

Working Status

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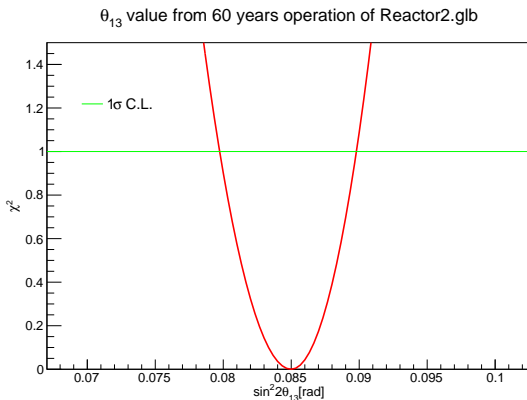
NuGroup Meeting, March 16, 2018

Outlines

- 1 Check and modify Reactor2.glb
- 2 Sensitivity to CP-violation for T2K
- 3 Sensitivity to CP-violation for T2K-II
- 4 Sensitivity to CP-violation for NOvA
- 5 Sensitivity to CP-violation for T2K-II + NOvA

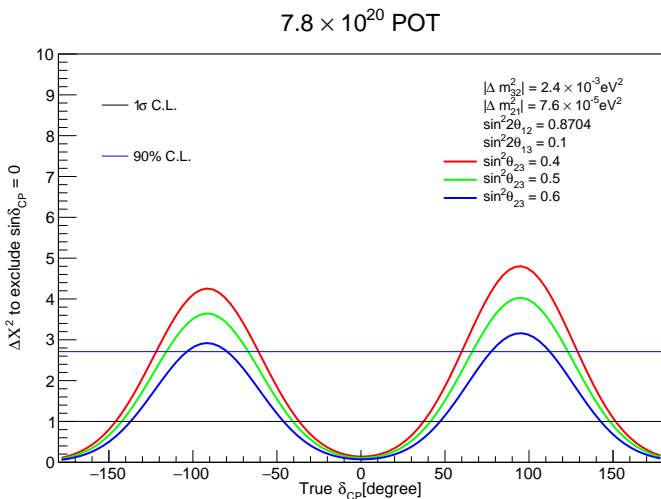
Check and modify Reactor2.glb

- Constraint on θ_{13} from reactor: $\sin^2 2\theta_{13} = 0.085 \pm 0.005$
- Current Reactor2.glb (8 years running): $\sin^2 2\theta_{13} = 0.085 \pm 0.008$
- Modified Reactor2.glb (60 years running):
 $\sin^2 2\theta_{13} = 0.085 \pm 0.005$



Sensitivity to CP-violation for T2K

- For taking data 7.8×10^{21} POT, $\delta_{CP} = 0$ and assuming that MH is known



Sensitivity to CP-violation for T2K-II

TABLE I: Number of events expected to be observed at the far detector for 10×10^{21} POT ν - + 10×10^{21} POT $\bar{\nu}$ -mode with a 50% statistical improvement.

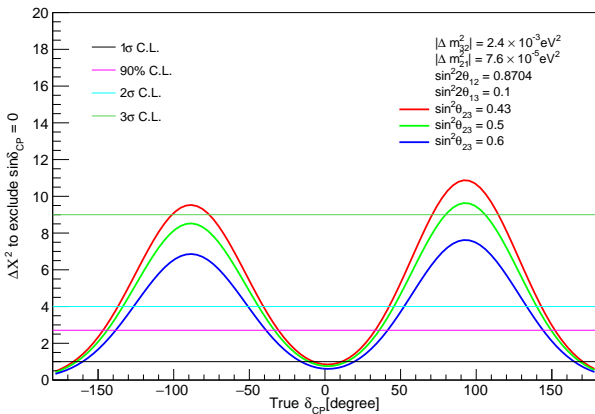
Assumed relevant oscillation parameters are: $\sin^2 2\theta_{13} = 0.085$, $\sin^2 \theta_{23} = 0.5$, $\Delta m_{32}^2 = 2.5 \times 10^{-3} \text{ eV}^2$, and normal mass hierarchy (MH).

	True δ_{CP}	Total	Signal $\nu_\mu \rightarrow \nu_e$	Signal $\bar{\nu}_\mu \rightarrow \bar{\nu}_e$	Beam CC $\nu_e + \bar{\nu}_e$	Beam CC $\nu_\mu + \bar{\nu}_\mu$	NC
ν -mode	0	467.6	356.3	4.0	73.3	1.8	32.3
ν_e sample	$-\pi/2$	558.7	448.6	2.8	73.3	1.8	32.3
$\bar{\nu}$ -mode	0	133.9	16.7	73.6	29.2	0.4	14.1
$\bar{\nu}_e$ sample	$-\pi/2$	115.8	19.8	52.3	29.2	0.4	14.1

