

AZh: Post-fit results for nuisance parameters

Still blind analysis

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Study of nuisance parameters on $BDT < 0.6$

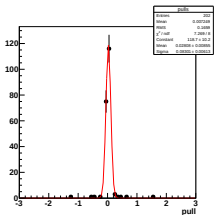
- Look at MC and Data for $BDT < 0.6$, where no signal is present;
- Fit background to data with `MaxLikelihoodFit` allowing all systematics to vary according to their nuisance parameters;
- **Look at nuisance parameters after the fit**
 - ▶ as well as at the distribution of backgrounds Pre vs Post fit;
- Warning: the background is the same within each mass region (225-275, 300-350, 400-600), so the nuisance parameters for background-only fit are always the same
- Warning: the systematics associated to the MC statistics is assigned only for the 30 bins with highest S/B, which are all in the $BDT > 0.6$ region, so the post-fit results are all 0, almost by construction



Low2D M225

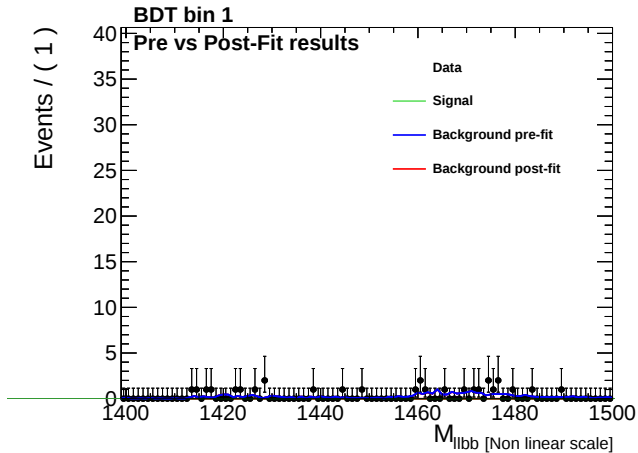


name	b -only fit $\Delta x/\sigma_{in}, \sigma_{out}/\sigma_{in}$	$s + b$ fit $\Delta x/\sigma_{in}, \sigma_{out}/\sigma_{in}$	$\rho(\theta, \mu)$
CMS_ash_reweight	-0.05, 0.12	-0.05, 0.12	-0.00
CMS_eff_b	-0.06, 0.08	-0.06, 0.08	-0.00
CMS_eff_l	+0.02, 0.99	+0.03, 0.99	+0.00
CMS_norm_Others	+0.10, 0.98	+0.09, 0.98	-0.00
CMS_norm_TTbar	+1.07, 0.80	+1.07, 0.80	-0.00
CMS_norm_VV	+0.44, 1.00	+0.44, 1.00	+0.00
CMS_norm_Z0b	-0.61, 0.82	-0.63, 0.82	-0.00
CMS_norm_Z1b	-0.19, 0.66	-0.22, 0.66	-0.00
CMS_norm_Z2b	+0.09, 0.96	+0.08, 0.96	-0.00
CMS_res_j	-0.13, 0.07	-0.14, 0.07	-0.00
CMS_scale_j	+0.07, 0.07	+0.07, 0.07	-0.00
CMS_scale_met	+0.08, 0.99	+0.08, 0.99	+0.00
CMS_scale_pu	+0.04, 0.99	+0.05, 0.99	-0.00
CMS_scale_q2	-0.03, 0.13	-0.04, 0.13	-0.00
CMS_stat_TTbar	+0.18, 0.99	+0.18, 0.99	-0.00
CMS_stat_Z0b	-0.01, 0.99	-0.01, 0.99	-0.00
CMS_stat_Z1b	-0.02, 0.99	-0.02, 0.99	-0.00
CMS_stat_Z2b	+0.09, 0.96	+0.07, 0.96	-0.00
lumi_8TeV	+0.02, 0.99	+0.03, 0.99	+0.00
pdf_gg	+0.00, 0.99	+0.02, 0.99	+0.00
pdf_qg	+0.04, 0.99	+0.04, 0.99	-0.00
pdf_qq	+0.22, 0.99	+0.22, 0.99	-0.00



