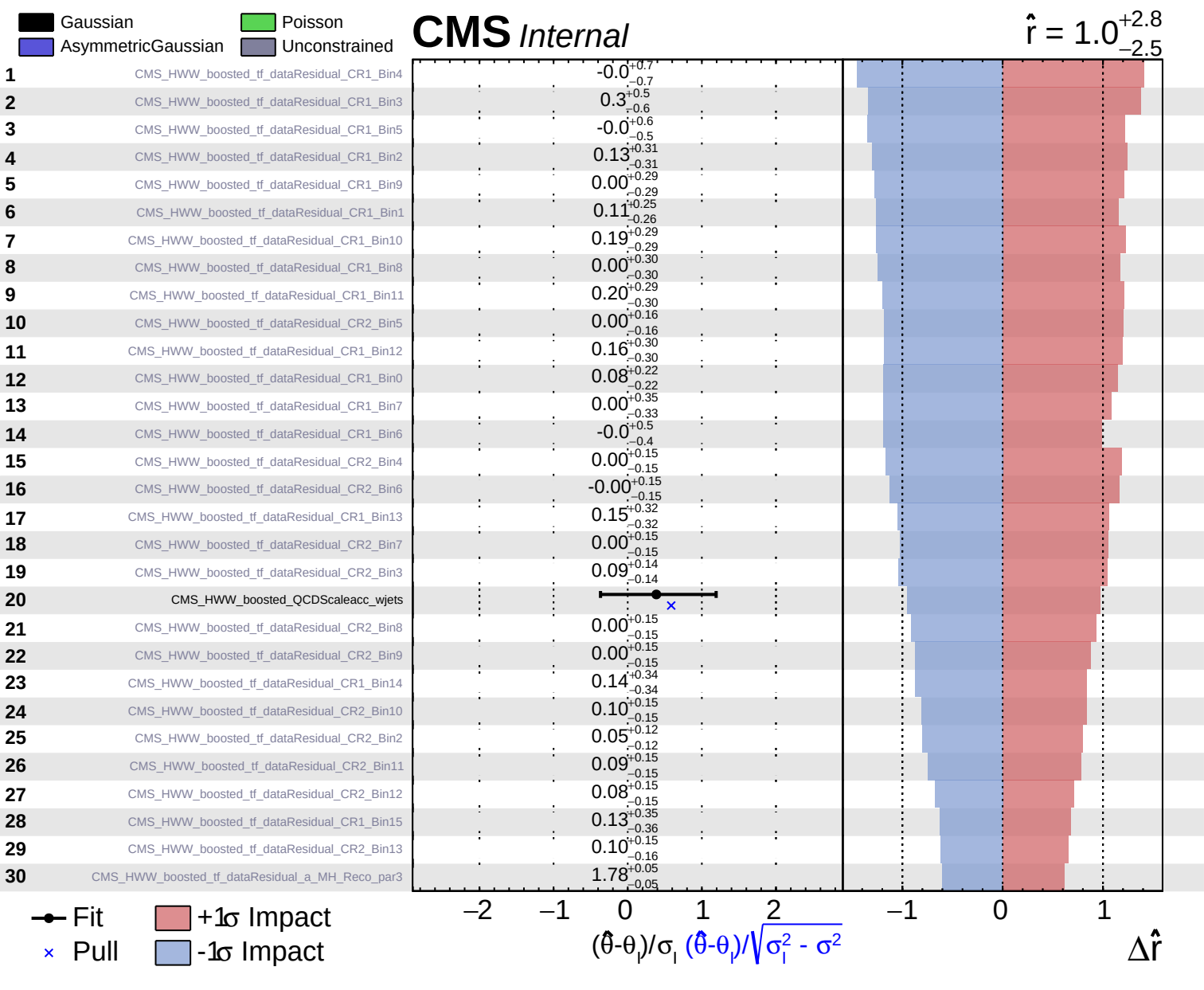
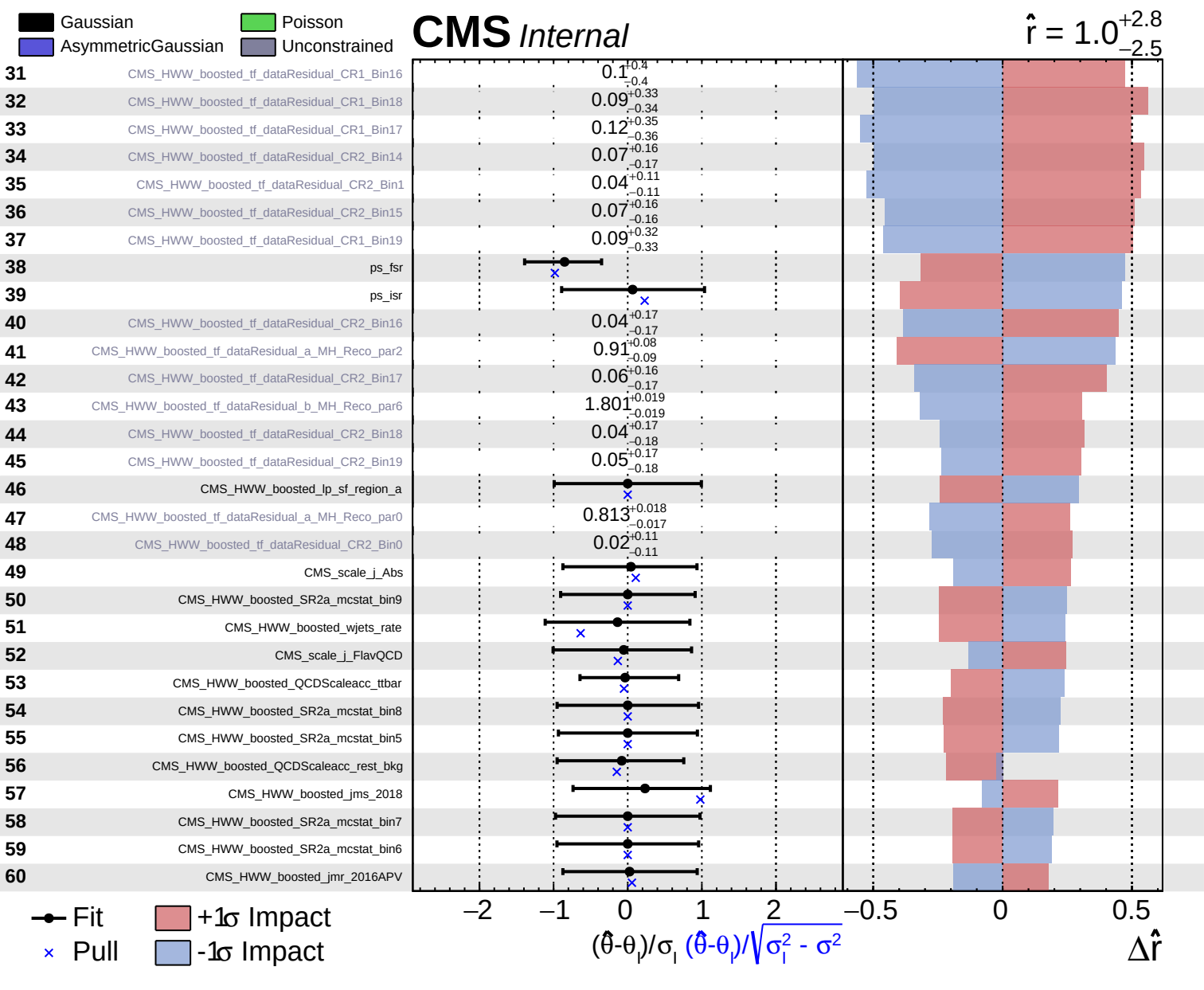
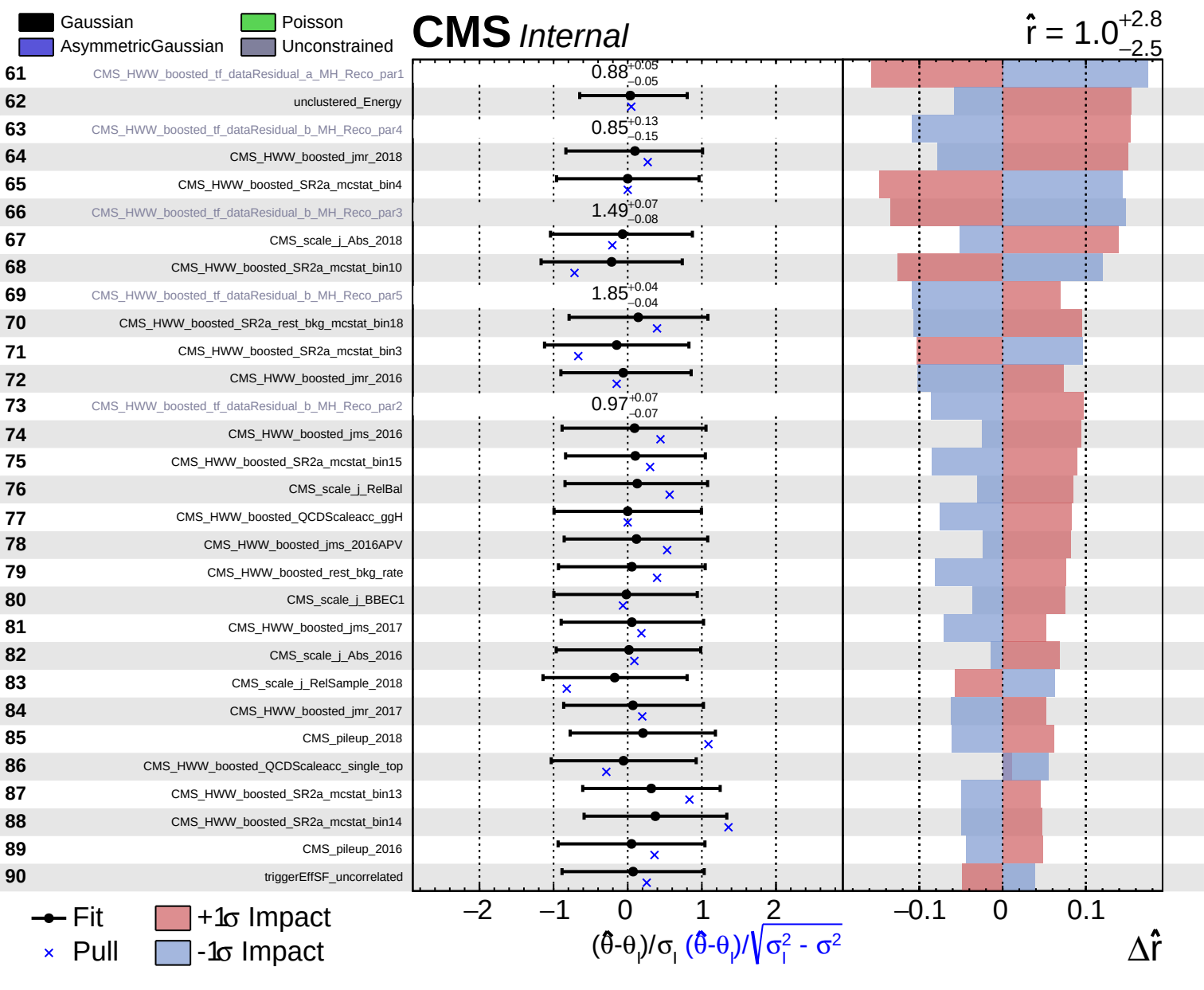
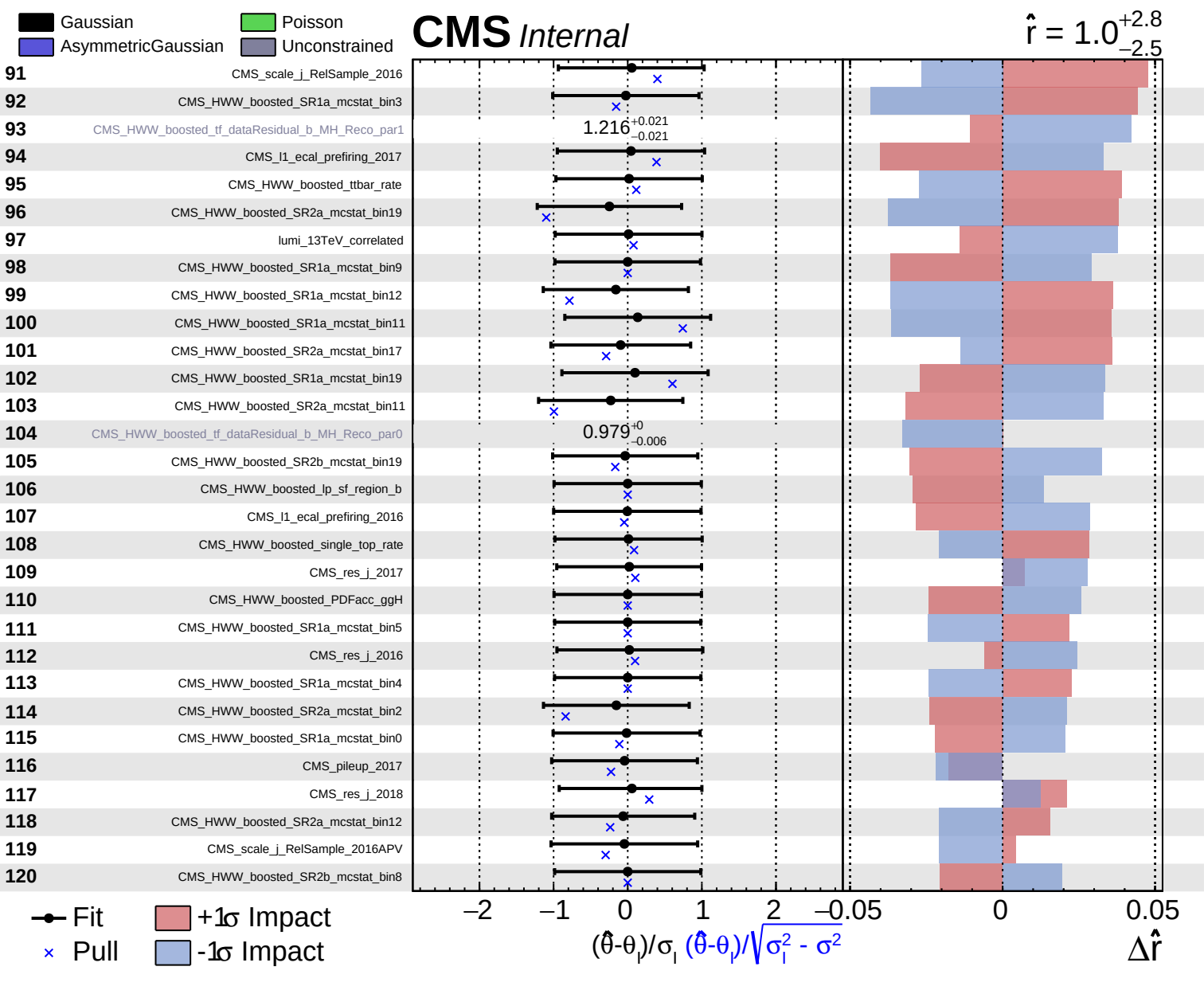
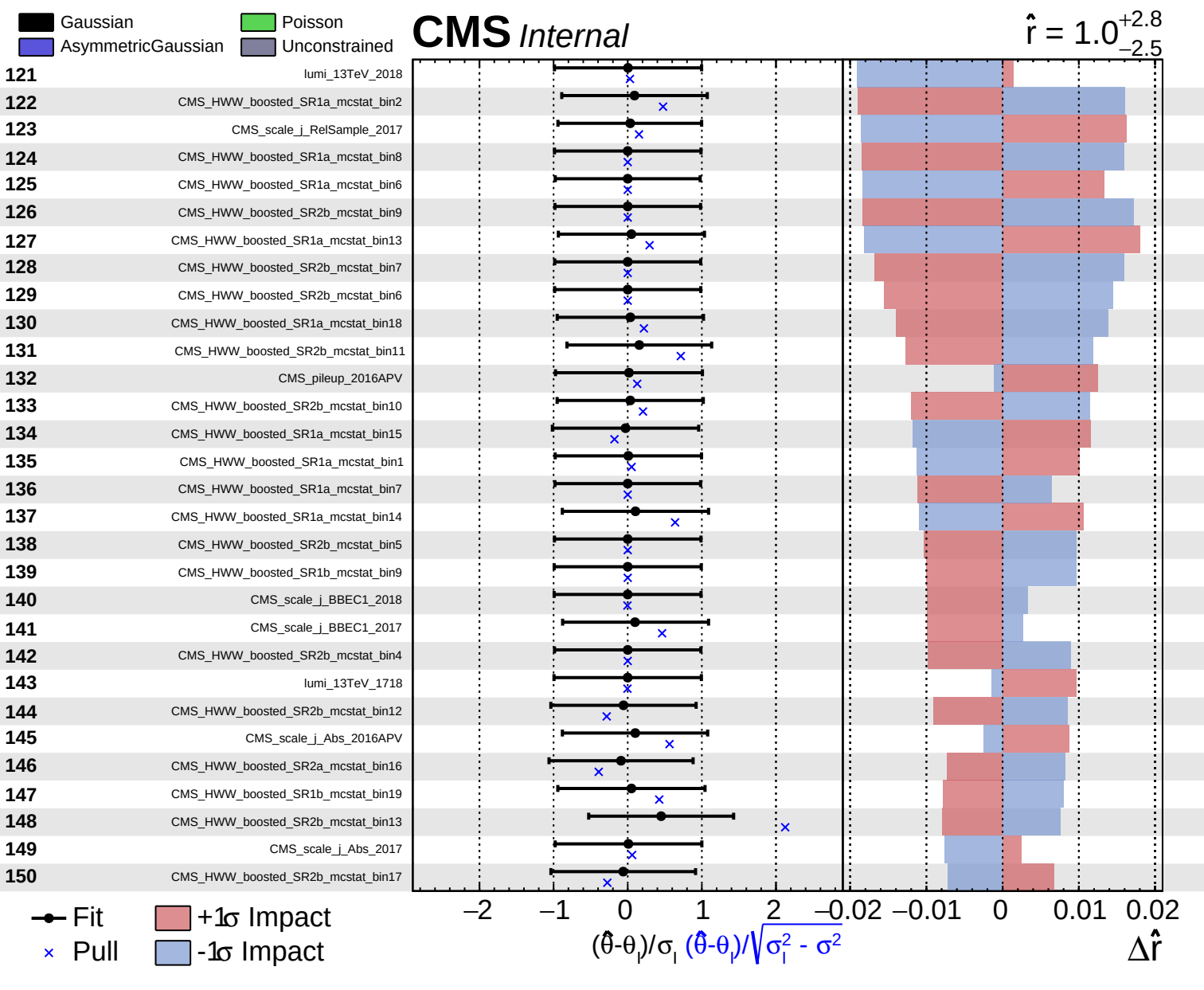
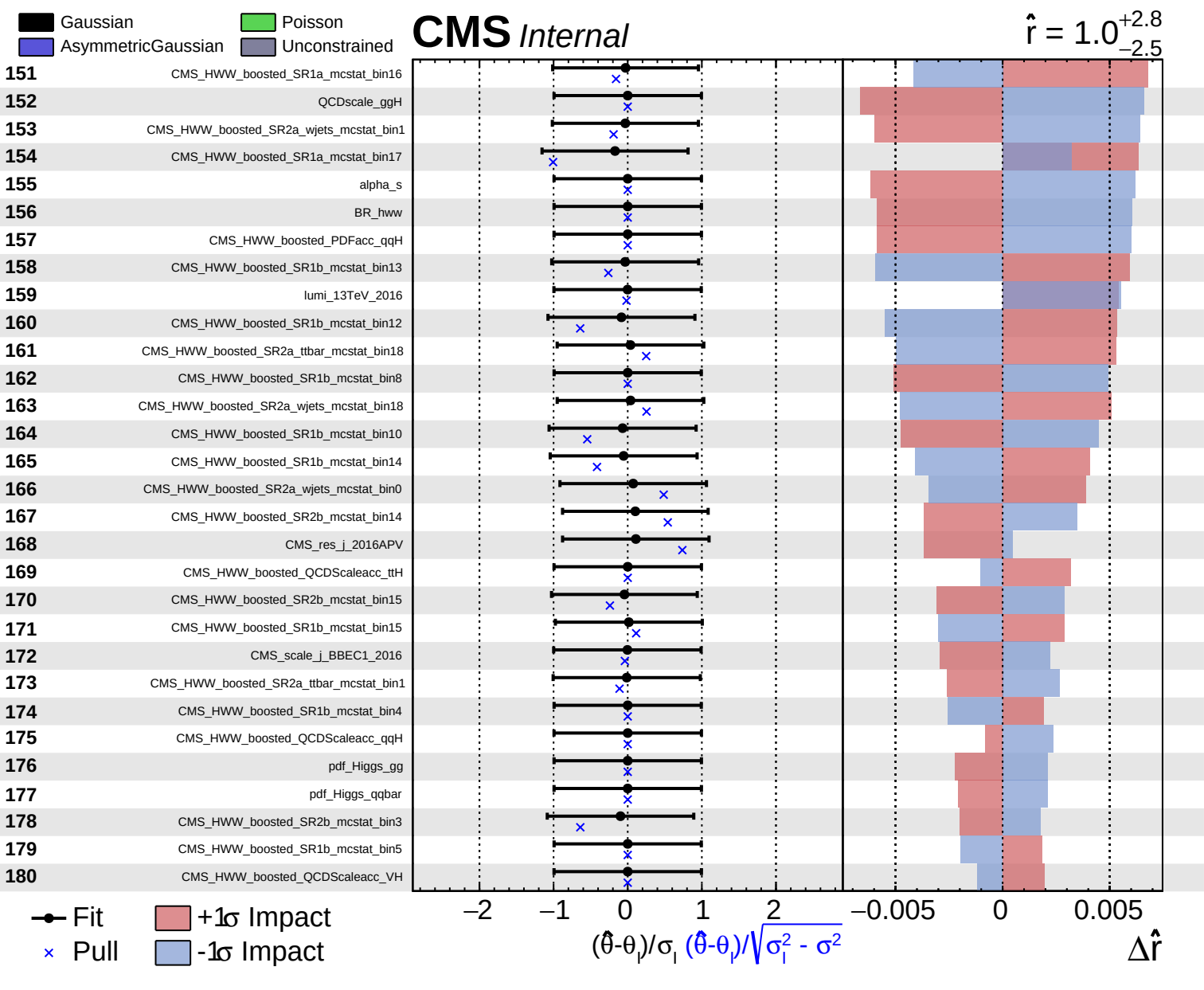

Gaussian
AsymmetricGaussian
Poisson
Unconstrained
CMS Internal
$\hat{r} = 1.0^{+2.8}_{-2.5}$
1 CMS_HWW_boosted_tf_dataResidual_CR1_Bin4 -0.0 +0.7 −0.7
2 CMS_HWW_boosted_tf_dataResidual_CR1_Bin3 0.3 +0.5 −0.6