	Total	Beam CC ν_μ	Beam CC $\bar{\nu}_\mu$	Beam CC $\nu_e + \bar{\nu}_e$	$\nu_\mu \rightarrow \nu_e +$ $\bar{\nu}_\mu \rightarrow \bar{\nu}_e$	NC
ν -mode ν_μ sample	2735.0	2393.0	158.2	1.6	7.2	175.0
$\bar{\nu}$ -mode $\bar{\nu}_\mu$ sample	1283.5	507.8	707.9	0.6	1.0	66.2

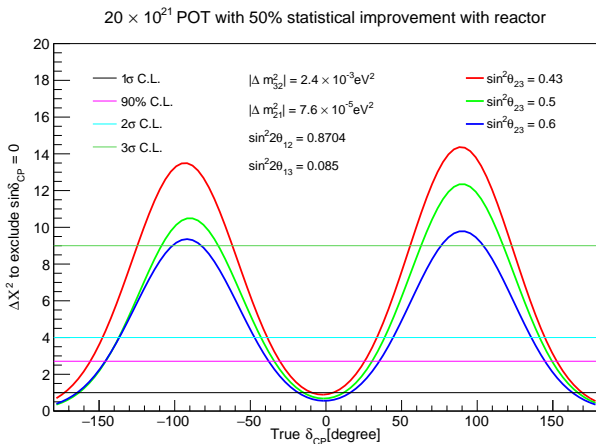
Sensitivity to CP-violation for T2K-II

- For taking data 20×10^{21} POT + 50% statistical improvement, $\delta_{CP} \sim 0$ and assuming that MH is known



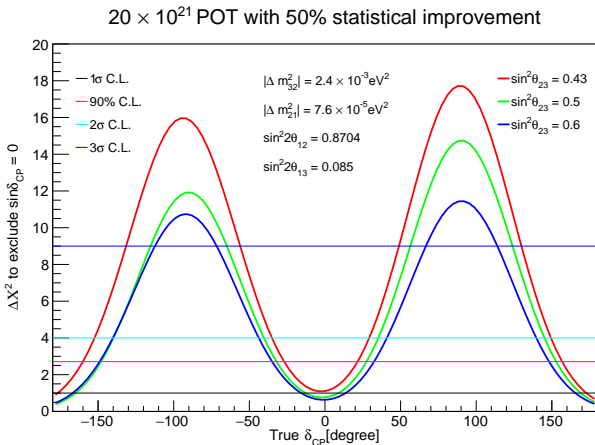
Sensitivity to CP-violation for T2K-II

- For taking data 20×10^{21} POT + 50% statistical improvement, constraint from reactor, $\delta_{CP} \sim 0$ and assuming that MH is known



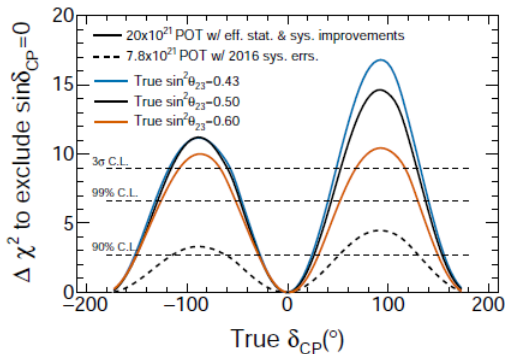
Sensitivity to CP-violation for T2K-II

- For taking data 20×10^{21} POT + 50% statistical improvement, constraint from reactor, $\delta_{CP} \sim -\pi/2$ and assuming that MH is known



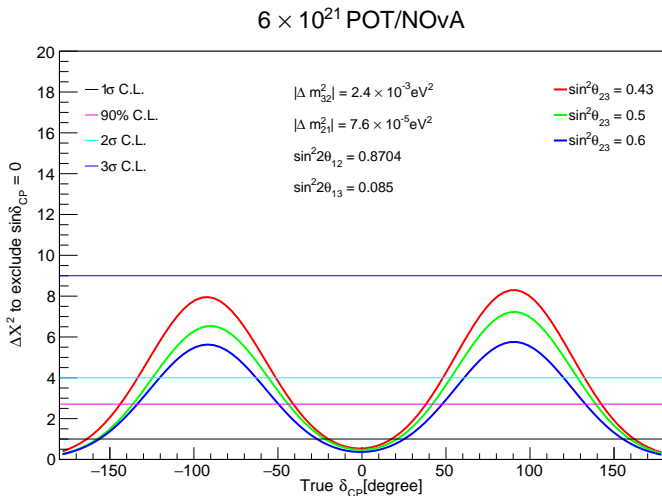
Sensitivity to CP-violation for T2K-II

Compare with the T2K-II paper



(b) Assuming the MH is known – measured by an outside experiment.

Sensitivity to CP-violation for NOvA



Sensitivity to CP-violation for T2K-II + NOvA