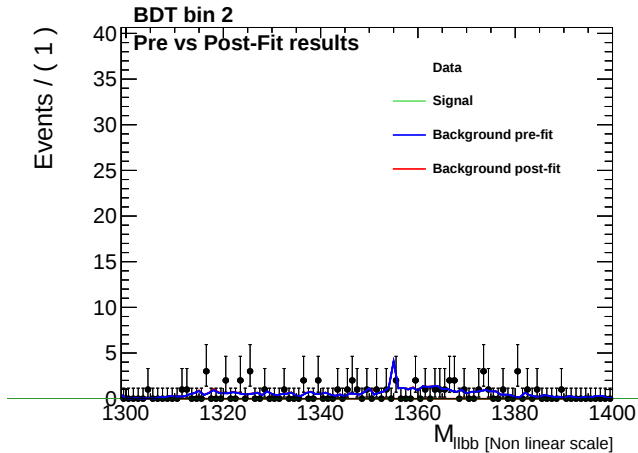


Pre vs Post fit plots



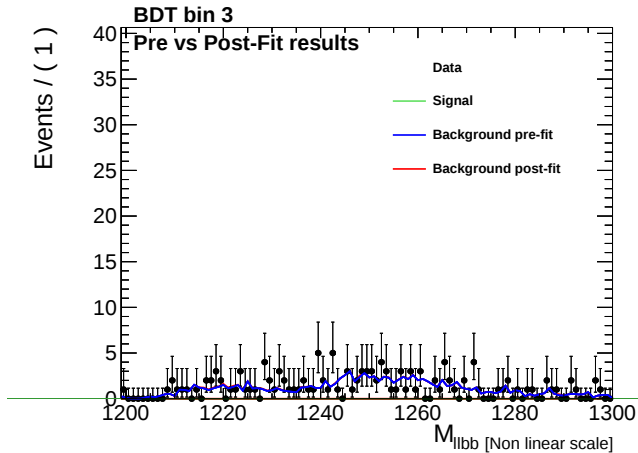


Pre vs Post fit plots



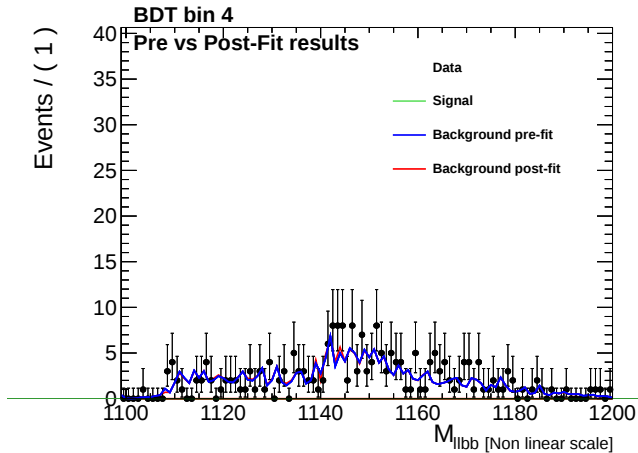


Pre vs Post fit plots



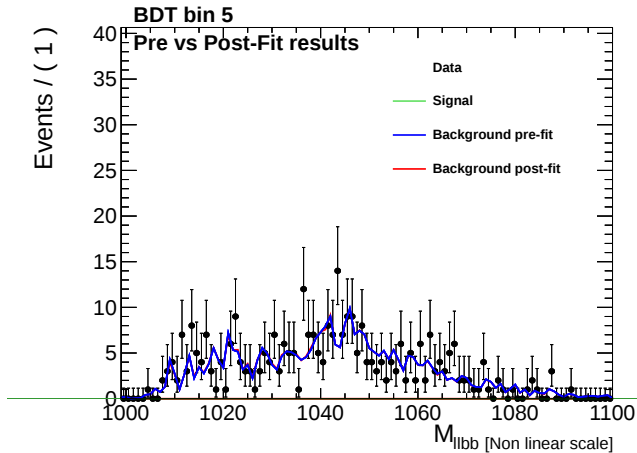


Pre vs Post fit plots



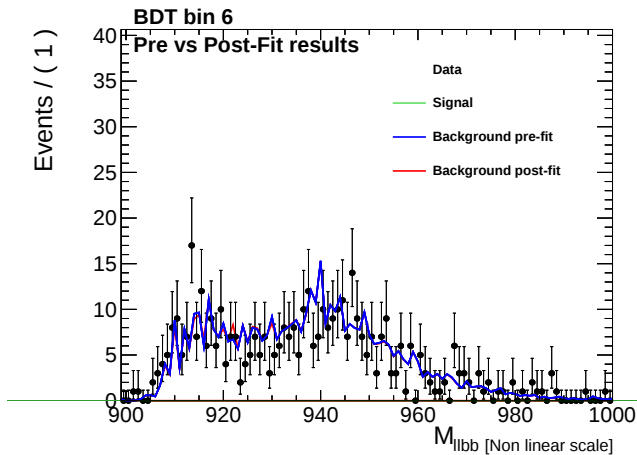


Pre vs Post fit plots



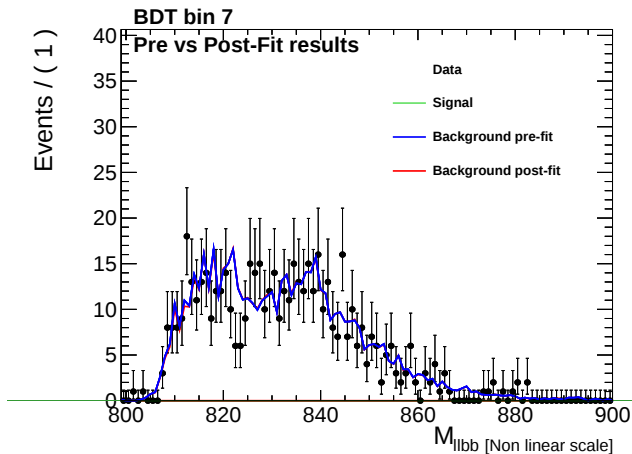


Pre vs Post fit plots



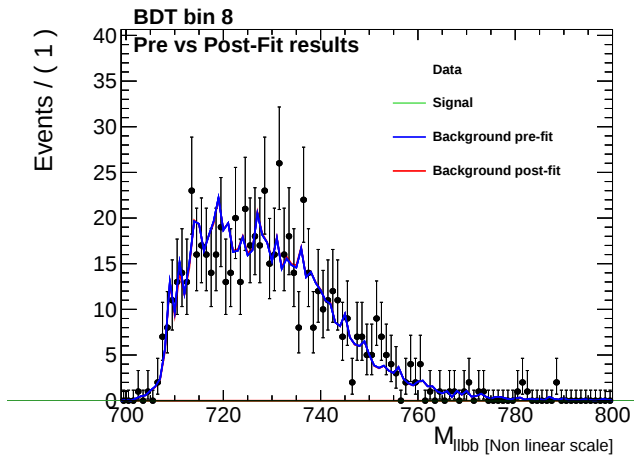


Pre vs Post fit plots



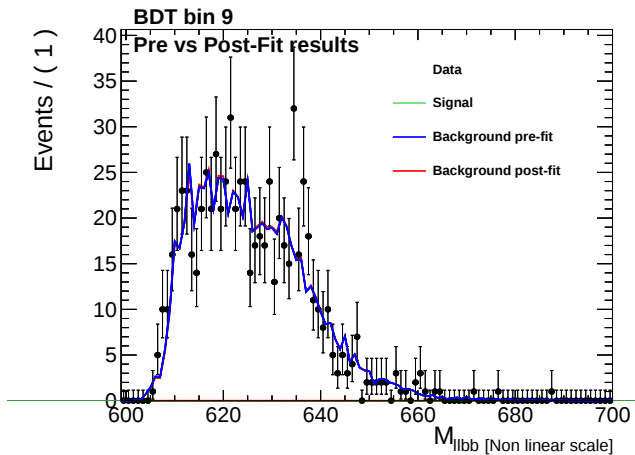


Pre vs Post fit plots





Pre vs Post fit plots

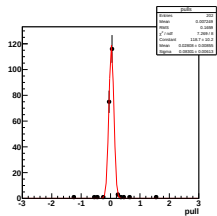




Low2D M250



name	b -only fit $\Delta x / \sigma_{in}, \sigma_{out} / \sigma_{in}$	$s + b$ fit $\Delta x / \sigma_{in}, \sigma_{out} / \sigma_{in}$	$\rho(\theta, \mu)$
CMS_ash_reweight	-0.05, 0.12	-0.05, 0.12	-0.00
CMS_eff_b	-0.06, 0.08	-0.06, 0.08	-0.00
CMS_eff_l	+0.02, 0.99	+0.02, 0.99	-0.00
CMS_norm_Others	+0.10, 0.98	+0.10, 0.98	-0.00
CMS_norm_TTbar	+1.07, 0.80	+1.07, 0.80	+0.00
CMS_norm_VV	+0.44, 1.00	+0.44, 1.00	-0.00
CMS_norm_Z0b	-0.61, 0.82	-0.61, 0.82	+0.00
CMS_norm_Z1b	-0.19, 0.66	-0.19, 0.66	+0.00
CMS_norm_Z2b	+0.09, 0.96	+0.09, 0.96	+0.00
CMS_res_j	-0.13, 0.07	-0.13, 0.07	-0.00
CMS_scale_j	+0.07, 0.07	+0.07, 0.07	-0.00
CMS_scale_met	+0.08, 0.99	+0.08, 0.99	-0.00
CMS_scale_pu	+0.04, 0.99	+0.04, 0.99	+0.00
