Comment on combined fit method from A. F. Zarnecki

Rounding problem

At the begining of section IV authors write (from line 197):

"Then, the signal statistical uncertainties corresponding to the integrated luminosity of 2 ab^{-1} are estimated. For that, the weighted signal and background distributions are summed, the content of each bin is rounded to the integer number and the Poisson uncertainties for the bin contents are assumed to imitate the real data."

I consider the "rounding procedure" described here as "illegal", being against the "good practice" rules. What one get from the generated MC samples are the distributions of the EXPECTED numbers of events and there is no reason to round them to the integer numbers.

ILD TDR 2013 (Volume 2, page 30).

The International Large Detector: Letter of Intent (Filip is in autorlist), arXiv:1006.3396 [hep-ex], (section 3.3.1.1, page 38).

model independent impact analysis including Bremsstrahlung photons. To extract the mass and cross section a modified fitting function is used. The results of the fits ($e^+e^- X n\gamma$) for m_H and $\sigma(e^+e^- \to ZH)$ are listed in Table 3.3-4. Including Bremsstrahlung photons improves

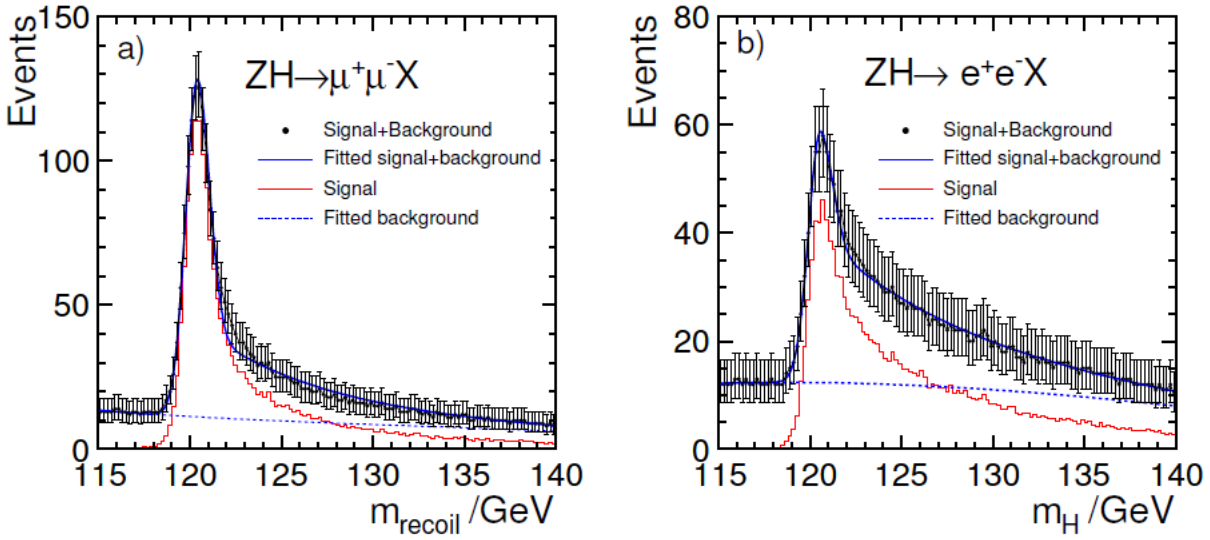
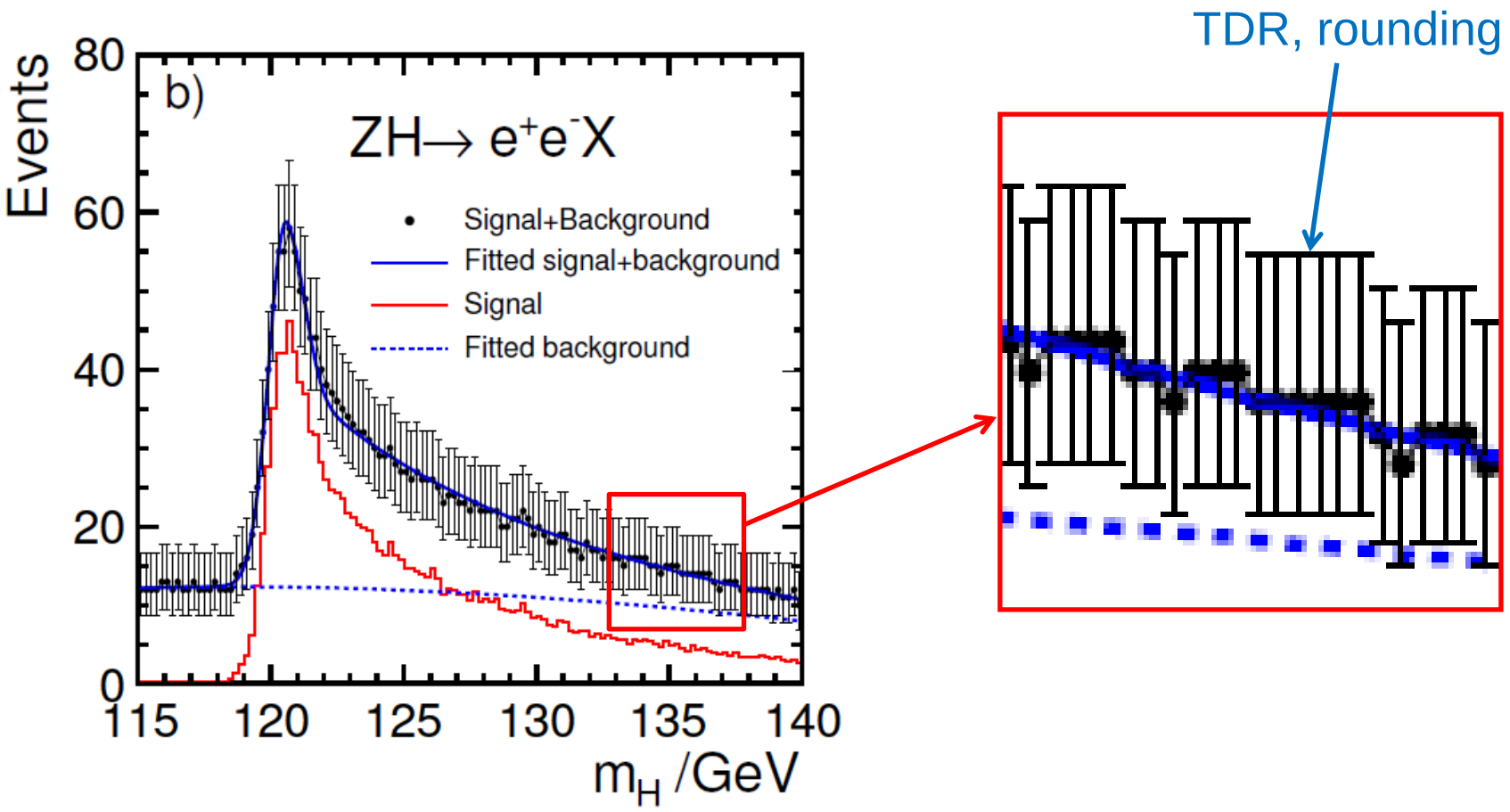


FIGURE 3.3-13. Results of the model independent analysis of the Higgs-strahlung process $e^+e^- \to HZ$ in which a) $Z \to \mu^+\mu^-$ and b) $Z \to e^+e^-$. The results are shown for a beam polarisation of $P(e^+, e^-) = (+30\,\%, -80\,\%)$.

Exactly the same method as our is used in this analysis

Rounding is illegal ?

