Subtracting histograms using profile likelihood

It is known that many interesting signals expected at LHC are of unknown shape and strongly contaminated by background events. These signals will be difficult to

detect during the first years of LHC operation due to the initial low luminosity.

In this work, one proposes a method on how to obtain signal information of unknow shape from data even when there are very low signal and large background statistics. We present a method of subtracting histograms based on the profile likelihood when the background is previously estimated by Monte Carlo events. Estimators for each bin of the histogram difference are calculted so as limits for the signals with 68,3% Confidence Level for a low statistics case when one has a exponential background and a gaussian signal. Our results show a good performance and avoid the problem of negative values when subtracting histograms. This approach can be used to look for the Higgs particle.

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