CMS_scale_q2	-0.03, 0.13	-0.03, 0.13	+0.00
CMS_stat_TTbar	+0.18, 0.99	+0.17, 0.99	+0.00
CMS_stat_Z1b	-0.02, 0.99	-0.02, 0.99	-0.00
CMS_stat_Z2b	+0.09, 0.96	+0.09, 0.96	+0.00
lumi_8TeV	+0.02, 0.99	+0.02, 0.99	+0.00
pdf_qg	+0.04, 0.99	+0.04, 0.99	+0.00
pdf_qq	+0.22, 0.99	+0.22, 0.99	-0.00

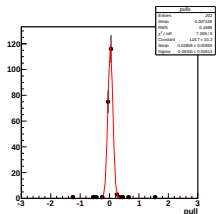




Low2D M275



name	b -only fit $\Delta x / \sigma_{in}, \sigma_{out} / \sigma_{in}$	$s + b$ fit $\Delta x / \sigma_{in}, \sigma_{out} / \sigma_{in}$	$\rho(\theta, \mu)$
CMS_ash_reweight	-0.05, 0.12	-0.05, 0.12	-0.00
CMS_eff_b	-0.06, 0.08	-0.06, 0.08	-0.00
CMS_eff_l	+0.02, 0.99	+0.02, 0.99	+0.00
CMS_norm_Others	+0.10, 0.98	+0.10, 0.98	-0.00
CMS_norm_TTbar	+1.07, 0.80	+1.07, 0.80	+0.00
CMS_norm_VV	+0.44, 1.00	+0.44, 1.00	-0.00
CMS_norm_Z0b	-0.61, 0.82	-0.61, 0.82	+0.00
CMS_norm_Z1b	-0.19, 0.66	-0.19, 0.66	+0.00
CMS_norm_Z2b	+0.09, 0.96	+0.09, 0.96	+0.00
CMS_res_j	-0.13, 0.07	-0.13, 0.07	-0.00
CMS_scale_j	+0.07, 0.07	+0.07, 0.07	+0.00
CMS_scale_met	+0.08, 0.99	+0.08, 0.99	+0.00
CMS_scale_pu	+0.04, 0.99	+0.04, 0.99	+0.00
CMS_scale_q2	-0.03, 0.13	-0.03, 0.13	+0.00
CMS_stat_TTbar	+0.18, 0.99	+0.17, 0.99	+0.00
CMS_stat_Z1b	-0.02, 0.99	-0.02, 0.99	+0.00
CMS_stat_Z2b	+0.09, 0.96	+0.09, 0.96	+0.00
lumi_8TeV	+0.02, 0.99	+0.02, 0.99	+0.00
pdf_qg	+0.04, 0.99	+0.04, 0.99	-0.00
pdf_qq	+0.22, 0.99	+0.22, 0.99	+0.00





