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Global Neutrino Analysis framework and GPU based computations

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GNA is a high-performance fitting framework developed for the data analysis of the neutrino experiments. The framework is based on data flow principles: an experiment model is represented by the computational graph of simple functions as separate nodes that are computed lazily.

In this work, we describe the GPU support library for GNA named cuGNA which uses CUDA toolkit. This library is implemented to enable both the performance of GPU and the versatility of data flow approach. We have added GPU-based node implementation to the existing library as well as implemented GNA core features that make GPU support hidden from the end user.

Current status of CUDA computations in GNA, tests on real-life computational graphs, and performance comparison to CPU-based models are presented in this work.

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