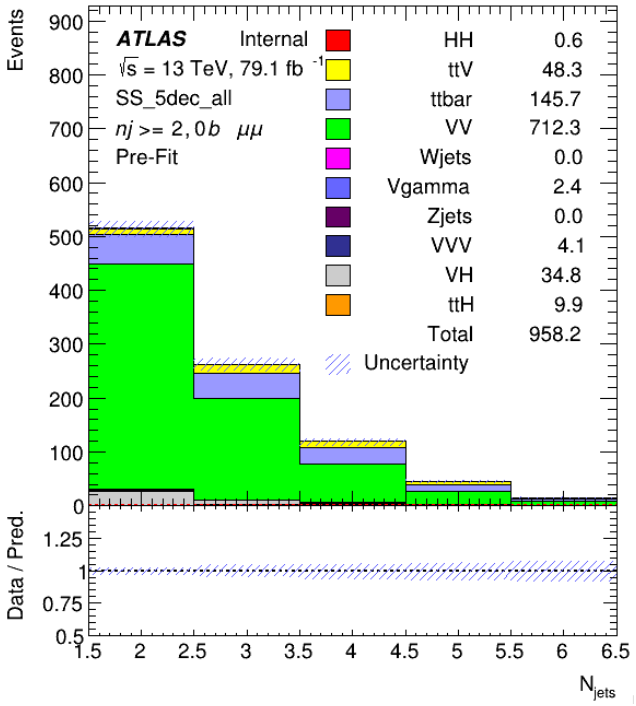
Weekly Report

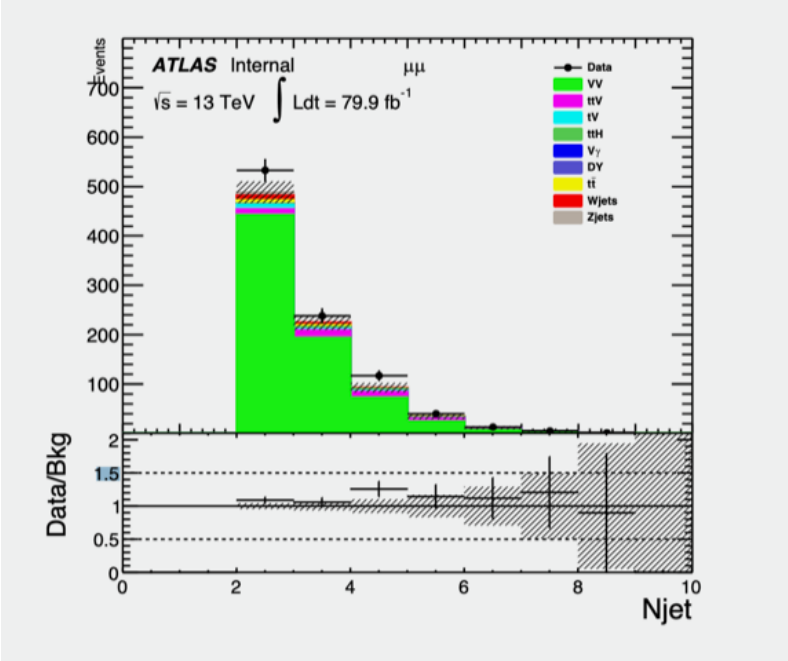
Xin Shuiting

9/Dec/2019

2lss events yields comparison

>=2jets, no b jets region





Main difference :Wjets(0,16.8), ttbar(145.7,14.28), Zjets(0,6.01),Vgamma(2.4,0.88).