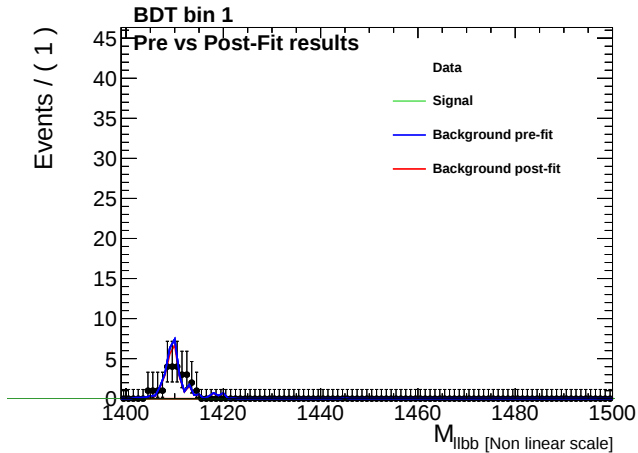
Int2D M300



name	<i>b</i> -only fit	<i>s + b</i> fit	$\rho(\theta, \mu)$
	$\Delta x / \sigma_{in}, \sigma_{out} / \sigma_{in}$	$\Delta x / \sigma_{in}, \sigma_{out} / \sigma_{in}$	
CMS_azh_reweight	-0.00, 0.19	-0.00, 2.93	-0.00
CMS_eff_b	+0.02, 0.00	+0.02, 0.06	+0.00
CMS_eff_l	+0.00, 0.03	+0.01, 0.52	+0.00
CMS_norm_Others	+0.03, 0.03	+0.02, 0.51	+0.00
CMS_norm_TTbar	+1.14, 0.02	+1.11, 0.43	+0.00
CMS_norm_VV	+0.06, 0.03	+0.06, 0.51	+0.00
CMS_norm_Z0b	-1.16, 0.02	-1.17, 0.41	+0.00
CMS_norm_Z1b	-0.07, 0.02	-0.09, 0.33	+0.00
CMS_norm_Z2b	-0.19, 0.03	-0.20, 0.48	+0.00
CMS_res_j	-0.00, 0.08	-0.00, 0.01	+0.00
CMS_scale_j	+0.07, 0.00	+0.08, 0.04	-0.00
CMS_scale_met	+0.01, 0.03	+0.02, 0.52	+0.00
CMS_scale_pu	+0.01, 0.03	+0.01, 0.52	+0.00
CMS_scale_q2	-0.17, 0.00	-0.17, 0.05	+0.00
CMS_stat_300_Others_bin0	+0.00, 0.03	+0.00, 0.52	-0.00
CMS_stat_300_Others_bin1	+0.00, 0.03	+0.00, 0.52	-0.00
CMS_stat_300_Others_bin10	+0.00, 0.03	+0.00, 0.52	-0.00
CMS_stat_300_Others_bin11	+0.00, 0.03	+0.00, 0.52	-0.00
CMS_stat_300_Others_bin12	+0.00, 0.03	+0.00, 0.52	-0.00
CMS_stat_300_Others_bin13	+0.00, 0.03	+0.00, 0.52	-0.00
CMS_stat_300_Others_bin14	+0.00, 0.03	+0.00, 0.52	-0.00
CMS_stat_300_Others_bin15	+0.00, 0.03	+0.00, 0.52	-0.00
CMS_stat_300_Others_bin16	+0.00, 0.03	+0.00, 0.52	-0.00
CMS_stat_300_Others_bin17	+0.00, 0.03	+0.00, 0.52	-0.00
CMS_stat_300_Others_bin18	+0.00, 0.03	+0.00, 0.52	-0.00
CMS_stat_300_Others_bin19	+0.00, 0.03	+0.00, 0.52	-0.00
CMS_stat_300_Others_bin2	+0.00, 0.03	+0.00, 0.52	-0.00
CMS_stat_300_Others_bin20	+0.00, 0.03	+0.00, 0.52	-0.00

