NuFIT 2.2: Three-neutrino fit based on data available in August 2016

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Abstract: We present updated results for our global analysis of solar, atmospheric, reactor, and accelerator neutrino data in the framework of three-neutrino oscillations. We also provide χ^2 tables for the various one- and two-dimensional projections of the global analysis. If you use these results, please refer to both [1] and [2]. Data sets which have been updated with respect to NuFIT 2.1 are marked by the "⇒" tag.

Solar experiments

- Chlorine total rate [3], 1 data point.
- Gallex & GNO total rates [4], 2 data points.
- SAGE total rate [5], 1 data point.
- SK1 full energy and zenith spectrum [6], 44 data points.
- SK2 full energy and day/night spectrum [7], 33 data points.
- SK3 full energy and day/night spectrum [8], 42 data points.
- SK4 2055-day energy and day/night spectrum [9], 46 data points.
- SNO combined analysis [10], 7 data points.
- Borexino Phase-I 740.7-day low-energy data [11], 33 data points.
- Borexino Phase-I 246-day high-energy data [12], 6 data points.
- Borexino Phase-II 408-day low-energy data [13], 42 data points.

Atmospheric experiments

- SK1–4 (including SK4 1775-day) combined data [14], 70 data points.
- IceCube/DeepCore 3-year data [15, 16], 64 data points.

Reactor experiments

- KamLAND combined DS1 & DS2 spectrum [17], 17 data points.
- CHOOZ energy spectrum [18], 14 data points.
- Palo-Verde total rate [19], 1 data point.
- Double-Chooz FD-I (461 days) and FD-II (212 days) spectra [20], 54 data points.

$\Rightarrow$ Daya-Bay 1230-day spectrum [21], 34 data points.

- Reno 800-day near & far total rates [22], 2 data points (with free normalization).
- SBL reactor data (including Daya-Bay total flux at near detector), 77 data points [23, 24].

Accelerator experiments

- MINOS 10.71×10^{20} pot ν_μ-disappearance data [25], 39 data points.
- MINOS 3.36×10^{20} pot $\bar{\nu}_\mu$-disappearance data [25], 14 data points.
- MINOS 10.6×10^{20} pot ν_e-appearance data [26], 5 data points.
- MINOS 3.3×10^{20} pot $\bar{\nu}_e$-appearance data [26], 5 data points.

$\Rightarrow$ T2K 7.48×10^{20} pot ν_μ-disappearance data [27, 28], 28 data points.

$\Rightarrow$ T2K 7.48×10^{20} pot ν_e-appearance data [27, 28], 5 data points.

$\Rightarrow$ T2K 7.47×10^{20} pot $\bar{\nu}_\mu$-disappearance data [27, 28], 63 data points.

$\Rightarrow$ T2K 7.47×10^{20} pot $\bar{\nu}_e$-appearance data [27, 28], 1 data point.

$\Rightarrow$ NOνA 6.05×10^{20} pot ν_μ-disappearance data [29], 18 data points.

$\Rightarrow$ NOνA 6.05×10^{20} pot ν_e-appearance data [29], 10 data points.

Description of the χ^2 data tables

We provide two gzip-compressed files (one for Normal and one for Inverted Ordering) containing the χ^2 data tables for our global analysis. Each file is divided into 21 sections, identified by a unique tag and corresponding to a particular one- or two-dimensional projections. The tags and the meaning of the data columns for each section are listed below (note that $\ell = 1$ for NO and $\ell = 2$ for IO).

N°	Section tag	1^{st} column	2^{nd} column	3^{rd} column
1	`# T13/T12`	$\sin^2\theta_{13}$	$\sin^2\theta_{12}$	$\Delta\chi^2$
2	`# T13/DMS`	$\sin^2\theta_{13}$	$\log_{10}(\Delta m^2_{21} \,/\, [\text{eV}^2])$	$\Delta\chi^2$
3	`# T12/DMS`	$\sin^2\theta_{12}$	$\log_{10}(\Delta m^2_{21} \,/\, [\text{eV}^2])$	$\Delta\chi^2$
4	`# T13/T23`	$\sin^2\theta_{13}$	$\sin^2\theta_{23}$	$\Delta\chi^2$
5	`# T13/DMA`	$\sin^2\theta_{13}$	$\Delta m^2_{3\ell} \,/\, [10^{-3}\ \text{eV}^2]$	$\Delta\chi^2$
6	`# T23/DMA`	$\sin^2\theta_{23}$	$\Delta m^2_{3\ell} \,/\, [10^{-3}\ \text{eV}^2]$	$\Delta\chi^2$
7	`# T13/DCP`	$\sin^2\theta_{13}$	$\delta_{\text{CP}} \,/\, [\text{deg}]$	$\Delta\chi^2$
8	`# T23/DCP`	$\sin^2\theta_{23}$	$\delta_{\text{CP}} \,/\, [\text{deg}]$	$\Delta\chi^2$
9	`# DMA/DCP`	$\Delta m^2_{3\ell} \,/\, [10^{-3}\ \text{eV}^2]$	$\delta_{\text{CP}} \,/\, [\text{deg}]$	$\Delta\chi^2$

N°	Section tag	1st column	2nd column	3rd column
10	`# T12/T23`	$\sin^2\theta_{12}$	$\sin^2\theta_{23}$	$\Delta\chi^2$
11	`# T12/DCP`	$\sin^2\theta_{12}$	$\delta_{\rm CP}\,/\,[\rm deg]$	$\Delta\chi^2$
12	`# T12/DMA`	$\sin^2\theta_{12}$	$\Delta m^2_{3\ell}\,/\,[10^{-3}\ \rm eV^2]$	$\Delta\chi^2$
13	`# DMS/T23`	$\log_{10}(\Delta m^2_{21}\,/\,[\rm eV^2])$	$\sin^2\theta_{23}$	$\Delta\chi^2$
14	`# DMS/DCP`	$\log_{10}(\Delta m^2_{21}\,/\,[\rm eV^2])$	$\delta_{\rm CP}\,/\,[\rm deg]$	$\Delta\chi^2$
15	`# DMS/DMA`	$\log_{10}(\Delta m^2_{21}\,/\,[\rm eV^2])$	$\Delta m^2_{3\ell}\,/\,[10^{-3}\ \rm eV^2]$	$\Delta\chi^2$
16	`# T13`	$\sin^2\theta_{13}$	$\Delta\chi^2$	—
17	`# T12`	$\sin^2\theta_{12}$	$\Delta\chi^2$	—
18	`# T23`	$\sin^2\theta_{23}$	$\Delta\chi^2$	—
19	`# DCP`	$\delta_{\rm CP}\,/\,[\rm deg]$	$\Delta\chi^2$	—
20	`# DMS`	$\log_{10}(\Delta m^2_{21}\,/\,[\rm eV^2])$	$\Delta\chi^2$	—
21	`# DMA`	$\Delta m^2_{3\ell}\,/\,[10^{-3}\ \rm eV^2]$	$\Delta\chi^2$	—

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