

# Comparison Between 3T and 3.5T $mumuH \rightarrow mumu$ +bb/cc/gg Analysis

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# Outline

- Full simulation of Signal and Dominant background (zzsl->mumu+qq)
- Background both from 3T and 3.5T are filtered
- Fit template not updated

# Efficiency and Fit Configuration

	H->bb	H->cc	H->gg
3.5T	54.35%	53.92%	50.31%
3T	52.47%	51.78%	49.40%

- **Signal Only Fit**
- **Signal Recoil :Crystal Ball + Double Sided Exponential**
- **Flavor template from MC**
- **H<sub>ww</sub> and H<sub>zz</sub> are fixed**

# Cutflow of H->bb

	3T	3.5T	Eff Ratio	InEff Ratio
FSClasser	86.4622%	87.2201%	0.99131	1.059304
$\cos \theta_z$	83.2223%	82.9499%	1.003284	0.984024
$\cos \theta_{\mu\mu}$	95.2939%	95.4212%	0.998666	1.027802
$M_{\mu\mu}$	94.7533%	96.0762%	0.986231	1.337148
M_recoil	92.7102%	92.7839%	0.999206	1.010213
2J+Lep_Veto	98.5379%	99.2262%	0.993063	1.889506
JetnPFO	99.4802%	99.7175%	0.997620	1.84
$\cos \theta_{JJ}$	92.8495%	92.8624%	0.999861	1.001807
$M_{JJ}$	99.2394%	99.6308%	0.996071	2.060130
y-value	96.4361%	96.4749%	0.999598	1.01107

# Cutflow $zz_{sl} \rightarrow mumuqq$

	3T down	3.5T down	3T up	3.5T up
FSClasser+filter	21699	24189	14259	15367
$\cos \theta_z$	14984	16853	9821	10627
$\cos \theta_{\mu\mu}$	13367	15002	8638	9327
$M_{\mu\mu}$	11893	13524	7725	8429
$M_{\text{recoil}}$	5434	6209	3617	3942
2J+Lep_Veto	5147	6111	3450	3906
JetnPFO	4992	5632	3326	3589
$\cos \theta_{JJ}$	4580	5188	3030	3291
$M_{JJ}$	4434	4672	2903	3054
y-value	4145	4375	2726	2857

# Fit Results

3 T

EXT NO.	PARAMETER NAME	VALUE	ERROR	INTERNAL STEP SIZE	INTERNAL VALUE
1	C	2.98443e-02	1.16010e-02	3.22969e-02	-1.01746e+00
2	a	-1.03607e+00	3.15654e-02	4.79707e-04	-1.03789e-01
3	a1	-3.44392e-01	1.92103e-02	6.12484e-03	-3.44392e-01
4	mean	1.25256e+02	6.52233e-03	1.96390e-03	1.74202e-01
5	n	9.17291e-01	3.01802e-02	2.76175e-03	2.81914e-01
6	nHbb	1.09549e+04	1.38980e+02	4.07062e-03	9.55916e-02
7	nHcc	5.41724e+02	6.00616e+01	8.19061e-03	-1.10141e+00
8	nHgg	1.41318e+03	9.02291e+01	1.22954e-02	-4.50956e-01
9	nbkg	3.39384e+00	9.68549e+00	6.40192e-02	-1.46313e+00
10	nzzsl_mu_bb	2.42790e+03	1.04827e+02	8.22363e-03	-3.11516e-01
11	nzzsl_mu_cc	2.08545e+03	7.09836e+01	6.90997e-03	-4.16277e-01
12	nzzsl_mu_uds	7.08060e+03	1.06463e+02	3.51638e-03	-2.96322e-01
13	sigma	3.22645e-01	6.59870e-03	4.57437e-03	-4.59375e-01