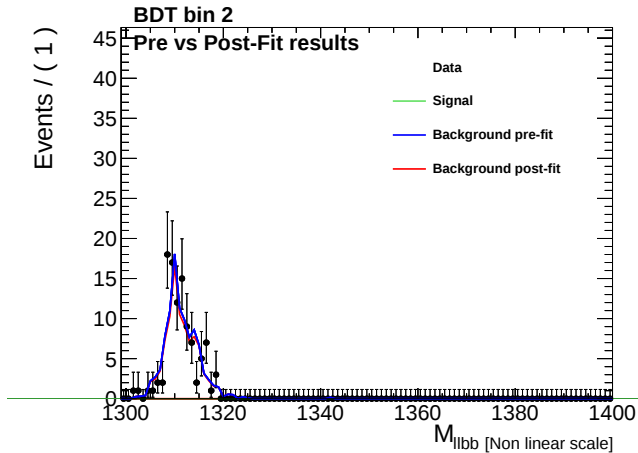


Pre vs Post fit plots



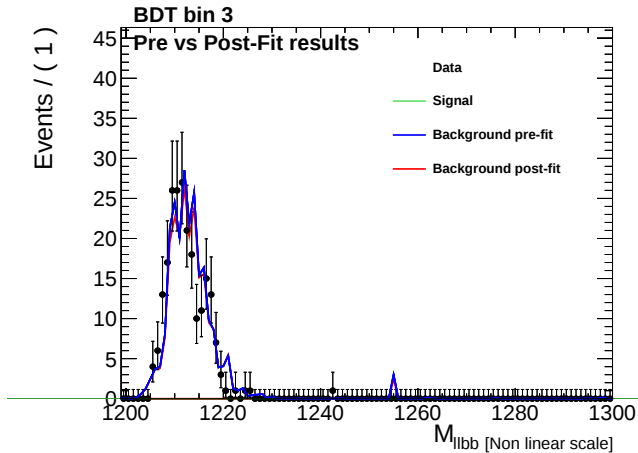


Pre vs Post fit plots



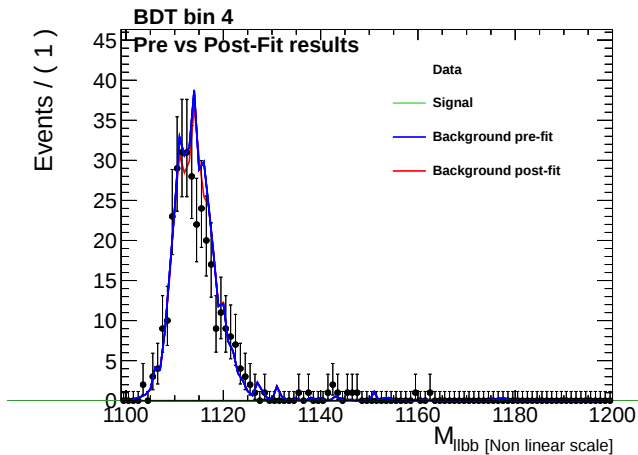


Pre vs Post fit plots



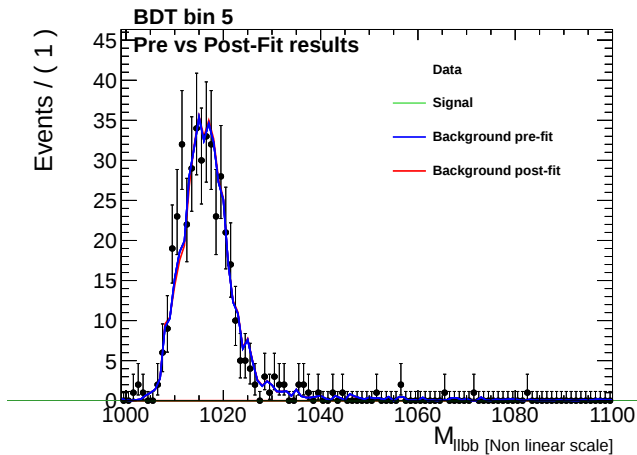


Pre vs Post fit plots



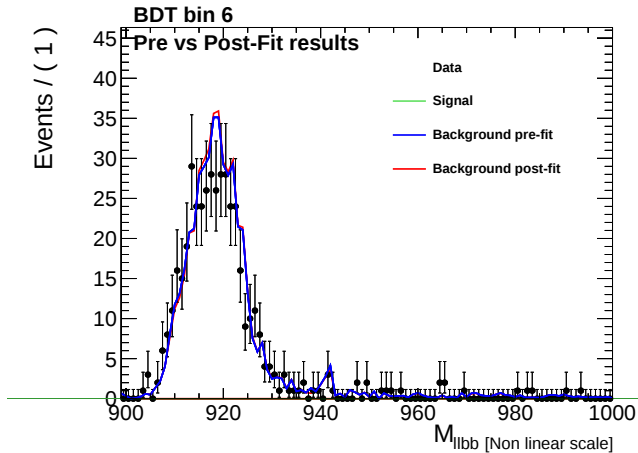


Pre vs Post fit plots



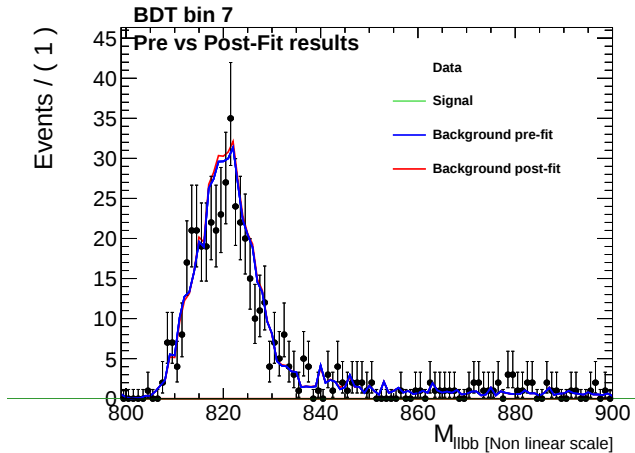


Pre vs Post fit plots



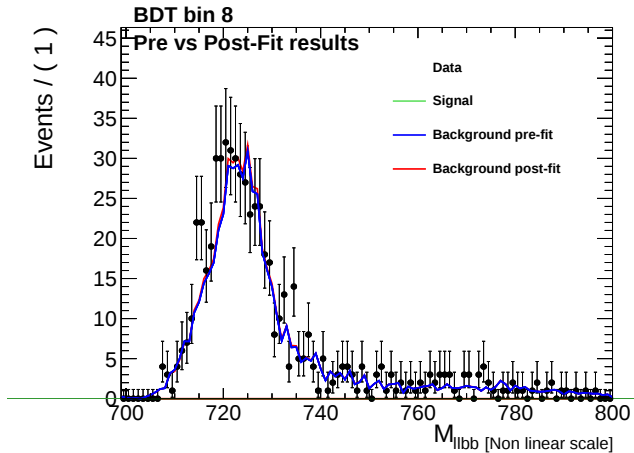


Pre vs Post fit plots



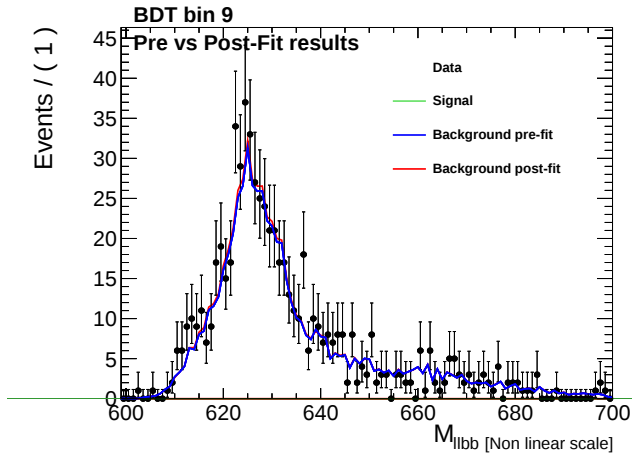


Pre vs Post fit plots





Pre vs Post fit plots





Int2D M325



name	<i>b</i> -only fit		<i>s</i> + <i>b</i> fit		$\rho(\theta, \mu)$
	$\Delta x / \sigma_{in}, \sigma_{out} / \sigma_{in}$		$\Delta x / \sigma_{in}, \sigma_{out} / \sigma_{in}$		
CMS_azh_reweight	-0.00, 0.19		-0.01, 0.09		-0.00
CMS_eff_b	+0.02, 0.00		+0.02, 0.02		-0.00
CMS_eff_l	+0.00, 0.03		+0.01, 0.99		-0.00
CMS_norm_Others	+0.03, 0.03		+0.02, 0.98		-0.00
CMS_norm_TTbar	+1.14, 0.02		+1.13, 0.89		+0.00
CMS_norm_VV	+0.06, 0.03		+0.06, 0.99		+0.00
CMS_norm_Z0b	-1.16, 0.02		-1.17, 0.84		+0.00
CMS_norm_Z1b	-0.07, 0.02		-0.08, 0.69		+0.00
CMS_norm_Z2b	-0.19, 0.03		-0.20, 0.95		-0.00
CMS_res_j	-0.00, 0.08		-0.00, 0.00		-0.00
CMS_scale_j	+0.07, 0.00		+0.07, 0.09		-0.00
CMS_scale_met	+0.01, 0.03		+0.02, 0.99		+0.00
CMS_scale_pu	+0.01, 0.03		+0.01, 0.99		-0.00
CMS_scale_q2	-0.17, 0.00		-0.17, 0.07		-0.00
CMS_stat_325_Others_bin0	+0.00, 0.03		+0.00, 0.99		+0.00
CMS_stat_325_Others_bin1	+0.00, 0.03		+0.00, 0.99		+0.00
CMS_stat_325_Others_bin10	+0.00, 0.03		+0.00, 0.99		+0.00
CMS_stat_325_Others_bin11	+0.00, 0.03		+0.00, 0.99		+0.00
CMS_stat_325_Others_bin12	+0.00, 0.03		+0.00, 0.99		+0.00
CMS_stat_325_Others_bin13	+0.00, 0.03		+0.00, 0.99		+0.00
CMS_stat_325_Others_bin14	+0.00, 0.03		+0.00, 0.99		+0.00
CMS_stat_325_Others_bin15	+0.00, 0.03		+0.00, 0.99		+0.00
CMS_stat_325_Others_bin16	+0.00, 0.03		+0.00, 0.99		+0.00
CMS_stat_325_Others_bin17	+0.00, 0.03		+0.00, 0.99		+0.00
CMS_stat_325_Others_bin18	+0.00, 0.03		+0.00, 0.99		+0.00
CMS_stat_325_Others_bin19	+0.00, 0.03		+0.00, 0.99		+0.00
CMS_stat_325_Others_bin2	+0.00, 0.03		+0.00, 0.99		+0.00
CMS_stat_325_Others_bin20	+0.00, 0.03		+0.00, 0.99		+0.00



