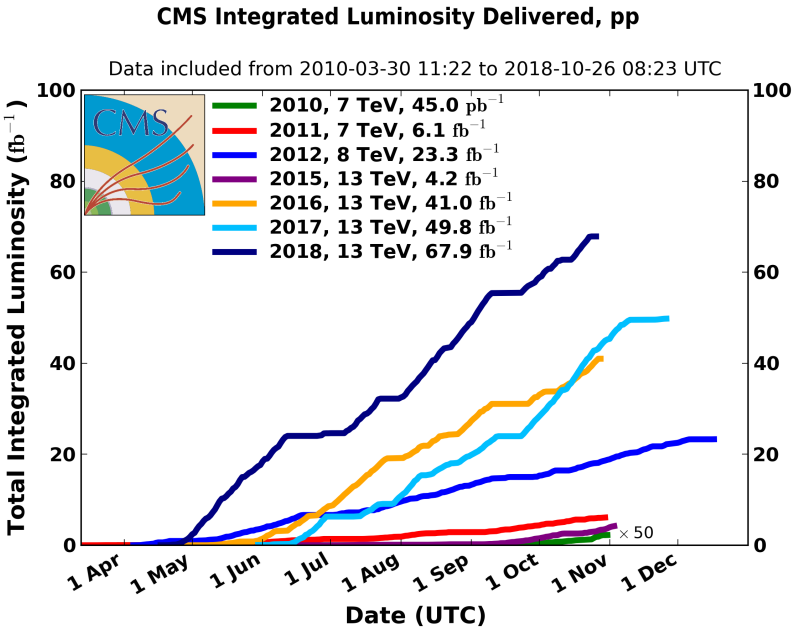
Token 879 199

$$\frac{dN_r}{dt} = \sigma \mathcal{L} \Rightarrow N_r = \sigma \cdot \underbrace{\int_b \mathcal{L} \cdot dt}_{L_{int}}$$

lum · (b^{-1}) integrata.