FRR DEF= 0.5

**True Value:**  
**nHbb: 10806**  
**nHcc: 497**  
**nHgg: 1471.6**

3.5 T

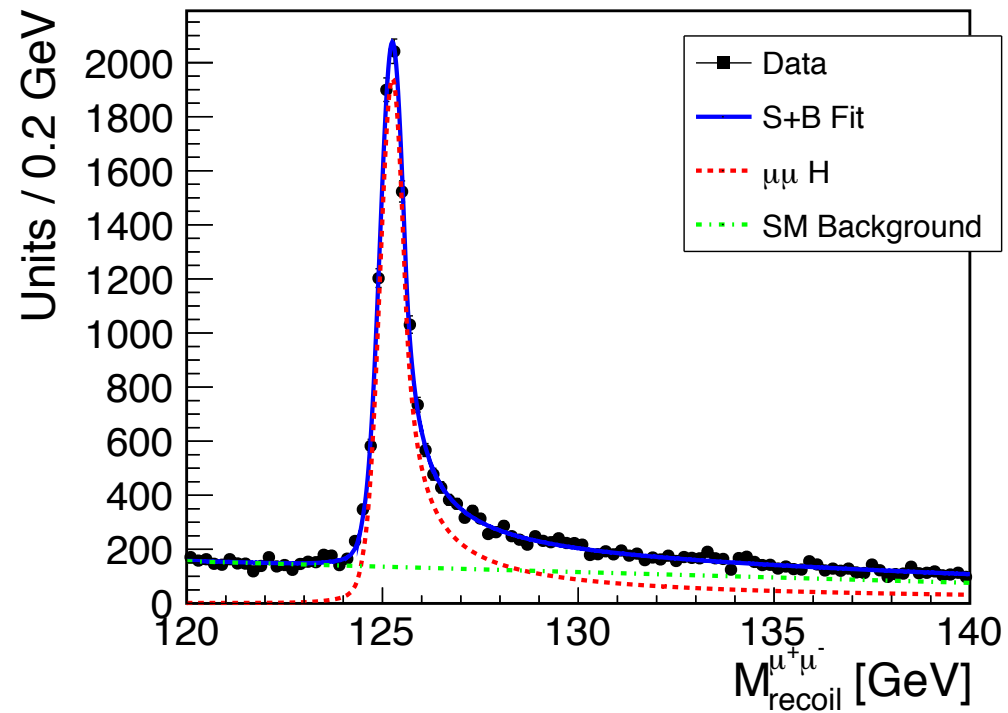
EXT NO.	PARAMETER NAME	VALUE	ERROR	INTERNAL STEP SIZE	INTERNAL VALUE
1	C	1.41257e-02	7.10497e-03	1.01210e-03	-1.19271e+00
2	a	-1.01976e+00	2.94921e-02	7.42029e-05	-1.02154e-01
3	a1	-2.66861e-01	2.54429e-02	3.01143e-04	-2.66861e-01
4	mean	1.25237e+02	5.50034e-03	5.94020e-05	1.52510e-01
5	n	9.26916e-01	2.62238e-02	9.02018e-05	2.88600e-01
6	nHhh	1.12777e+04	1.31890e+02	1.49491e-04	1.73038e-01
7	nHcc	5.13029e+02	5.57565e+01	2.94354e-04	-1.11426e+00
8	nHgg	1.54453e+03	8.43753e+01	4.18157e-04	-3.92464e-01
9	nbkg	5.00001e-01	7.91414e+00	4.45507e-01	-1.57075e+00
WARNING - ABOVE PARAMETER IS AT LIMIT.					
10	nzzsl_mu_bb	1.37509e+03	8.65210e+01	3.07649e-04	-6.52715e-01
11	nzzsl_mu_cc	1.46088e+03	5.98302e+01	2.46184e-04	-6.22211e-01
12	nzzsl_mu_uds	4.30346e+03	8.63575e+01	1.22372e-04	-6.06180e-01
13	sigma	2.69439e-01	5.42687e-03	1.48477e-04	-6.14320e-01