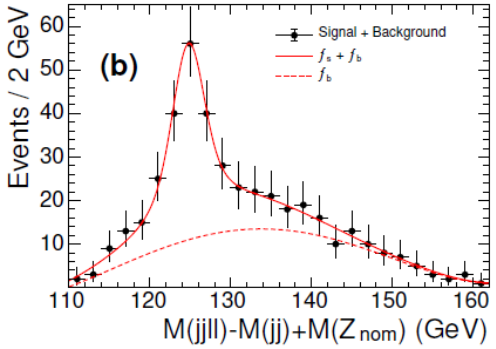


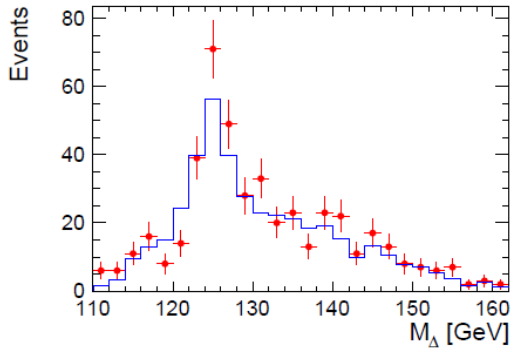
The signal and background components were added in this TDR analysis, the bin values were rounded to closest integer values and then a single fit was used to obtain estimates for the mass accuracy and the cross-section accuracy.

Filip comment →

Poisson fluctuations

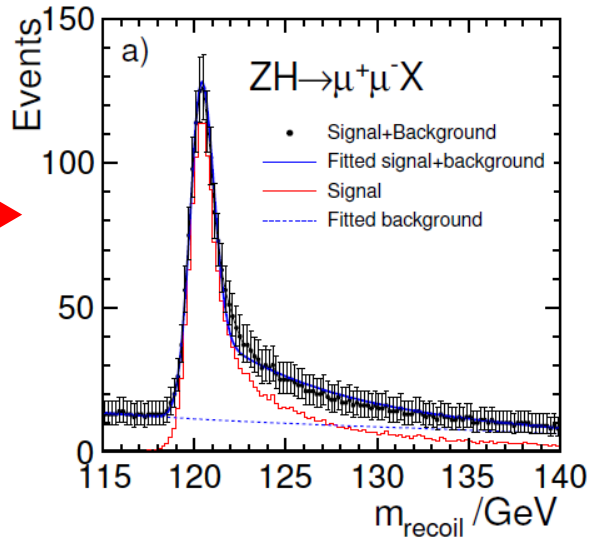
When the expected experimental results are shown on the plot the Poisson uncertainties indicated do not agree with the fluctuations of the data (which are much smaller, resulting from MC statistics).

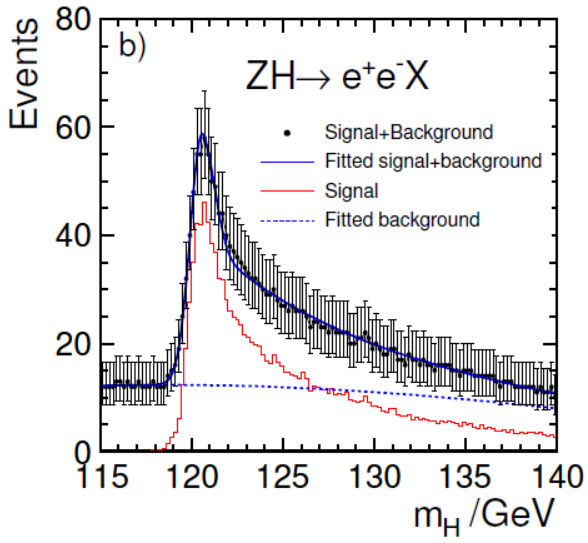




It makes much more sense, in my opinion, to present one of the ToyMC data sets on the plot, demonstrating the possible impact of fluctuations...

ILD TDR
V.2, page 30 →





Our analysis is done using exactly the same method, as missing mass analysis in TDR. Missing mass analysis is one of most important points in TDR. Almost all ILD members showed these figures in seminars.

There are two ways to resolve the problem:

1. **Both analyses are not correct.**

2. **Both analyses are correct.**

We are waiting for your opinion.