p p

$\underline{P_1} = (P, P, 0, 0)$

$\underline{P_2} = (P, -P, 0, 0)$

$P = 3.5$ TeV

$m_p = 1$ GeV

$$\frac{P}{m} = \frac{3.5 \times 10^3}{1}$$

$E \simeq P$

$$\sqrt{s} = \sqrt{|\underline{P_1} + \underline{P_2}|^2} = 2P = 7 \text{ TeV}$$

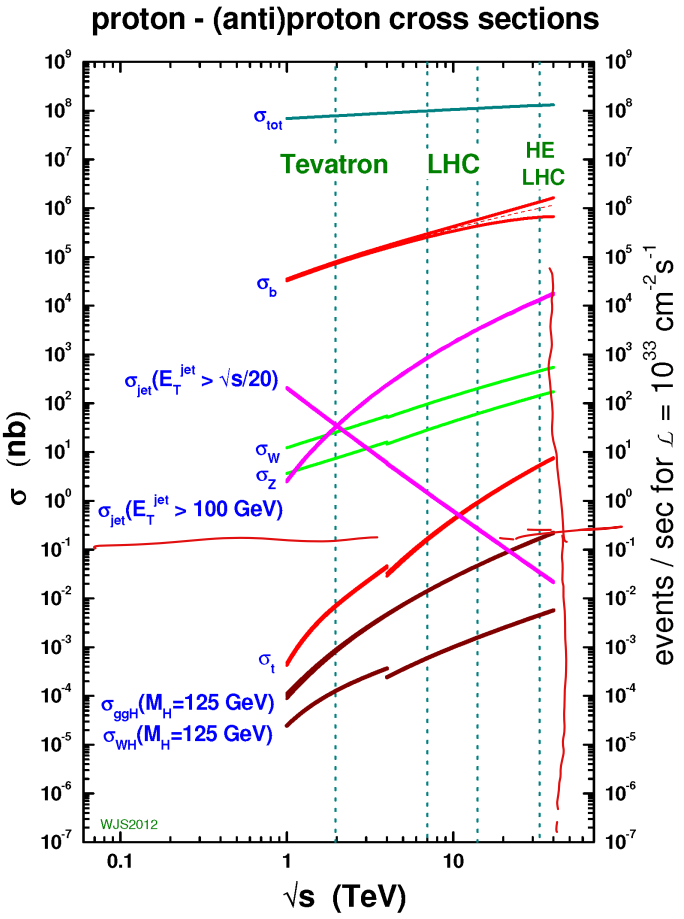
$$(fb)^{-1} = 10^{15}\, b^{-1}$$

$$\mathcal{L} \propto \frac{N_1 \cdot N_2}{S} f$$

$$N_H = \sigma_H \cdot L_{int}$$

$p + p \longrightarrow H + X$

2016-2018: $L_{int} = 163\ fb^{-1}$

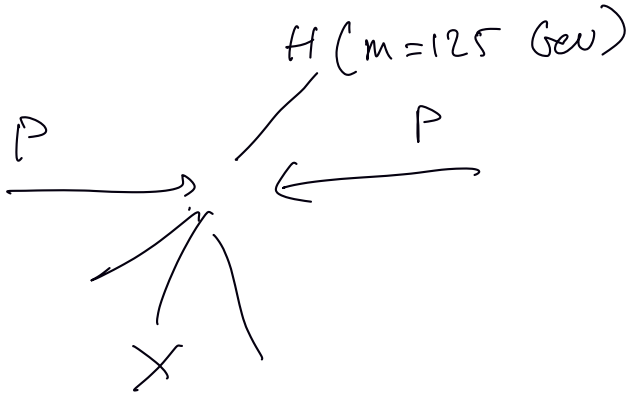


$N_H = 160\ fb^{-1} \times 0.1\ nb$

$= 2 \times 10^{2} \times 10^{-1} \times 10^{-9} \times 10^{15}$

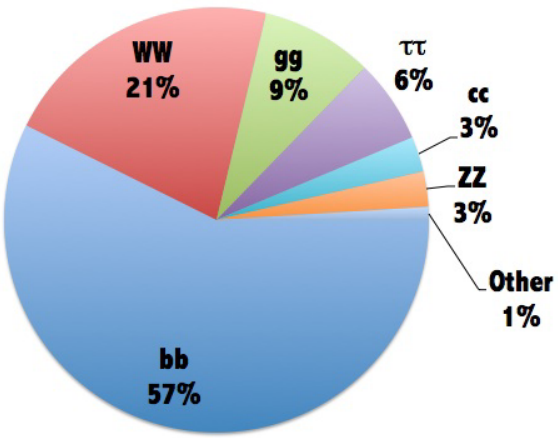
$= 2 \times 10^{7}$

$0.1\ nb = \sigma_H$



$\sqrt{s} = 13 \times 10^{3}\ GeV$

Higgs decays at m_H=125GeV



3%

$H \rightarrow Z^0 Z^0$

$\hookrightarrow \mu^+\mu^-$

$\hookrightarrow \mu^+\mu^-$

Branching Fraction H

Z DECAY MODES

	Mode	Fraction (Γ_i/Γ)	Scale factor/ Confidence level
Γ_1	e^+e^-	(3.363 ±0.004) %	
Γ_2	$\mu^+\mu^-$	(3.366 ±0.007) %	
Γ_3	$\tau^+\tau^-$	(3.370 ±0.008) %	
Γ_4	$\ell^+\ell^-$	[a] (3.3658±0.0023) %	
Γ_5	invisible	(20.00 ±0.06) %	
Γ_6	hadrons	(69.91 ±0.06) %	
Γ_7	$(u\bar{u}+c\bar{c})/2$	(11.6 ±0.6) %	
Γ_8	$(d\bar{d}+s\bar{s}+b\bar{b})/3$	(15.6 ±0.4) %	
Γ_9	$c\bar{c}$	(12.03 ±0.21) %	
Γ_{10}	$b\bar{b}$	(15.12 ±0.05) %	
Γ_{11}	$b\bar{b}b\bar{b}$	(3.6 ±1.3) $\times 10^{-4}$	
Γ_{12}	ggg	< 1.1 %	CL=95%
Γ_{13}	$\pi^0\gamma$	< 5.2 $\times 10^{-5}$	CL=95%
Γ_{14}	$\eta\gamma$	< 5.1 $\times 10^{-5}$	CL=95%
Γ_{15}	$\omega\gamma$	< 6.5 $\times 10^{-4}$	CL=95%
Γ_{16}	$\eta'(958)\gamma$	< 4.2 $\times 10^{-5}$	CL=95%
Γ_{17}	$\gamma\gamma$	< 5.2 $\times 10^{-5}$	CL=95%
Γ_{18}	$\gamma\gamma\gamma$	< 1.0 $\times 10^{-5}$	CL=95%
Γ_{19}	$\pi^\pm W^\mp$	[b] < 7 $\times 10^{-5}$	CL=95%