FRR DEF= 0.5

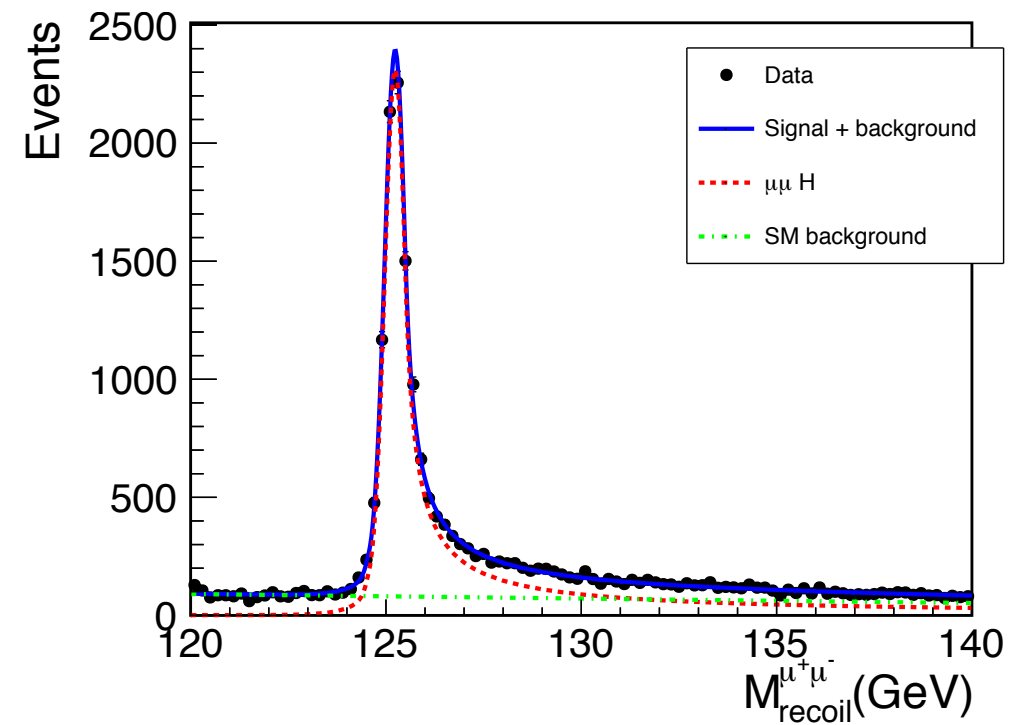
**True Value:**  
**nHbb: 11188.2**  
**nHcc: 518.2**  
**nHgg: 1502.4**

