GLoBES – General Long Baseline Experiment Simulator

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GLoBES is a versatile and powerful tool to study the physics potential of future long baseline and reactor neutrino oscillation experiments.

The exciting results on neutrino oscillations in the last few years have spurred great activity in the area of conceiving and developing new experimental methods to precisely pin down the underlying physical parameters. In the framework of three active neutrinos there are six parameters accessible by oscillation experiments: $\Delta m^2_{21}, \Delta m^2_{31}, \theta_{12}, \theta_{13}, \theta_{23}, \delta_{\rm CP}$.

In order to assess the physics potential of a given experiment or method it is on the one hand necessary to have a precise description of the experimental setup in terms of the initial neutrino flux and flavour composition and the detector properties, like fiducial mass, energy resolution, background rejection *asf.* On the other hand, however, it is very important to have a precise description of the oscillation physics itself, which in turn dictates the applicable analysis strategy. This task posses considerable difficulties due to the large number of free parameters and the complex dependence of the observables on the physical parameters.

GLoBES allows to treat all those parts within an integrated software environment. The experiment description in terms of fluxes, cross sections, backgrounds, *etc.* is performed with the 'Abstract Experiment Definition Language', which has successfully been applied to experiments like MINOS, OPERA, ICARUS, Double-Chooz, T2K, NOvA, and neutrino factories [1–10].

The analysis facilities provided by GLoBES allow to fully take into account systematical errors as well as all oscillation parameters even including the matter density uncertainty. Moreover it is easily possible to analyze any combination of up to 32 individual experiments. Furthermore degeneracies and the existence of multiple solutions can be naturally taken into account by GLoBES.

GLoBES is available as C library for GNU/Linux and can be obtained at `http://www.ph.tum.de/~globes`, where also an extensive documentation can be found.

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