

Neutrinos, DUNE and the world best bound on CPT invariance

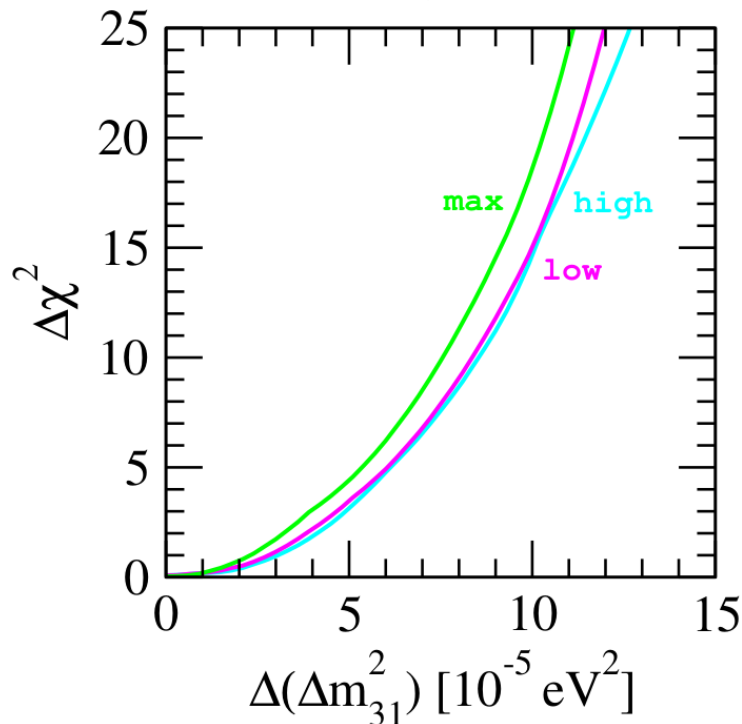
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CPT violating neutrinos

- A violation of CPT invariance could be manifested in different oscillation parameters for neutrinos and antineutrinos
- We can use oscillation data to compute bounds
- DUNE could improve some of these bounds by one order of magnitude



$$|\Delta m_{21}^2 - \Delta \bar{m}_{21}^2| < 4.7 \times 10^{-5} \text{ eV}^2,$$

$$|\Delta m_{31}^2 - \Delta \bar{m}_{31}^2| < 3.7 \times 10^{-4} \text{ eV}^2,$$

$$|\sin^2 \theta_{12} - \sin^2 \bar{\theta}_{12}| < 0.14, \quad 3\sigma$$

$$|\sin^2 \theta_{13} - \sin^2 \bar{\theta}_{13}| < 0.03, \quad \text{C.L.}$$

$$|\sin^2 \theta_{23} - \sin^2 \bar{\theta}_{23}| < 0.32$$

CPT violating neutrinos

- If CPT is violated in nature we commit errors in analyzing neutrino and antineutrino data together
- If the T2K measurements were confirmed by DUNE, we could observe CPT violation with a high confidence level
- These results could not be explained by NSIs