$H \to \pi^0\pi^0$ 3%

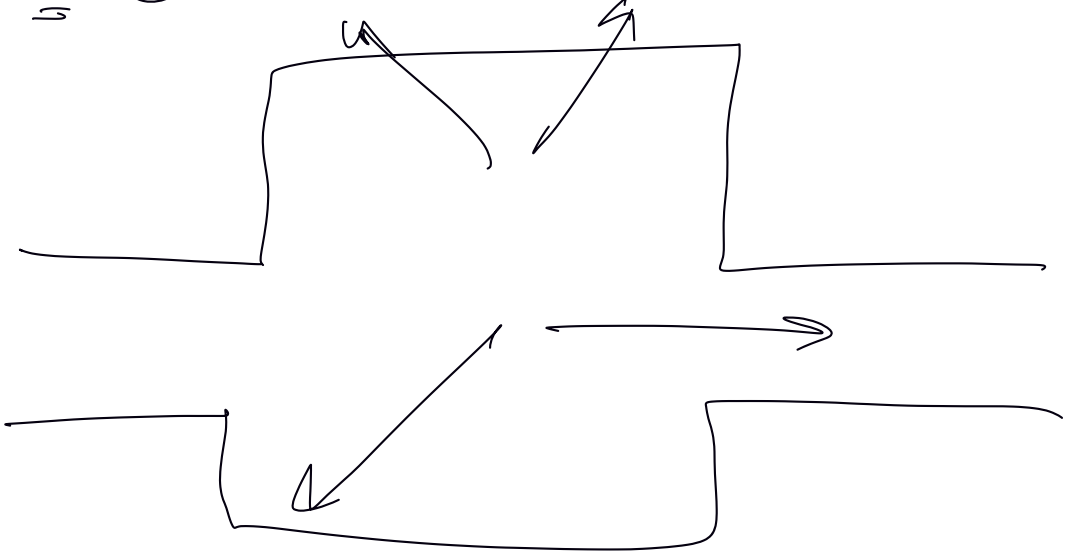
$\pi^0 \to \mu^+\mu^-$ 3%

$p+p \to H+X \to \pi^0\pi^0 \to \mu^+\mu^-\mu^+\mu^-$

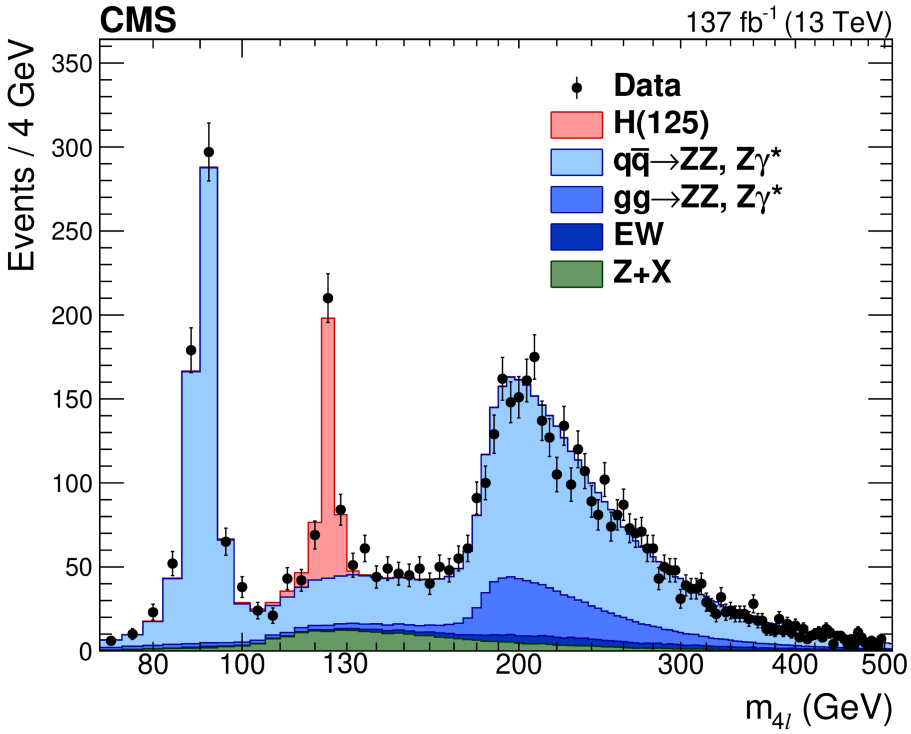
$N_{eventi} = L_{int} \cdot \sigma \cdot \times BF(H \to \pi\pi) \times BF(\pi^0 \to \mu\mu) \times BF(\pi \to \mu\nu)$