3 CMS_HWW_boosted_tf_dataResidual_CR1_Bin5 -0.0 +0.6 −0.5
4 CMS_HWW_boosted_tf_dataResidual_CR1_Bin2 0.13 +0.31 −0.31
5 CMS_HWW_boosted_tf_dataResidual_CR1_Bin9 0.00 +0.29 −0.29
6 CMS_HWW_boosted_tf_dataResidual_CR1_Bin1 0.11 +0.25 −0.26
7 CMS_HWW_boosted_tf_dataResidual_CR1_Bin10 0.19 +0.29 −0.29
8 CMS_HWW_boosted_tf_dataResidual_CR1_Bin8 0.00 +0.30 −0.30
9 CMS_HWW_boosted_tf_dataResidual_CR1_Bin11 0.20 +0.29 −0.30
10 CMS_HWW_boosted_tf_dataResidual_CR2_Bin5 0.00 +0.16 −0.16
11 CMS_HWW_boosted_tf_dataResidual_CR1_Bin12 0.16 +0.30 −0.30
12 CMS_HWW_boosted_tf_dataResidual_CR1_Bin0 0.08 +0.22 −0.22
13 CMS_HWW_boosted_tf_dataResidual_CR1_Bin7 0.00 +0.35 −0.33
14 CMS_HWW_boosted_tf_dataResidual_CR1_Bin6 -0.0 +0.5 −0.4
15 CMS_HWW_boosted_tf_dataResidual_CR2_Bin4 0.00 +0.15 −0.15
16 CMS_HWW_boosted_tf_dataResidual_CR2_Bin6 -0.00 +0.15 −0.15
17 CMS_HWW_boosted_tf_dataResidual_CR1_Bin13 0.15 +0.32 −0.32