# Mrecoil from Fit

3 T



3.5 T



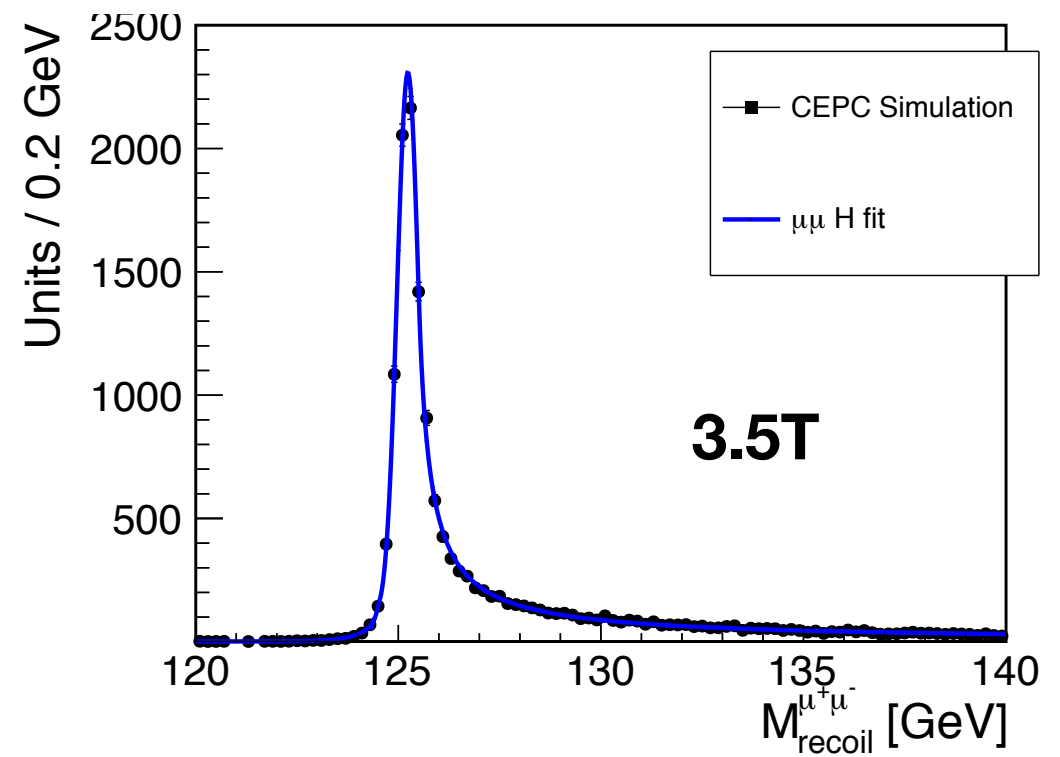
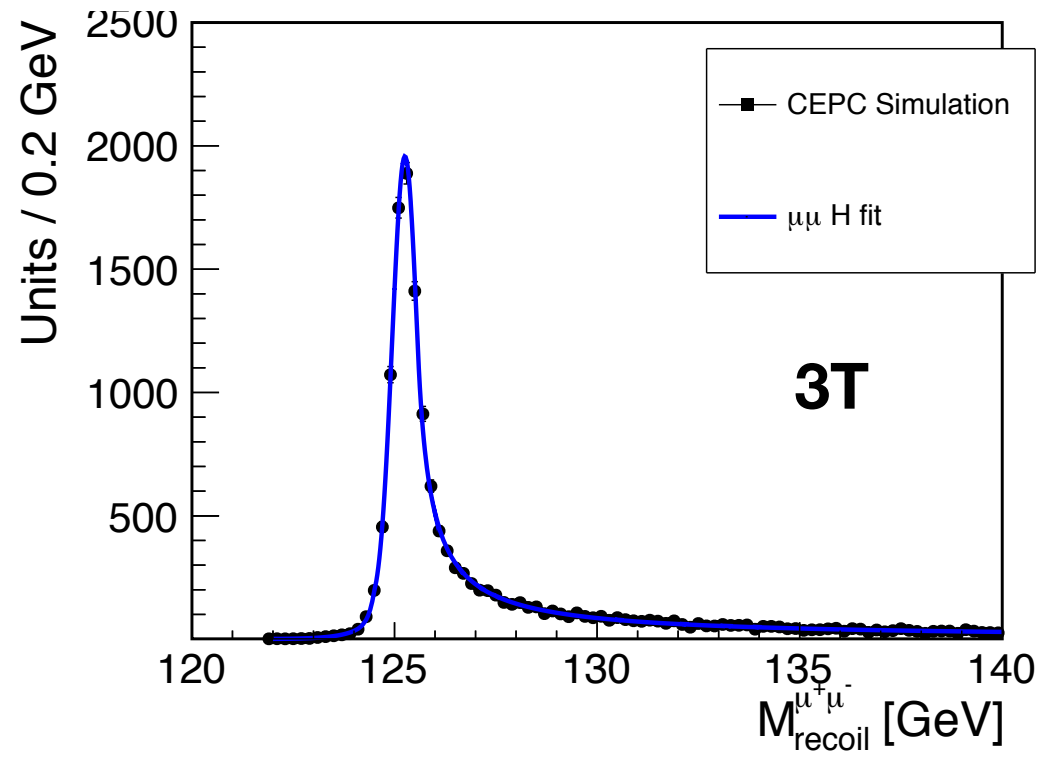
**Backup**