Will check the input samples , weight calculations and selections

A cutflow of ttbar sample

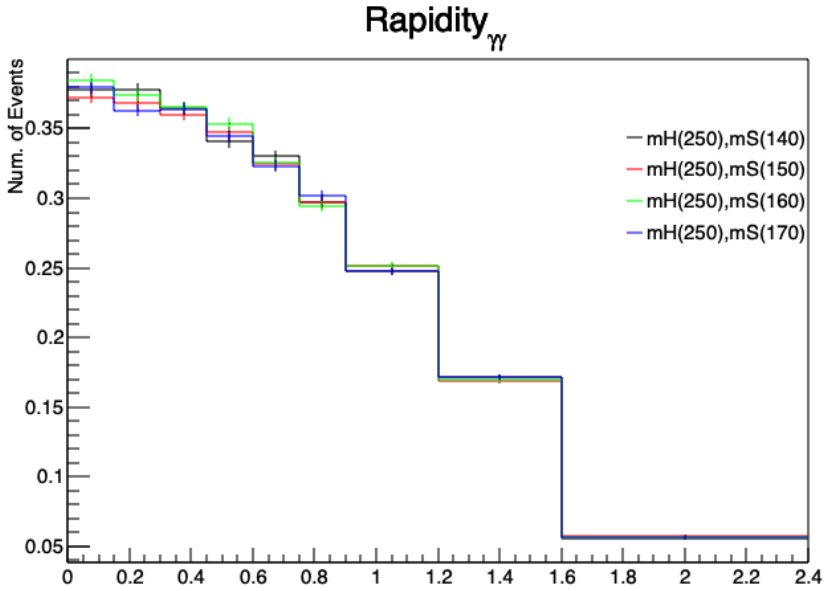
cut flow

	raw_number	wgt_number	ee	mumu	emu
input:	24358344	2.0055e+06	475750	525419	1.00433e+06
TightLeptons:	22692	1876.56	475.042	437.134	964.383
pt_l1, match:	13145	1085.91	309.663	203.142	573.102
B veto:	4862	403.741	104.597	88.2319	210.912
MET:	4862	403.741	104.597	88.2319	210.912
DY:	4783	397.073	103.048	86.4969	207.528
Zveto:	4613	383.226	89.2011	86.4969	207.528
PLV	1727	144.57 ~~1727~~	34.9622	28.7972	80.8278
Njet:	937	77.2786	18.5688+-1.27367	13.8774+-1.10261	44.8324+-1.98928

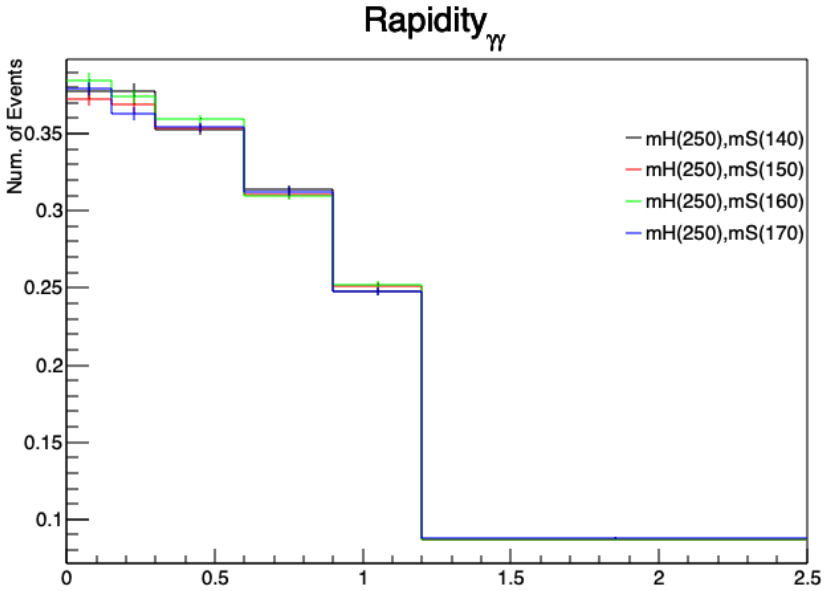
Plan to run with new samples

H->Sh study

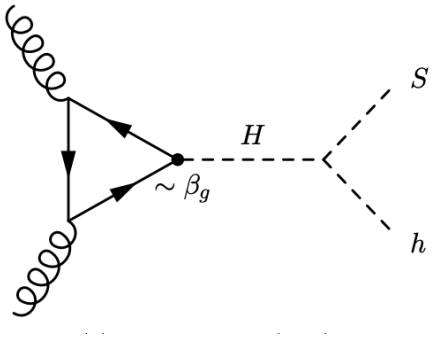
1)BSM production with ATLAS binning and CMS binning



