative and invite colleagues who might be interested

SUPPLEMENTARY

WG3 MEMBERS (1/2)

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