Int2D M350



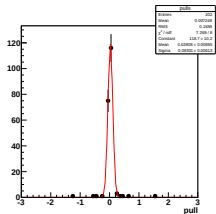
name	<i>b</i> -only fit	<i>s + b</i> fit	$\rho(\theta, \mu)$
	$\Delta x / \sigma_{in}, \sigma_{out} / \sigma_{in}$	$\Delta x / \sigma_{in}, \sigma_{out} / \sigma_{in}$	
CMS_azh_reweight	-0.00, 0.19	-0.01, 0.10	+0.00
CMS_eff_b	+0.02, 0.00	+0.02, 0.59	-0.00
CMS_eff_l	+0.00, 0.03	+0.01, 0.99	-0.00
CMS_norm_Others	+0.03, 0.03	+0.02, 0.98	+0.00
CMS_norm_TTbar	+1.14, 0.02	+1.13, 0.99	+0.00
CMS_norm_VV	+0.06, 0.03	+0.06, 0.99	+0.00
CMS_norm_Z0b	-1.16, 0.02	-1.16, 0.89	+0.00
CMS_norm_Z1b	-0.07, 0.02	-0.08, 1.76	+0.00
CMS_norm_Z2b	-0.19, 0.03	-0.19, 0.99	+0.00
CMS_res_j	-0.00, 0.08	-0.00, 0.00	-0.00
CMS_scale_j	+0.07, 0.00	+0.07, 0.08	+0.00
CMS_scale_met	+0.01, 0.03	+0.01, 0.99	-0.00
CMS_scale_pu	+0.01, 0.03	+0.01, 0.99	-0.00
CMS_scale_q2	-0.17, 0.00	-0.17, 0.14	-0.00
CMS_stat_350_Others_bin0	+0.00, 0.03	+0.00, 0.99	+0.00
CMS_stat_350_Others_bin1	+0.00, 0.03	+0.00, 0.99	+0.00
CMS_stat_350_Others_bin10	+0.00, 0.03	+0.00, 0.99	+0.00
CMS_stat_350_Others_bin11	+0.00, 0.03	+0.00, 0.99	+0.00
CMS_stat_350_Others_bin12	+0.00, 0.03	+0.00, 0.99	+0.00
CMS_stat_350_Others_bin13	+0.00, 0.03	+0.00, 0.99	+0.00
CMS_stat_350_Others_bin14	+0.00, 0.03	+0.00, 0.99	+0.00
CMS_stat_350_Others_bin15	+0.00, 0.03	+0.00, 0.99	+0.00
CMS_stat_350_Others_bin16	+0.00, 0.03	+0.00, 0.99	+0.00
CMS_stat_350_Others_bin17	+0.00, 0.03	+0.00, 0.99	+0.00
CMS_stat_350_Others_bin18	+0.00, 0.03	+0.00, 0.99	+0.00
CMS_stat_350_Others_bin19	+0.00, 0.03	+0.00, 0.99	+0.00
CMS_stat_350_Others_bin2	+0.00, 0.03	+0.00, 0.99	+0.00
CMS_stat_350_Others_bin20	+0.00, 0.03	+0.00, 0.99	+0.00



High2D M400

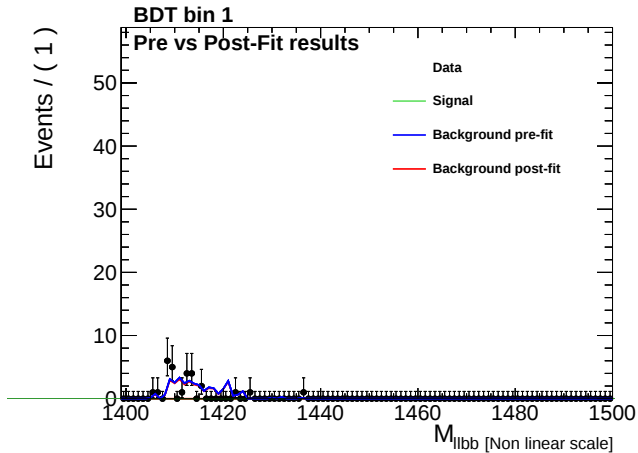


name	b -only fit	$s + b$ fit	$\rho(\theta, \mu)$
	$\Delta x / \sigma_{in}, \sigma_{out} / \sigma_{in}$	$\Delta x / \sigma_{in}, \sigma_{out} / \sigma_{in}$	
CMS_ash_reweight	+0.05, 0.11	+0.05, 0.11	-0.00
CMS_eff_b	-0.04, 0.11	-0.04, 0.11	-0.00
CMS_eff_l	+0.02, 0.99	+0.03, 0.99	+0.00
CMS_norm_Others	+0.14, 0.97	+0.14, 0.97	+0.00
CMS_norm_TTbar	+0.75, 0.88	+0.75, 0.88	+0.00
CMS_norm_VV	+0.19, 0.99	+0.18, 0.99	-0.00
CMS_norm_Z0b	-1.73, 0.84	-1.73, 0.84	-0.00
CMS_norm_Z1b	+0.07, 0.68	+0.07, 0.68	-0.00
CMS_norm_Z2b	-0.31, 0.95	-0.31, 0.95	+0.00
CMS_res_j	-0.05, 0.11	-0.05, 0.11	+0.00
CMS_scale_j	-0.15, 0.07	-0.15, 0.07	+0.00
CMS_scale_met	+0.05, 0.99	+0.05, 0.99	-0.00
CMS_scale_pu	+0.03, 0.99	+0.03, 0.99	+0.00
CMS_scale_q2	-0.01, 0.11	-0.01, 0.11	-0.00
CMS_stat_TTbar	+0.12, 0.99	+0.12, 0.99	-0.00
CMS_stat_Z0b	-0.03, 0.99	-0.03, 0.99	-0.00
CMS_stat_Z2b	-0.29, 0.95	-0.29, 0.95	+0.00
lumi_8TeV	+0.03, 0.99	+0.03, 0.99	+0.00
pdf_qg	+0.06, 0.99	+0.06, 0.99	+0.00
pdf_qq	+0.12, 0.99	+0.11, 0.99	-0.00