$= 2\times10^7 \times 3\times10^{-2} \times 3\times10^{-2} \times 3\times10^{-2}$

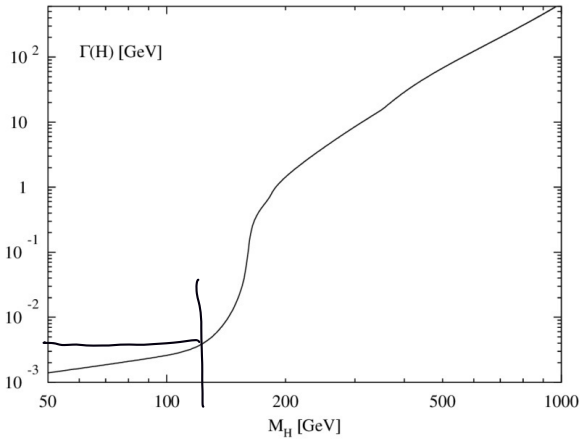
$= 2\times10^7 \times 27\times10^{-6} = 54\times10 = 540$

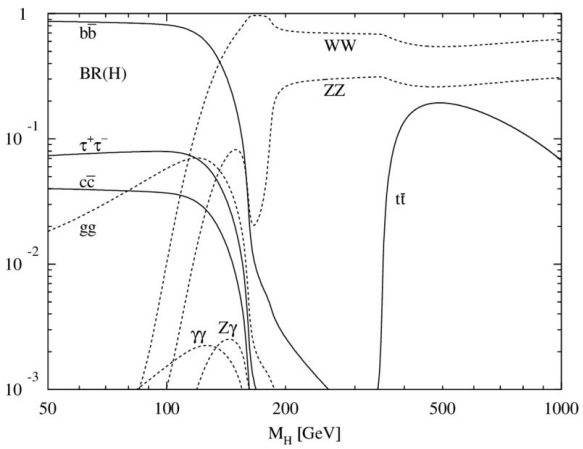


$M_{inv}^2 = |P_{\mu 1} + P_{\mu 2} + P_{\mu 3} + P_{\mu 4}|^2$



$= \sqrt{|p_{\mu^-} + p_{\mu^+} + p_{\mu^-} + p_{\mu^+}|^2}$

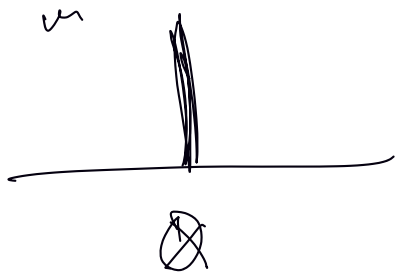


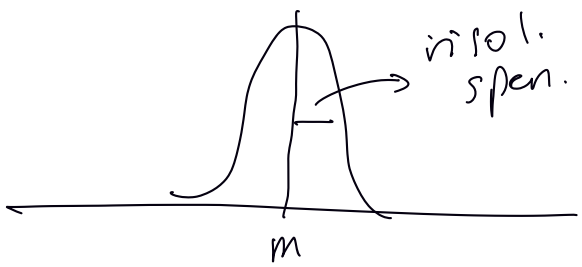


$M_H = 125\ \text{GeV}$

$\Gamma_H < 1\ \text{GeV}$

$\frac{\Gamma}{m}$





G (risonanze)

$p + p \rightarrow Z^0 + Z^0 + X$

$Z^0 \hookrightarrow \mu^+\mu^-$

$Z^0 \hookrightarrow \mu^+\mu^-$

$\bar{x} = \beta\gamma c\tau$ $\qquad$ $\tau = 2.2\ \mu s.$

$\beta\gamma = \frac{p}{m}$ $\qquad$ $m_\mu = 106\ MeV = 0.1\ GeV$

$m_Z = 91\ GeV$

$Z^0 \rightarrow \mu\mu \Rightarrow p_\mu \simeq 45\ GeV.$

$\frac{p}{m} = \frac{45}{0.1} = 450.$

$\beta\gamma c\tau = 4.5 \times 10^2 \times 3 \times 10^8 \times 2.2 \times 10^{-6}\ m$