PHYS 721 Homework 7

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1. By fitting a function to the data there appears to be a few regions where the data is above the background function especially in the region around 126.5 GeV. When investigrating this region further by fitting a Gausian function with a mean around 126.5 GeV a peak apears with a mass of $126.32 \pm 0.66\,GeV$ and a width of $0.97 \pm 0.13\,GeV$ with a χ^2 value close to 1.

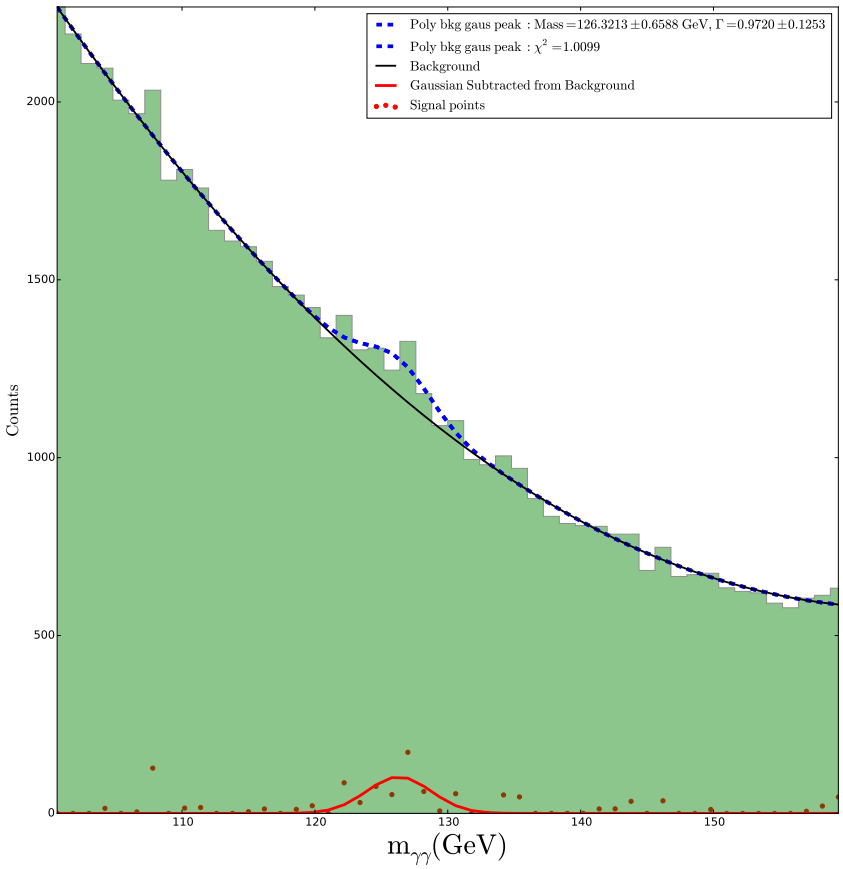

Figure 1: Shows the mass of $\gamma\gamma$ pairs with a background function fit as well as a gausian peak fit on the background. In red the subtracted signal as well as subtracted Gausian function can also be seen.

2. Given that the width is $1.66\,GeV$ without any knowledge of the mass allows for one to find the confidence level of the peak. Knowing the confidence level can give the σ value for the signal data with a value of $5\,\sigma$ meaning the discovery of a new particle.