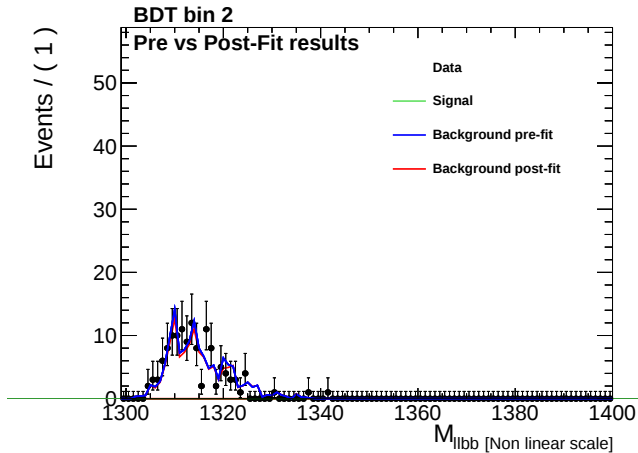


Pre vs Post fit plots



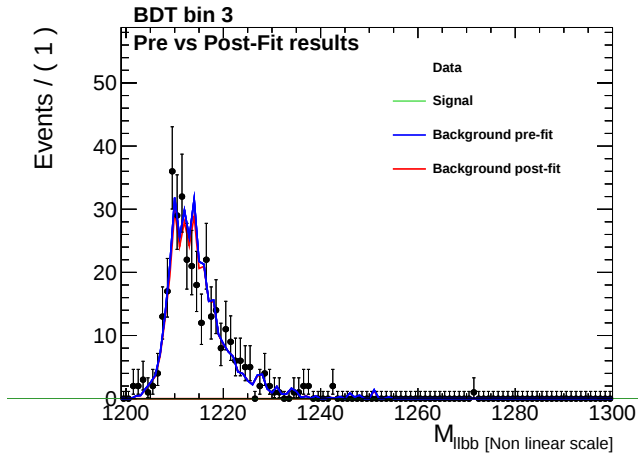


Pre vs Post fit plots



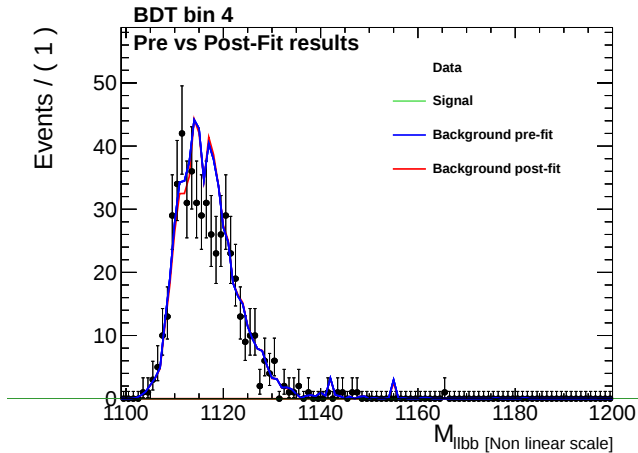


Pre vs Post fit plots



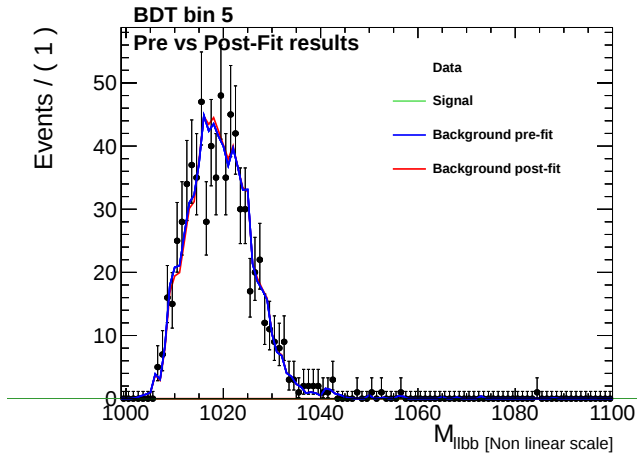


Pre vs Post fit plots



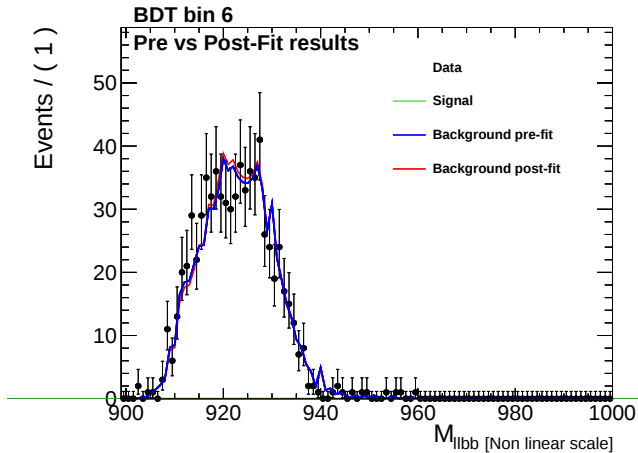


Pre vs Post fit plots



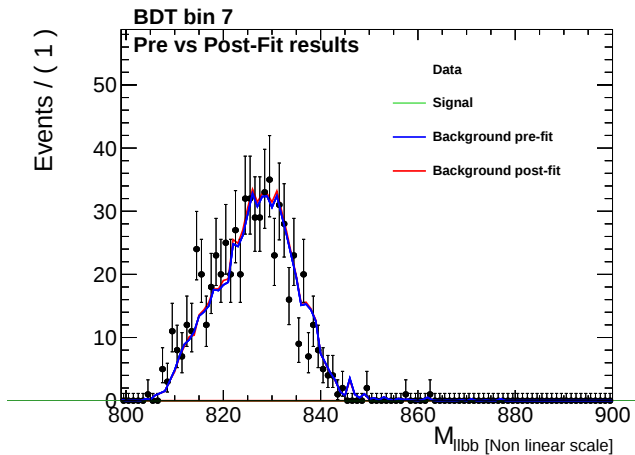


Pre vs Post fit plots



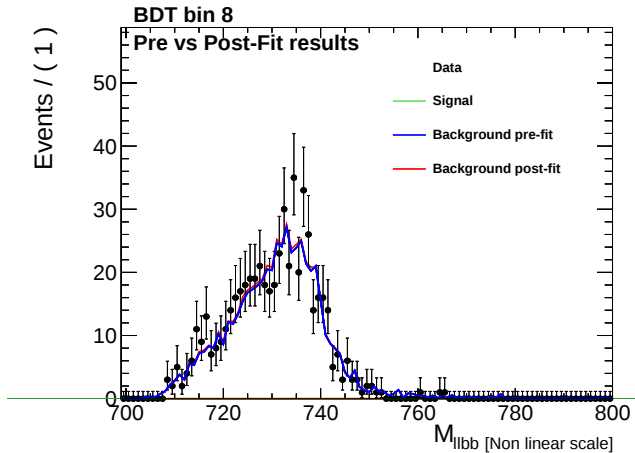


Pre vs Post fit plots



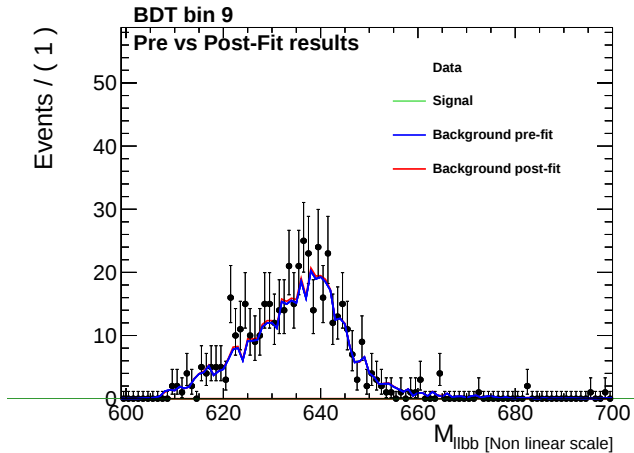


Pre vs Post fit plots





Pre vs Post fit plots

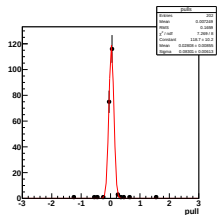




High2D M500



name	b -only fit	$s + b$ fit	$\rho(\theta, \mu)$
	$\Delta x / \sigma_{in}, \sigma_{out} / \sigma_{in}$	$\Delta x / \sigma_{in}, \sigma_{out} / \sigma_{in}$	
CMS_ash_reweight	+0.05, 0.11	+0.05, 0.11	-0.00
CMS_eff_b	-0.04, 0.11	-0.04, 0.11	-0.00
CMS_eff_l	+0.02, 0.99	+0.02, 0.99	-0.00
CMS_norm_Others	+0.14, 0.97	+0.14, 0.97	-0.00
CMS_norm_TTbar	+0.75, 0.88	+0.75, 0.88	-0.00
CMS_norm_VV	+0.19, 0.99	+0.19, 0.99	-0.00
CMS_norm_Z0b	-1.73, 0.84	-1.73, 0.84	-0.00
CMS_norm_Z1b	+0.07, 0.68	+0.07, 0.68	-0.00
CMS_norm_Z2b	-0.31, 0.95	-0.31, 0.95	+0.00
CMS_res_j	-0.05, 0.11	-0.05, 0.11	+0.00
CMS_scale_j	-0.15, 0.07	-0.15, 0.07	-0.00
CMS_scale_met	+0.05, 0.99	+0.05, 0.99	-0.00
CMS_scale_pu	+0.03, 0.99	+0.03, 0.99	-0.00
