Scientific Reach of Future Neutrino Oscillations Exps.

Parameter	T2K	T2H	Reactor	Nova	Nova2	VLBNO.
Δm_{32}^2	± 4 %	± 4 %	-	± 2 %	± 2 %	± 1 %
$\sin^2(2\theta_{23})$	±1.5 %	± 0.4 %	-	± 0.4 %	± 0.2 %	± 0.5 %
$\sin^2(2\theta_{13})$ [a]	>0.02	>0.01	>0.01	>0.01	>0.01	>0.01
$\Delta m_{21}^2 \sin(2\theta_{12})$ [b]	-	-	-	-	-	12 %
sign of (Δm_{32}^2) [c]	-	-	-	possible	yes	yes
measure δ_{CP} [d]	-	~20°	-	-	~20°	±13°
N-decay gain	x1	x20	-	-	-	x8
Detector (Ktons)	50	1000	20t	30	30+50	400
Beam Power (MW)	0.74	4.0	14000	0.4	2.0	1.5
Baseline (km)	295 [e]	295 [e]	1	810 [e]	810 [e]	>2500
Detector Cost ($M)	exists	~1000	20	165	+200	400
Beam Cost ($M)	exists	500	exists	50	1000	400
Ops. Cost ($M/10 yrs)	500	700	50	500	600	150/500 [f]

Both results needed to resolve ambiguities!

[a] detection of $\nu_\mu \rightarrow \nu_e$, upper limit on or determination of $\sin^2(2\theta_{13})$

[b] detection of $\nu_\mu \rightarrow \nu_e$ appearance, even if $\sin^2(2\theta_{13}) = 0$; determine θ_{23} angle ambiguity

[c] detection of the matter enhancement effect over the entire δ_{CP} angle range

[d] measure the CP-violation phase δ_{CP} in the lepton sector; Nova2 depends on T2K2

[e] beam is 'off-axis' from 0-degree target direction; [f] with/without RHIC operations

Best Bets

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U.S. DEPARTMENT OF ENERGY

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