

Discussion session on

Provide physics motivation of LBL oscillations within wider context of particle physics, beyond a relatively small (compared to the scale of the facility) neutrino aficionados circle.

**NuFact 11
CERN - August 1 2011**

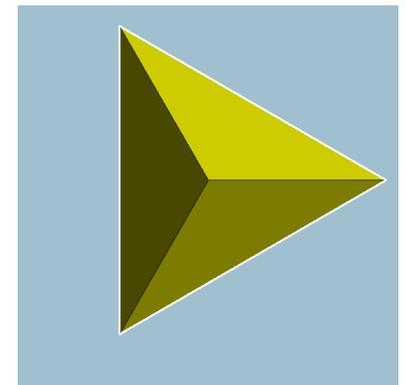
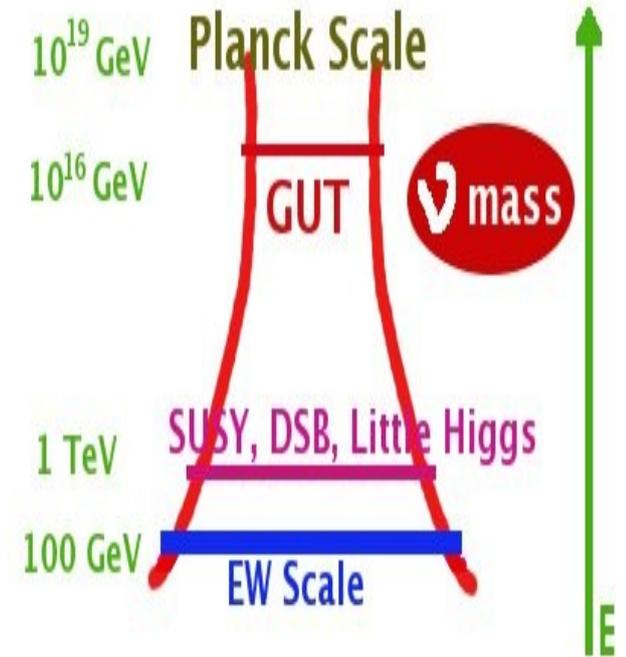
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1 - The observation of neutrino masses and mixing implies new physics BSM!

Now we want to identify this new physics:

- **open window on the physics BSM**
(possibly at scales not accessible directly)
- **complementary window on the flavour problem**
- neutrinos are **critical ingredients in understanding the evolution of the Universe**



Neutrinos provide **indirect information** on this physics. **What is the role of neutrino experiments?**

Discussion structure

MASSES

Within theory models

- Phenomenology
- Theory
- Talks by Ibarra and Mohapatra

MIXING

- Standard picture
- Beyond 3-nu mixing
- Talk by Minakata

Their connection

- Origin of neutrino masses BSM
- Flavour problem

MASSES

What is the role of neutrino physics (and LBL experiments in particular) in understanding the physics BSM?