18 CMS_HWW_boosted_tf_dataResidual_CR2_Bin7 0.00 +0.15 −0.15
19 CMS_HWW_boosted_tf_dataResidual_CR2_Bin3 0.09 +0.14 −0.14
20 CMS_HWW_boosted_QCDScaleacc_wjets
21 CMS_HWW_boosted_tf_dataResidual_CR2_Bin8 0.00 +0.15 −0.15
22 CMS_HWW_boosted_tf_dataResidual_CR2_Bin9 0.00 +0.15 −0.15
23 CMS_HWW_boosted_tf_dataResidual_CR1_Bin14 0.14 +0.34 −0.34
24 CMS_HWW_boosted_tf_dataResidual_CR2_Bin10 0.10 +0.15 −0.15
25 CMS_HWW_boosted_tf_dataResidual_CR2_Bin2 0.05 +0.12 −0.12
26 CMS_HWW_boosted_tf_dataResidual_CR2_Bin11 0.09 +0.15 −0.15
27 CMS_HWW_boosted_tf_dataResidual_CR2_Bin12 0.08 +0.15 −0.15
28 CMS_HWW_boosted_tf_dataResidual_CR1_Bin15 0.13 +0.35 −0.36
29 CMS_HWW_boosted_tf_dataResidual_CR2_Bin13 0.10 +0.15 −0.16
30 CMS_HWW_boosted_tf_dataResidual_a_MH_Reco_par3 1.78 +0.05 −0.05
−2 −1 0 1 2
$(\hat{\theta}-\theta_I)/\sigma_I$
−1 0 1
$(\hat{\theta}-\theta_I)/\sqrt{\sigma_I^2 - \sigma^2}$
$\Delta\hat{r}$
Fit
Pull
+1σ Impact
-1σ Impact

