

## GPU analyses on the grid

*Thursday 12 July 2018 12:00 (15 minutes)*

Analyses of multi-million event datasets are natural candidates to exploit the massive parallelisation available on GPUs. This contribution presents two such approaches to measure CP violation and the corresponding user experience.

The first is the energy test, which is used to search for CP violation in the phase-space distribution of multi-body hadron decays. The method relies on a pairwise comparison of all events, hence introducing a quadratic dependence on the sample size, which parallelisation on the GPU can compensate.

The second method is the time-dependent amplitude analysis with the GooFit package. With the complex amplitude model the number of fit parameters is typically in excess of 50, making this a great computational challenge on very large datasets.

Both methods have been submitted via Dirac to the Manchester Analysis Facility GPU cluster. The contribution will report on the performance of running GPU jobs on the grid as well as on the performance of the two algorithms. Both analyses have been performed on the large datasets of the LHCb experiment. The gain in computing time is up to about one order of magnitude, which would render the analysis impossible on CPUs.

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