- **Phenomenology**

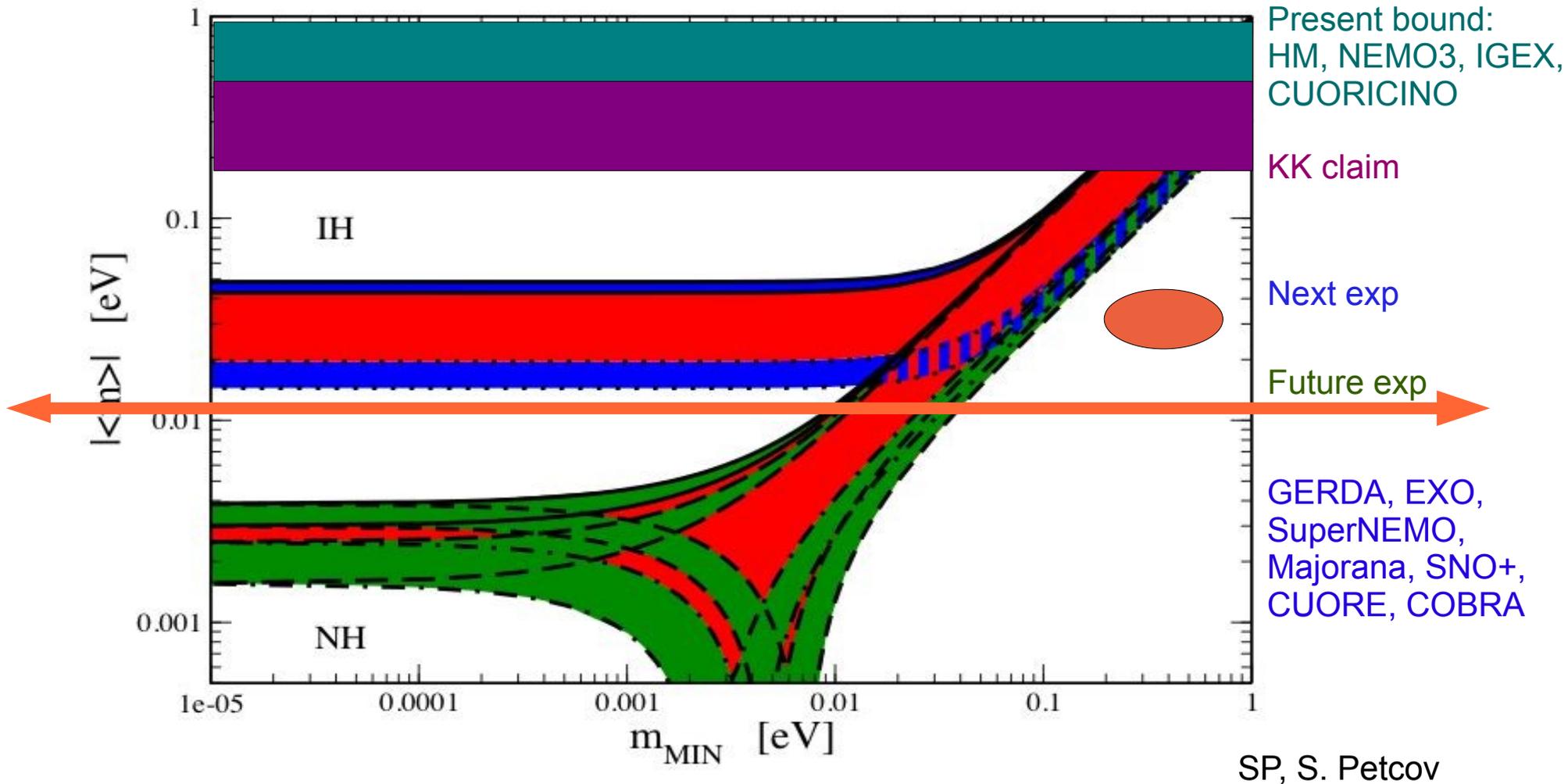
What is the complementarity and synergy between LBL and other neutrino experiments?

- **Theory**

How can we get some information about the scale at which neutrino masses arise? And about the mechanism of their generation?

What is the connection with other particle physics searches?

An example: neutrinoless double beta decay + LBL, direct mass searches



Betabeta-decay (no signal) + LBL (IH) → Dirac neutrinos (?)

Betabeta-decay + direct mass search: new physics (?)

MIXING

- **Standard Picture**

If θ_{13} is large, what can we learn about mixing in the coming future?

Is tribimaximal mixing still a good guiding principle?

- **Beyond 3-neutrino mixing**

What can we learn from LBL experiments? What do we need for it (precision, near detectors...)?

- **In models BSM, are masses and mixing connected?**

Summary

Neutrino physics provides a new window on the physics at high energy scales and on the problem of flavour.

Many new questions are open:

What is the **complementarity** between these experiments? And what the **synergy**?

Are there **priorities** between these experiments from a theoretical point of view?

Is the **information** we can get from neutrino physics on the physics BSM **unique**?

Is it **complementary with the energy frontier** (future collider) experiments and other searches? If so, how?

What is the **case for precision** in neutrino physics experiments?