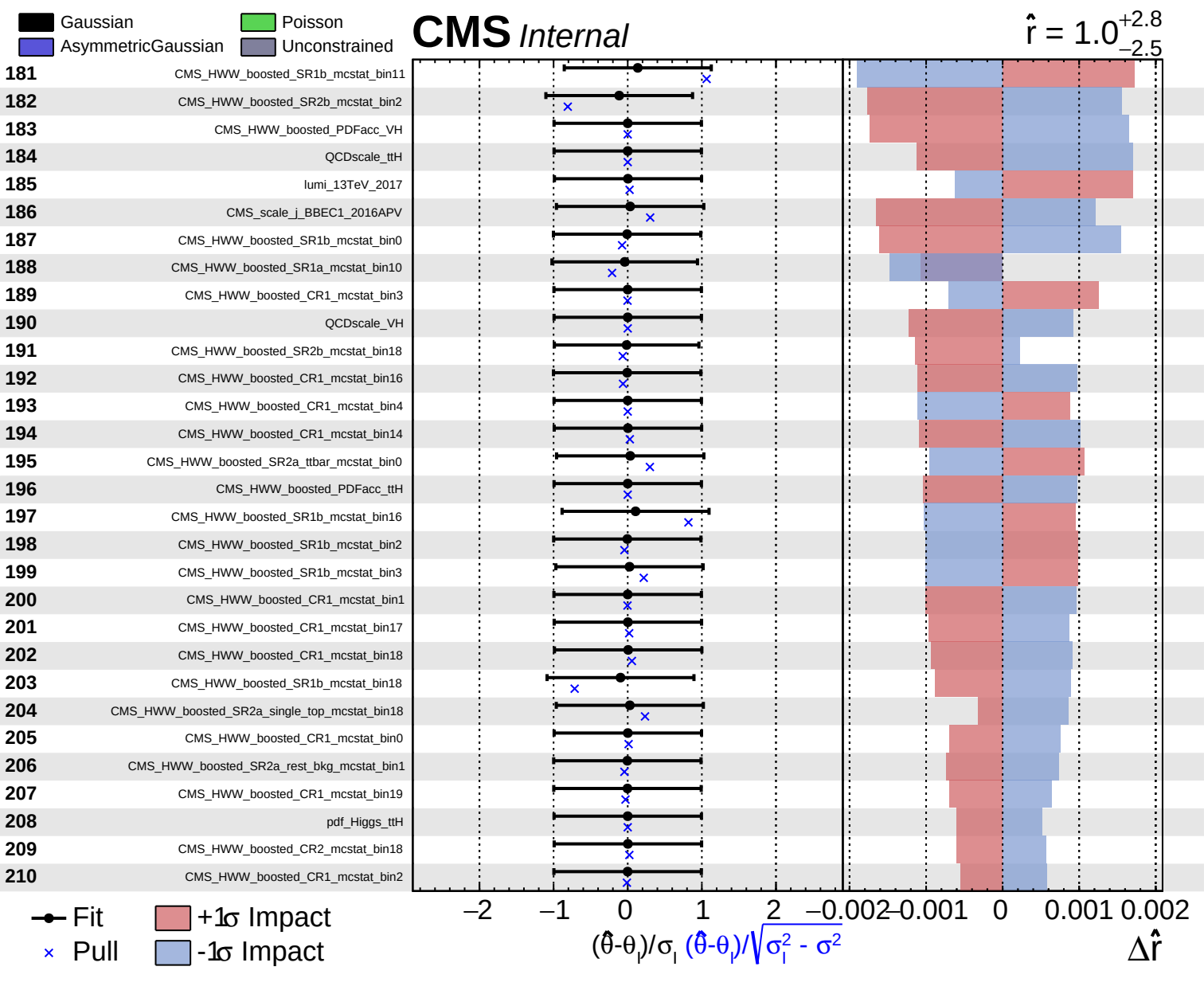

Gaussian
AsymmetricGaussian
Poisson
Unconstrained
CMS Internal
r̂ = 1.0 +2.8 −2.5
31 CMS_HWW_boosted_tf_dataResidual_CR1_Bin16 0.1 +0.4 −0.4
32 CMS_HWW_boosted_tf_dataResidual_CR1_Bin18 0.09 +0.33 −0.34
33 CMS_HWW_boosted_tf_dataResidual_CR1_Bin17 0.12 +0.35 −0.36
34 CMS_HWW_boosted_tf_dataResidual_CR2_Bin14 0.07 +0.16 −0.17
35 CMS_HWW_boosted_tf_dataResidual_CR2_Bin1 0.04 +0.11 −0.11
36 CMS_HWW_boosted_tf_dataResidual_CR2_Bin15 0.07 +0.16 −0.16