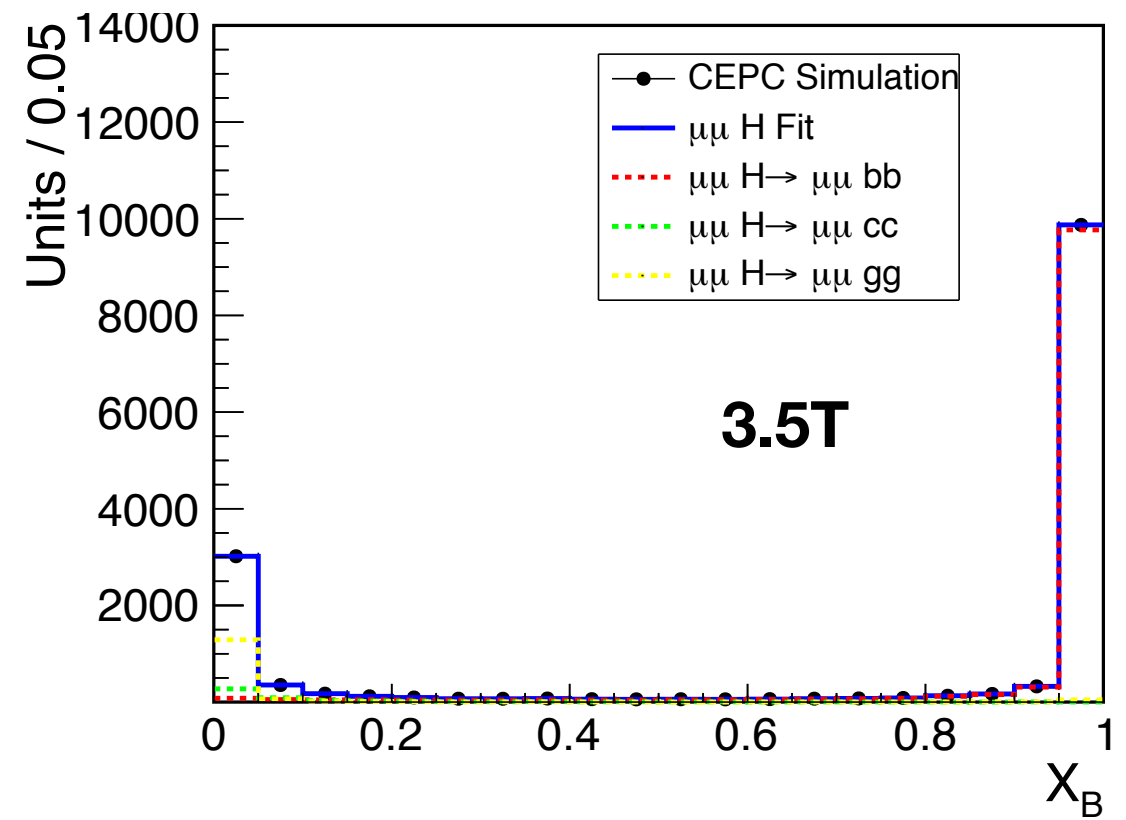
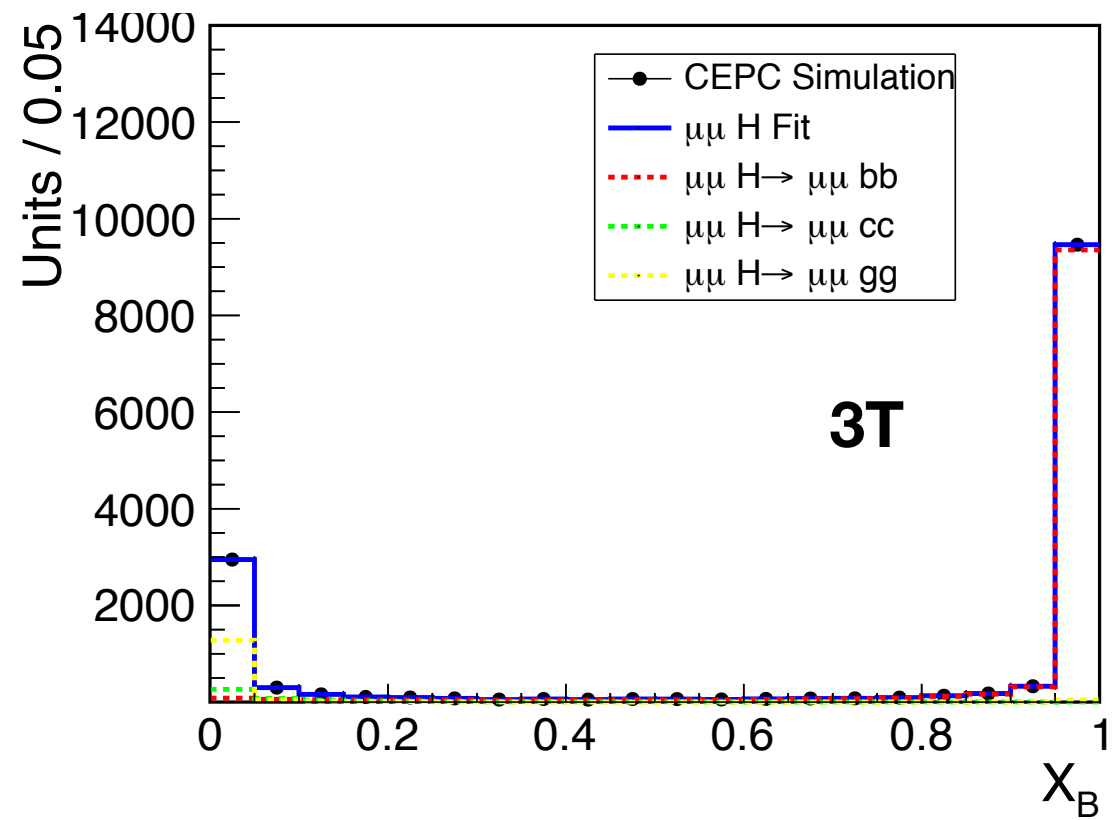
# Fit Result

