Limit Setting

The binned likelihood function is shown inthe equation below。

$$\ell(data|N_j,\theta_i)=\prod_{k=1}^{N_{bin}}\frac{\mu_k^{\,n_k}e^{-\mu_k}}{n_k!}\prod_{i=1}^{N_{sys}}G(\theta_i,\mu_{\theta_i},\sigma_{\theta_i})$$

Employing Bayesian statistics we use equation below and treat G(θ i, 0, 1) as nuisance parameters θ i with Gaussian priors to incorporate the effects of systematic uncertainty.

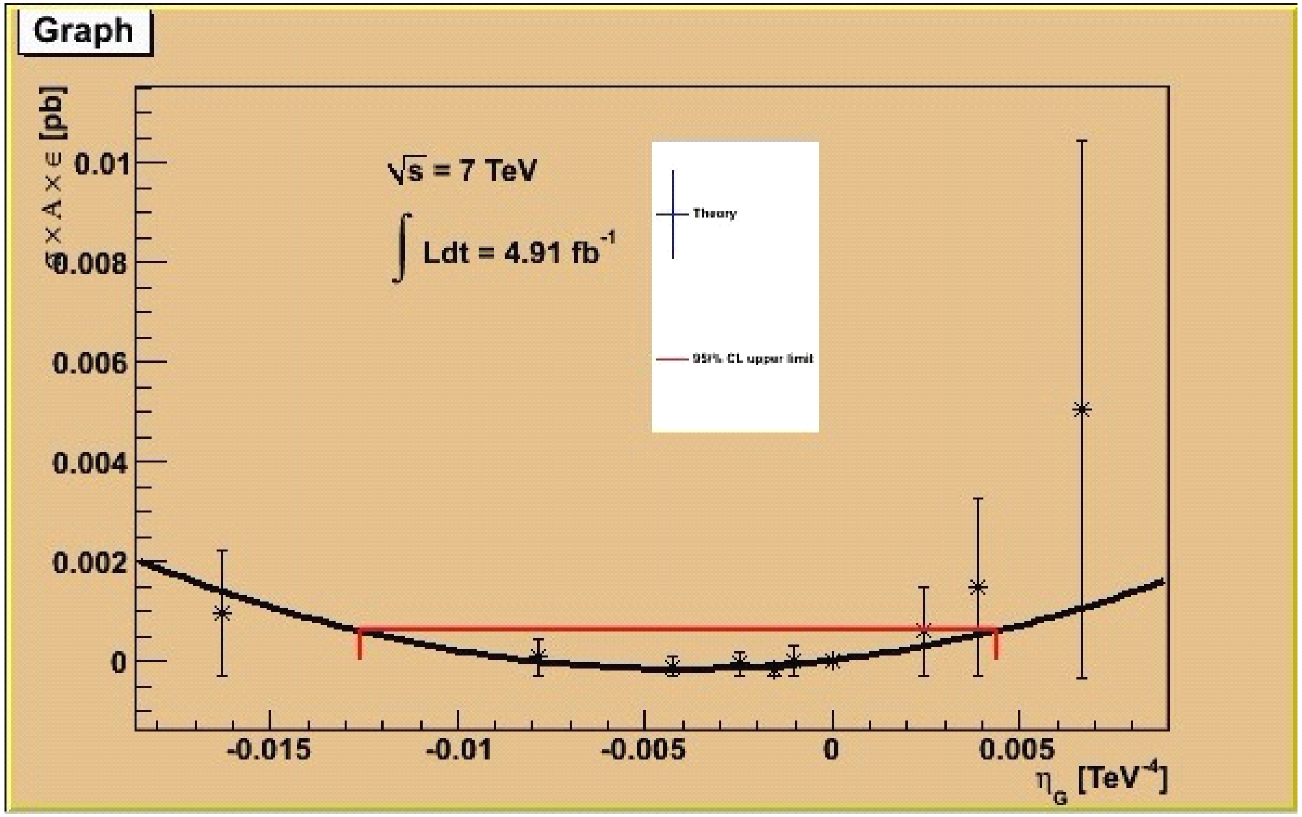
$$\ell(data\,|\,\sigma B)=\int\ell(\sigma B,\theta_{1,\dots,}\theta_N)d\theta_{1,\dots,}d\theta_N$$

$$0.95=\frac{\int_0^{(\sigma B)95}\ell^{'}(\sigma B)\pi(\sigma B)d(\sigma B)}{\int_0^{\infty}\ell^{'}(\sigma B)\pi(\sigma B)d(\sigma B)}$$

$$\sigma_{tot} = \sigma_{SM} + \eta_G \sigma_{\text{int}} + \eta_G^2 \sigma_G$$

$$S = (\sigma_{tot} - \sigma_{SM}) \times A \times \varepsilon$$

- The signal acceptance, defined by requiring that the two signal photons pass the pT and η cuts at the truth level。
- The signal efficiency, defined as the percentage of events within the acceptance which are selected after all selection cuts


Graph
$\sqrt{s}$ = 7 TeV
$\int$ Ldt = 4.91 fb^{-1}
Theory
95% CL upper limit
$\sigma \times A \times \epsilon$ [pb]
η_G [TeV^{-4}]
0.01
0.008
0.006
0.004
0.002
0
-0.015
-0.01
-0.005
0
0.005

$$\eta_G = F / M_s^4$$

$$F = 1, (GRW);$$

$$F = \begin{cases} \log\left(\frac{M_s^2}{M^2}\right) & n=2 \\ \frac{2}{n-2} & n>2 \end{cases}, (HLZ);$$

$$F = \frac{2\lambda}{\pi} = \pm\frac{2}{\pi}, (Hewett).$$

ADD Parameter	GRW	Hewett	HLZ n=3	n=4	n=5	n=6	n=7
etaG	0.0126	0.0126	0.0126				
Ms	2.98475	2.66611	3.5495	2.985	2.697	2.510	2.374