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GPU based spectral-fitter for Borexino solar neutrino analysis

A spectral fitter based on the graphics processor unit (GPU) has been developed for Borexino's solar neutrino analysis. It is able to shorten the fitting time to a superior level compared to the CPU fitting procedure. In Borexino solar neutrino spectral analysis, fitting usually requires around one hour to converge since it includes time-consuming convolutions in order to account for the detector response and pile-up effects. Moreover, for the CNO-neutrino analysis the convergence time is more than two days due to extra computations for the discrimination of ^{11}C and external γs. In sharp contrast, with the GPU-based fitter it takes less than 10 seconds and less than four minutes, respectively. This fitter is developed utilizing the GooFit project with customized likelihoods, pdfs and infrastructures supporting certain analysis methods. In this poster the design of the package, developed features and the comparison with the original CPU fitter are presented.

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