What Is ν?

Closing Discussion

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Fermilab
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Thank you for a very interesting week!

Belen Gavela, Ferruccio Feruglio, Bonnie Fleming, Steen Hannestad, Takaaki Kajita, Ann Nelson, Silvia Pascoli

Laura Baudis, Pilar Hernandez

Yasaman Farzan, Michele Frigerio, Cecilia Lunardini

Daniele Dominici

Marcia McGowan, Milvia Soumbounou, Tiina Timonen

Annalisa Anichini, Antonio Orlando, Margherita Pazzaglia

Congratulations
and Happy Birthday,
Alexei Smirnov!


What Is the Universe Made Of?
A public lecture (in Italian) by Graciela Gelmini
Pitti Palace, Tonight, 7 pm
(via Romana, near Ponte Vecchio, this side of the Arno river)
Boboli Gardens (by Pitti Palace) open free for us from ~ 6.15 pm
NASA Hubble Photo

Issues and Questions

What Is ν?

Numerous things, but one that stands out is the determination that —

$$\sin^2 2\theta_{13} \cong 0.10.$$

(Daya Bay, RENO, Double Chooz, T2K, MINOS)

In particular, $\sin^2 2\theta_{13} > 0.01$.

This is very encouraging for experiments that propose to look for ~~CP~~ in neutrino oscillation, and to determine whether the neutrino mass spectrum looks like  or  , by using superbeams (neutrinos from pion decay).

Non Accelerator-Neutrino Physics

Q: How desirable/important is it for proton decay, supernova neutrinos, and atmospheric neutrinos to be part of any "long-baseline neutrino oscillation" program?

Should We Join Forces?

Q: Will we ever need a neutrino factory (neutrinos from muon decay), or a beta beam (neutrinos from nuclear beta decay)?

Q: If so, should the Asian, European, and American neutrino communities agree to put the superbeam in one region, and the neutrino factory or beta beam in another region?

Sterile Neutrinos

Q: How seriously should we take the **HINTS** of sterile neutrinos (or something else) from the LSND, MiniBooNE, reactor, radioactive source, and cosmological data?

Q: What should we do, and how far should we go, to find out what is going on?

Double Beta Decay

Q: How many neutrinoless double beta decay experiments is it important to have?

Q: If one day we know that the neutrino mass spectrum is inverted, and we establish that $m_{ee} < 10$ meV, do we declare that neutrinos are probably Dirac particles, and stop looking for neutrinoless double beta decay?

The See-Saw Mechanism

Q: Can we understand the pattern of neutrino masses and leptonic mixing?

Q: What can we do to make it more (or less) plausible that neutrino masses come from the see-saw mechanism?

- For the high-mass-scale see-saw
- For the low-mass-scale see-saw

Q: Is Leptogenesis, an outgrowth of the see-saw picture, testable?

Charged Lepton Flavor Violation

Q: If we observe CLFV, how will we determine what underlying physics is involved?

Dark Matter

We have discussed several kinds of DM candidates:

LHC mass-scale WIMPS, light WIMPS, Asymmetric DM, DM from a hidden sector, keV-scale neutrinos, …

Q: Is there a "killer" collection of DM experiments that would markedly help us to determine the nature of DM?

INVISIBLES 13 : 15-19 July, 2013

(to be re-confirmed)

in a castle in UK