Contribution ID: **292** Type: **Poster**

Neutrino Oscillation Global Fits with GAMBIT

Tuesday, 18 June 2024 17:30 (2 hours)

The field of neutrino oscillation study is full of unique and insightful experiments, and global fits can be conducted to study their results in a unified and coherent approach, exploiting the strengths of the different experiments. For the success of a global study, factors such as experiment modelling, parameter space exploration, and statistical interpretation are of vital importance.

In this work, we present preliminary results from the first three-flavour neutrino global fit performed with the Global and Modular BSM Inference Tool (GAMBIT). GAMBIT is an open-source global fitting software package for studying generic particle and astronomical physics models. Its modular design allows easy implementation of likelihood functions and models. The built-in scanners also provide robust and efficient statistical sampling techniques.

Our neutrino global fit includes results from eight neutrino oscillation experiments of different types, including solar, reactor, atmospheric, and long-baseline accelerator. The fit also uses only publicly accessible experiment data and information, adhering to the open-source policy. In the fit, each experiment is represented by a set of likelihood functions. Realistic and physics-motivated systematic models along with sets of nuisance parameters are introduced to account for systematic uncertainties for the detector effects and the neutrino fluxes, to name a few. For a given combination of neutrino oscillation parameters and nuisance parameters, a combined likelihood can be calculated. A self-adaptive differential evolution sampling algorithm is utilised to explore the vast parameter space and search for the best-fit point. Rigorous and modern statistical methods are adopted to interpret the sampling result, maximising the accuracy of the global fit.

Poster prize

Yes

Given name

Chien

Surname

Lin

First affiliation

Imperial College London

Second affiliation

Institutional email

c.lin20@imperial.ac.uk

Gender

Male

Collaboration (if any)

Primary author: LIN, Chien (Imperial College London)

Presenter: LIN, Chien (Imperial College London)

Session Classification: Poster session and reception 1

Track Classification: Neutrino oscillations