

The road map to future neutrino oscillation accelerator experiments

Round table discussion with

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Questions :

1. **When?** Should we propose/decide on Future large project?
how many steps (superbeam, megaton, betabeams, neutrino factory
etc....) ?

2. **What** are the accelerator R&D pre-requisites in order to decide?

3. **q₁₃ ?** What do you think of the statement that one must have
proven $q_{13} \neq 0$ before making the decision?

4 **how about detector R&D?**

Personal view:

The strategic situation as I see it is as follows.

In 2011 LHC will be running and paid.

CLIC is not going to happen so soon and the sub-TeV linear collider will happen elsewhere.
(other scenarios lead to similar conclusion):

Conclusion: there is a possible window of opportunity at CERN in the years 2011-20XX
where my middle estimate for XX is >20.

The leading contender for this window is a high intensity neutrino programme.
(and... this is great physics!)

Which one?

Package 1: neutrino factory + near detectors
+ far magnetic detectors (LMD, Larg, tau)

Package(s) 2: superbeam + beta beam + large water Cherenkov or large Larg

CERN will not invest 10 years of its life into a second class facility.

A Physicist's (JJ) concerns:

Neutrino factory

Design improving with time, but always challenging

Tau and muon appearance + energy binning = best tools against degeneracies. Measures with great precision atmospheric parameters. Can also measure matter effects

Needs "only" "conventional" detectors (Minos x 10, Opera x 2-5)

The best neutrino machine around. But what is the realistic cost & time scale?

Beta-beam

Base line design gamma=60/100 has been studied over the last 1-2 years. The SPS has a limit on gamma 150 (He6) and 250 (Ne18). Better, under study. A design based on the Tevatron could reach a gamma of about 500

Requires Mton class detector.
Could start as early as 2015

Is this realistic? Cost?
Time scale?

T asymmetry for $\sin d = 1$

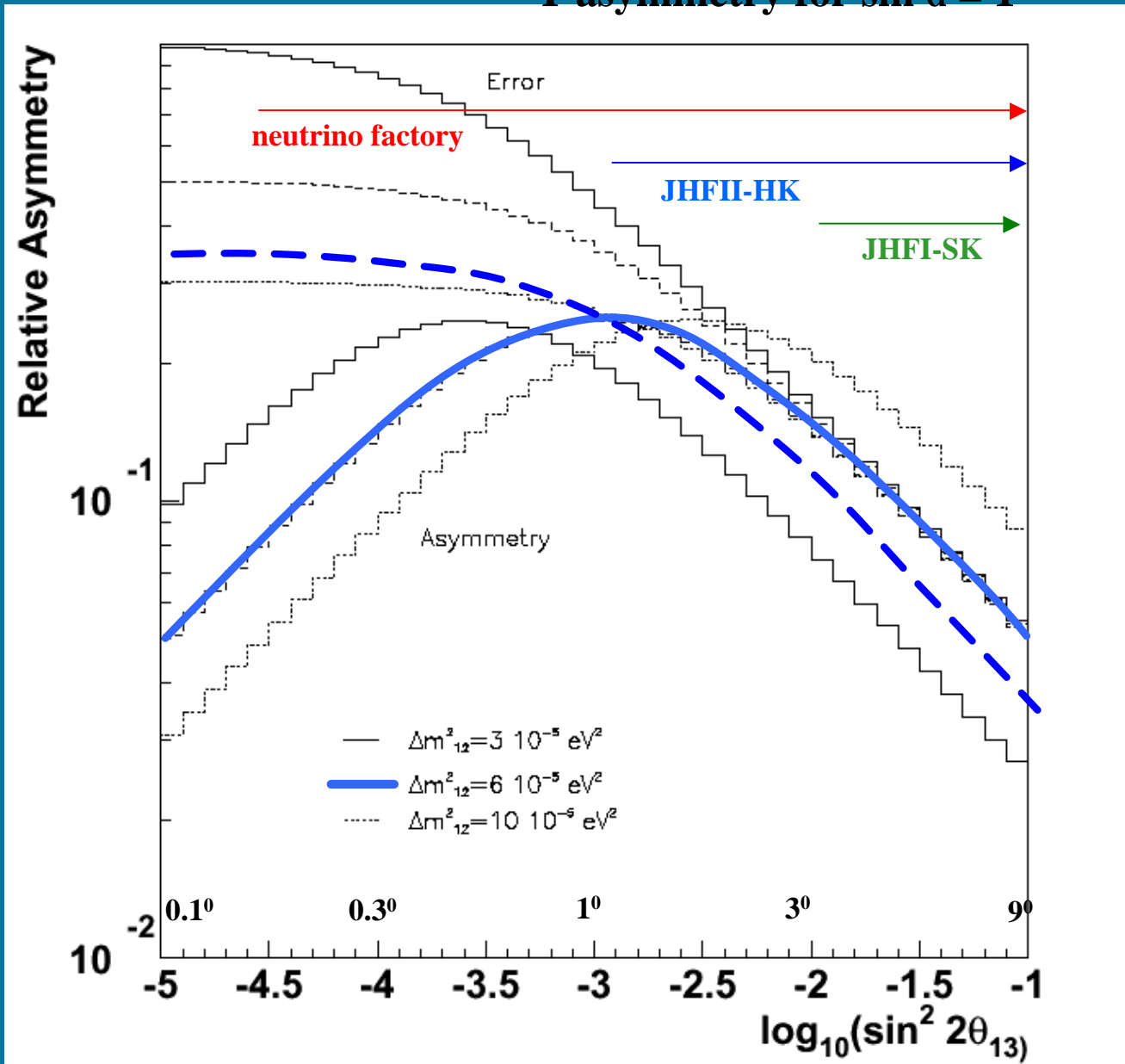


asymmetry is
a few %
and requires
excellent
flux normalization
(neutrino fact., beta beam
or
off axis beam with
not-too-near
near detector)

NOTE:

This is at first maximum!
Sensitivity at low values
of q_{13} is better for short
baselines, sensitivity at
large values of q_{13} may be
better for longer baselines
(2d max or 3d max.)

This would deserve a more
careful analysis!



**We in EU have perhaps a great opportunity in front of us
probably better than in any other continent**

**Need careful assessment on equal footing
of the relative merits of Beta-Beam versus NUFACT**

Organization of work without splitting the group!

Need ground rules & useful/agreed time lines & milestones for comparisons.

+ Some emulation will stimulate optimization of either design

Need to talk very regularly to each others

Need minimum amount of design work to ensure realistic costing and time estimates.

-- Great that beta-beam Design study is funded by EU!

-- Real **SCANDAL** that neutrino factory design study did not even get a chance to be proposed! Will try NEST proposals for MICE and FFAG... Or ?

→ will need to do design study anyway, but somewhat outside of framework of CARE...