	3T		3.5 T	
	Value	ERROR	VALUE	ERROR
nHbb	$1.08074 \times 10^4$	106.798	$1.111884 \times 10^4$	108.469
nHcc	496.335	40.874	518.285	40.8309
nHgg	$1.46764 \times 10^3$	57.649	$1.50056 \times 10^3$	58.8540
nHbkg	13.7384	8.19635	15.7974	8.20483
sigma	0.316155	$6.08143 \times 10^{-3}$	0.269189	$5.05385 \times 10^{-3}$
mean	125.259	$6.28207 \times 10^{-3}$	125.237	$5.39250 \times 10^{-3}$
a	-1.00508	0.027144	-1.00956	$2.64415 \times 10^{-2}$
n	0.948601	0.0219960	0.939792	0.0204244
peak	124.496	-	124.524	-
tau	0.503652	-	0.463546	-
tail_fraction	0.96875879	-	0.9636108	-
$\mu_{H \rightarrow bb} - 1$	$9.91 \times 10^{-5}$	$9.88 \times 10^{-3}$	$-6.164 \times 10^{-3}$	$9.695 \times 10^{-3}$
$\mu_{H \rightarrow cc} - 1$	$-1.74 \times 10^{-3}$	$8.22 \times 10^{-2}$	$1.76 \times 10^{-4}$	0.078795
$\mu_{H \rightarrow gg} - 1$	$-2.679 \times 10^{-3}$	$3.917 \times 10^{-2}$	$-1.199 \times 10^{-3}$	0.039174

# M\_recoil



# B Likeness



# C Likeness