CMS_scale_q2	-0.01, 0.11	-0.01, 0.11	+0.00
CMS_stat_TTbar	+0.12, 0.99	+0.12, 0.99	-0.00
CMS_stat_Z0b	-0.03, 0.99	-0.03, 0.99	-0.00
CMS_stat_Z2b	-0.29, 0.95	-0.29, 0.95	-0.00
lumi_8TeV	+0.03, 0.99	+0.03, 0.99	-0.00
pdf_qg	+0.06, 0.99	+0.06, 0.99	-0.00
pdf_qq	+0.12, 0.99	+0.12, 0.99	-0.00





High2D M500



name	b -only fit $\Delta x/\sigma_{in}, \sigma_{out}/\sigma_{in}$	$s + b$ fit $\Delta x/\sigma_{in}, \sigma_{out}/\sigma_{in}$	$\rho(\theta, \mu)$
CMS_ash_reweight	+0.37, 0.51	+0.37, 0.51	-0.00
CMS_eff_b	-0.12, 0.23	-0.12, 0.23	-0.00
CMS_eff_l	+0.03, 0.99	+0.03, 0.99	+0.00
CMS_norm_Others	+0.14, 0.98	+0.14, 0.98	-0.00
CMS_norm_TTbar	+0.35, 0.89	+0.35, 0.89	-0.00
CMS_norm_VV	+0.11, 0.99	+0.11, 0.99	-0.00
CMS_norm_Z0b	-1.99, 0.83	-1.99, 0.83	+0.00
CMS_norm_Z1b	-0.16, 0.65	-0.16, 0.65	+0.00
CMS_norm_Z2b	-0.48, 0.94	-0.48, 0.94	-0.00
CMS_res_j	-0.32, 0.25	-0.32, 0.25	+0.00
CMS_scale_j	+0.03, 0.20	+0.03, 0.20	+0.00
CMS_scale_met	+0.04, 0.99	+0.04, 0.99	-0.00
CMS_scale_pu	+0.02, 0.99	+0.02, 0.99	-0.00
CMS_scale_q2	-1.44, 0.74	-1.44, 0.74	-0.00
CMS_stat_TTbar	+0.06, 0.99	+0.06, 0.99	-0.00
CMS_stat_Z0b	-0.03, 0.99	-0.03, 0.99	-0.00
CMS_stat_Z1b	-0.02, 0.99	-0.02, 0.99	-0.00
CMS_stat_Z2b	-0.46, 0.95	-0.46, 0.95	-0.00
lumi_8TeV	+0.03, 0.99	+0.03, 0.99	+0.00
pdf_qg	+0.06, 0.99	+0.06, 0.99	-0.00
pdf_qq	+0.08, 0.99	+0.08, 0.99	-0.00