ATLAS



CMS



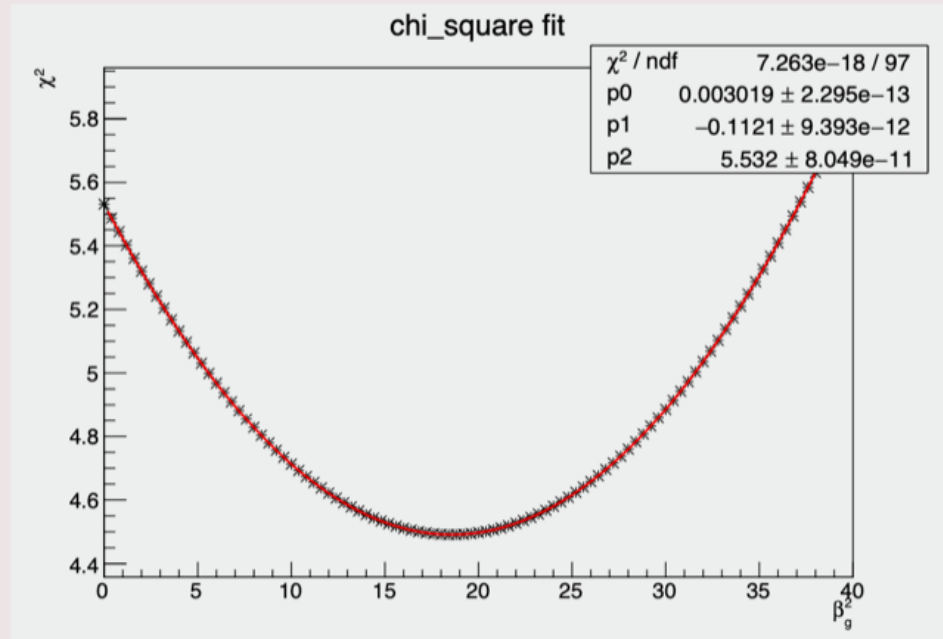
only one degree of freedom beta_g^2
~normalisation of the BSM signal~H cross section

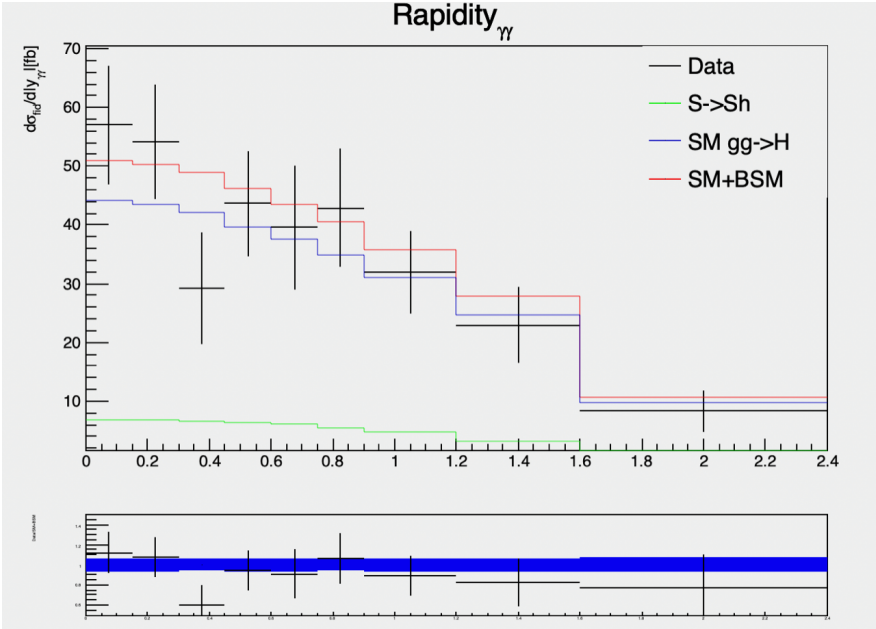
2) SM components of the fits are taken directly from the published experimental distributions

Fitting procedure

$$\chi^2 = \sum_i \frac{\left(N_i^{\mathrm{Data}} - N_i^{\mathrm{SM}} - \beta_g^2 N_i^{\mathrm{BSM}}\right)^2}{\left(\Delta N_i^{\mathrm{Data}}\right)^2 + \left(\Delta N_i^{\mathrm{SM}}\right)^2},$$

