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Assessment of the data-model agreement in Fermi-LAT data analysis

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An important step of a Fermi-LAT data analysis of a Region of Interest consists in performing a binned likelihood fit to find the sky model that, after convolution with the instrument response, best predicts the number of observed counts. The data and model counts are binned in a 3d grid, with two spatial and one spectral dimensions. Checking the goodness-of-fit is not straightforward because of the 3d nature of the data/model representation. The usual solution to this problem is to compute a so-called TS map by testing the presence of an additional source at each pixel of the RoI. While this solution is optimal to detect data/model positive deviations, it is not sensitive to negative deviations and it is furthermore very CPU expensive. We propose a new method which provides a map of the deviation probabilities. This method is by construction sensitive to both positive and negative deviations and is much faster than the TS map computation.

Author: BRUEL, Philippe

Presenter: BRUEL, Philippe

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