Experimental particle. physics

esipap...

European School of Instrumentation
in Particle & Astroparticle Physics

C. Significance of
H→γγ signal

H→γγ signal and γγ background models

- γγ background approximated model:

$$\frac{d\sigma_{\text{background}}}{dm_{\gamma\gamma}} = 1145[\text{fb/GeV}]e^{-0.023[\text{GeV}^{-1}]m_{\gamma\gamma}}$$
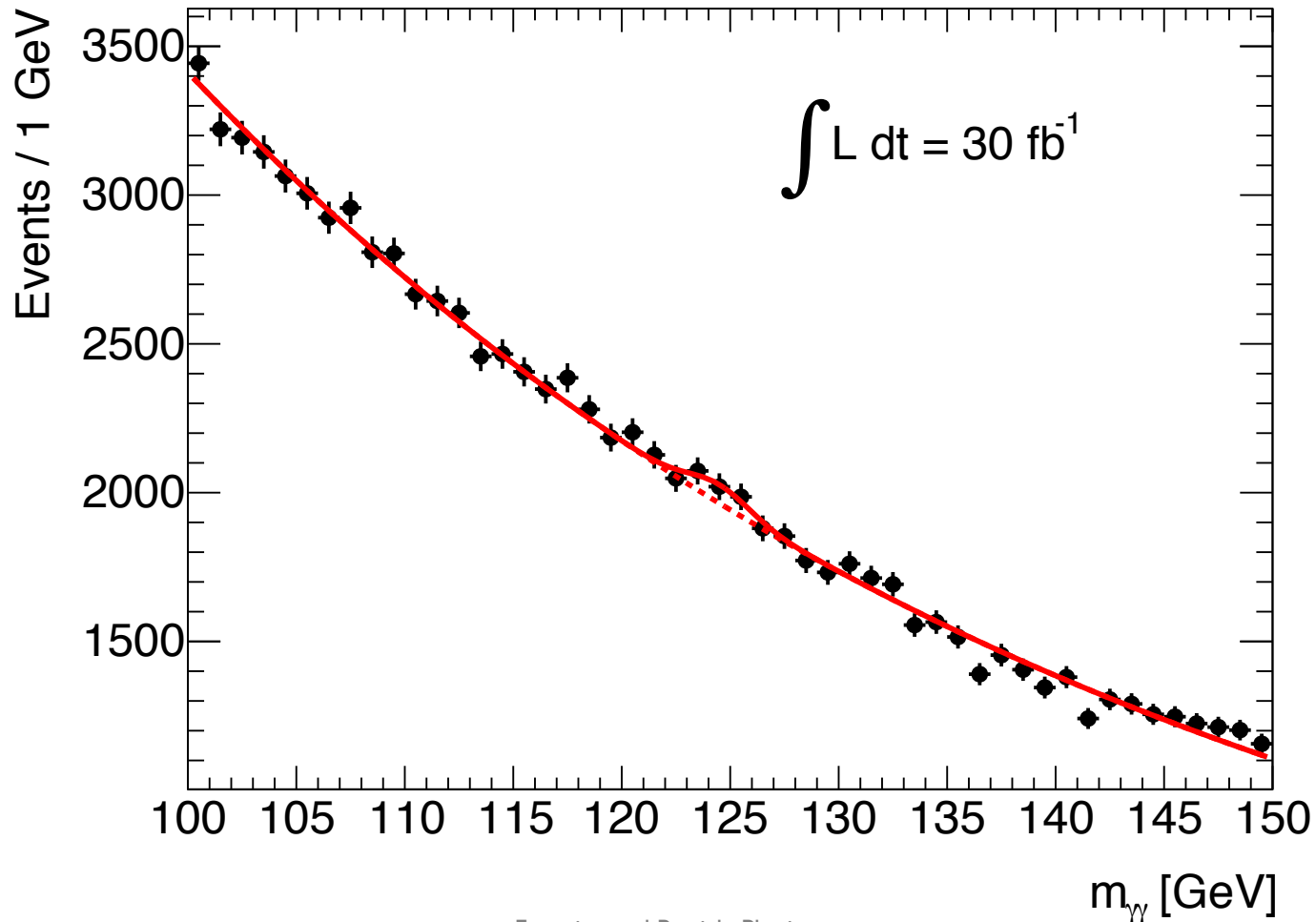
- H→γγ approximated model:

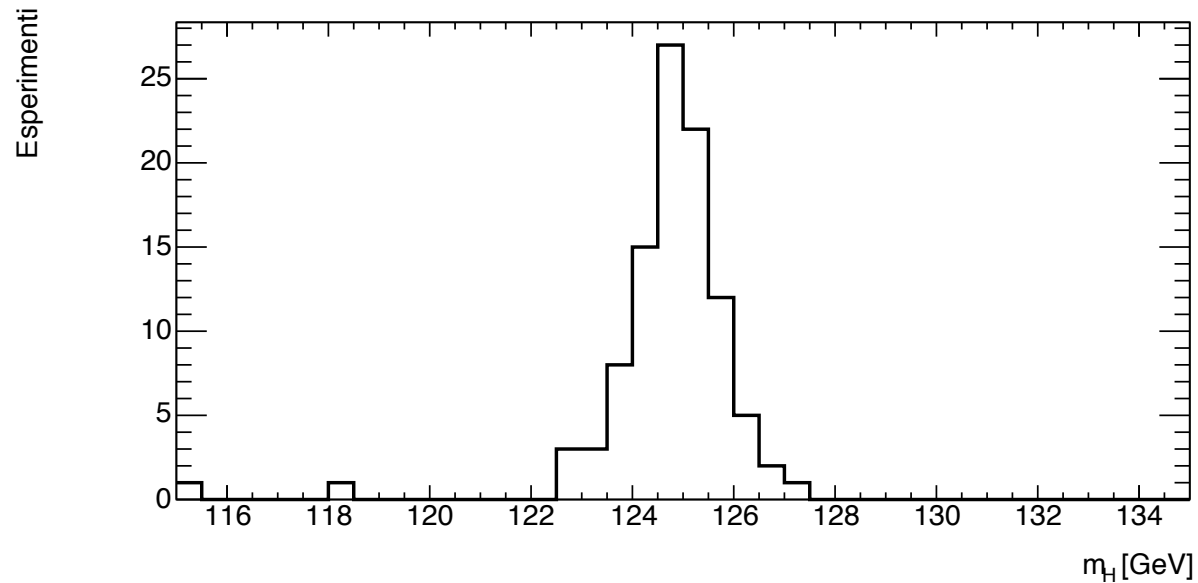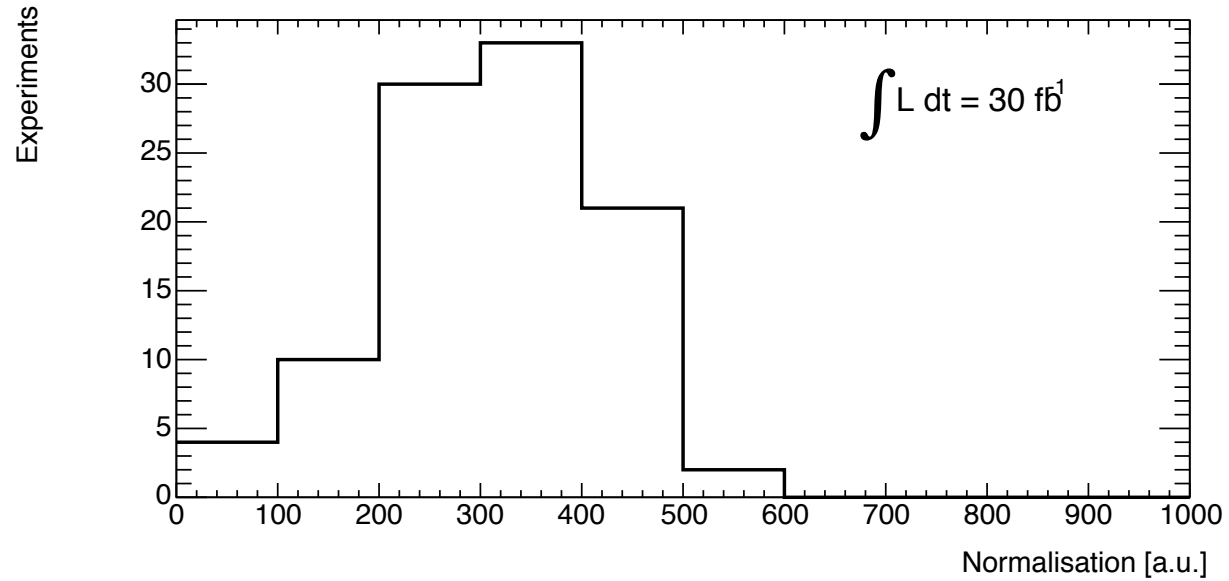$$\sigma(m_H = 125 GeV) \times BR \times \varepsilon_{\text{experiment}} \simeq 10 fb$$

- Width dominated by invariant mass resolution $\sigma_{\gamma\gamma}$

H→γγ fit example

$$p_0 e^{-p_1 m} + p_2 \frac{1}{\sqrt{2\pi p_4}} e^{-\frac{1}{2}\frac{(m-p_3)^2}{p_4^2}}$$

Toy experiments

Significance

$\sigma_{\gamma\gamma} = 1.4$ GeV

Significance

Integrated luminosity [fb-1]

$L = 100$ fb^{-1}

Significance

$\sigma_{\gamma\gamma}$ [GeV]