Fit with a Quadratic function





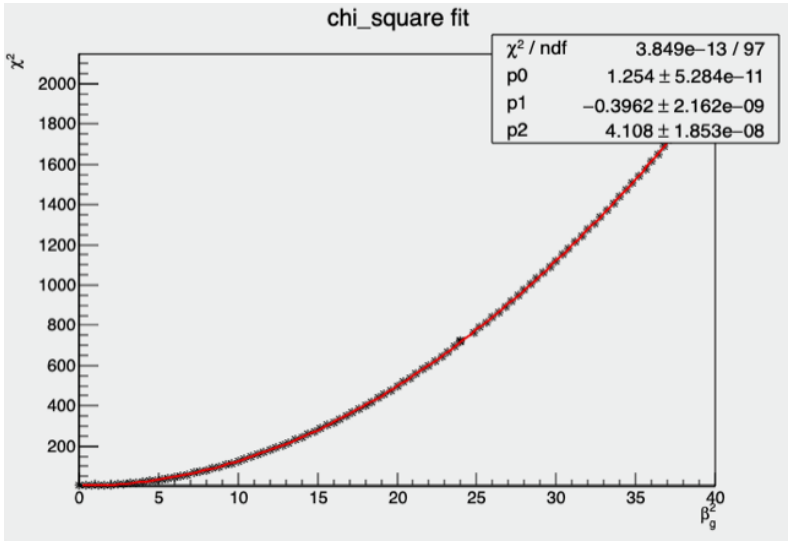
Minimum:18.26

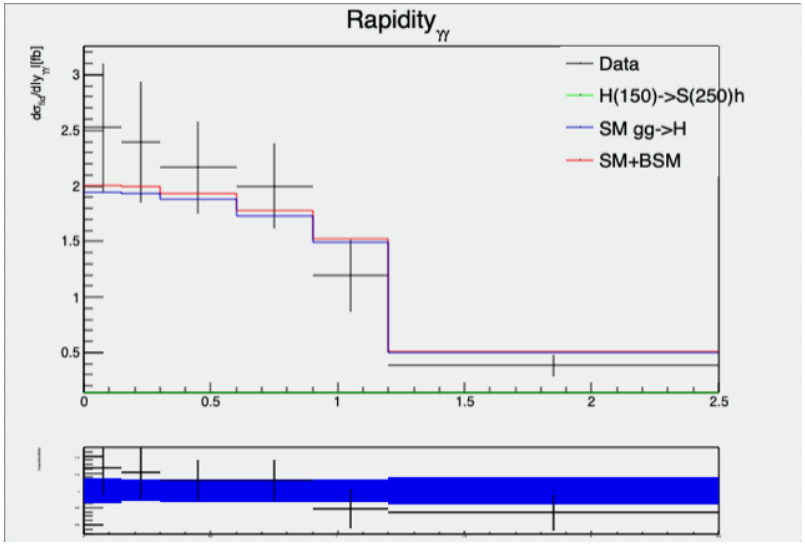
“Numerical” solution

Draw a graph respect to beta_g^2 by step 0.4

ATLAS H->yy

CMS H->ZZ



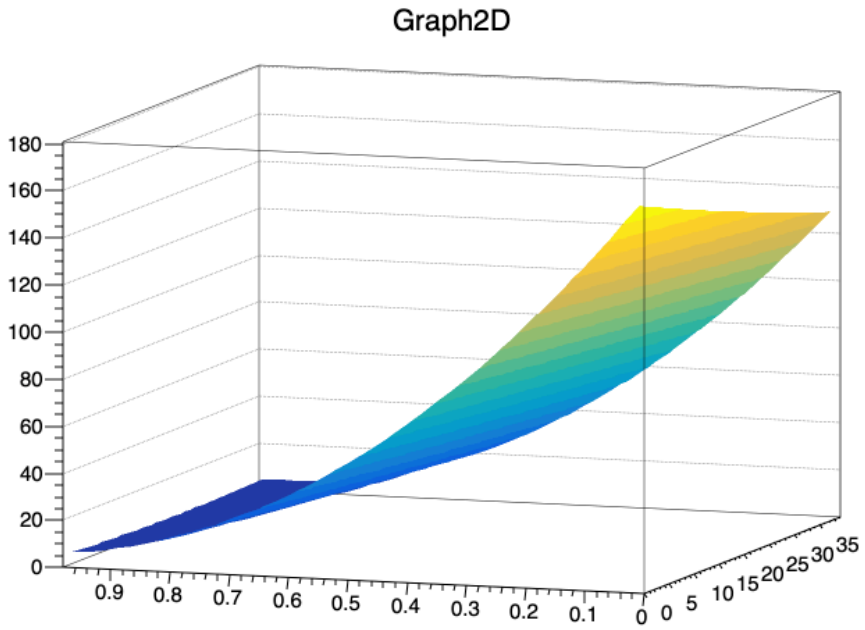


Minimum: 0.15

Turn to 2D fit

Make SM float: 0<\alpha<1

$$\chi^2 = \sum_i \frac{\left(N_i^{\text{Data}} - \alpha N_i^{\text{SM}} - \beta_g^2 N_i^{\text{BSM}}\right)^2}{\left(\Delta N_i^{\text{Data}}\right)^2 + \left(\alpha \Delta N_i^{\text{SM}}\right)^2}$$



Get it minimum value?

Chi2	=	3.9877		
NDf	=	2494		
Edm	=	2.04675e-12		
NCalls	=	190		
p0	=	0.00311569	+/-	6.71265e-06
p1	=	0.460743	+/-	0.000120007
p2	=	147.701	+/-	0.0107402
p3	=	-1.03208	+/-	0.00029643
p4	=	-310.561	+/-	0.0118572
p5	=	168.406	+/-	0.00391308