37 CMS_HWW_boosted_tf_dataResidual_CR1_Bin19 0.09 +0.32 −0.33
38 ps_fsr
39 ps_isr
40 CMS_HWW_boosted_tf_dataResidual_CR2_Bin16 0.04 +0.17 −0.17
41 CMS_HWW_boosted_tf_dataResidual_a_MH_Reco_par2 0.91 +0.08 −0.09
42 CMS_HWW_boosted_tf_dataResidual_CR2_Bin17 0.06 +0.16 −0.17
43 CMS_HWW_boosted_tf_dataResidual_b_MH_Reco_par6 1.801 +0.019 −0.019
44 CMS_HWW_boosted_tf_dataResidual_CR2_Bin18 0.04 +0.17 −0.18
45 CMS_HWW_boosted_tf_dataResidual_CR2_Bin19 0.05 +0.17 −0.18
46 CMS_HWW_boosted_lp_sf_region_a
47 CMS_HWW_boosted_tf_dataResidual_a_MH_Reco_par0 0.813 +0.018 −0.017
48 CMS_HWW_boosted_tf_dataResidual_CR2_Bin0 0.02 +0.11 −0.11
49 CMS_scale_j_Abs
50 CMS_HWW_boosted_SR2a_mcstat_bin9
51 CMS_HWW_boosted_wjets_rate
52 CMS_scale_j_FlavQCD
53 CMS_HWW_boosted_QCDScaleacc_ttbar
54 CMS_HWW_boosted_SR2a_mcstat_bin8
55 CMS_HWW_boosted_SR2a_mcstat_bin5
56 CMS_HWW_boosted_QCDScaleacc_rest_bkg
57 CMS_HWW_boosted_jms_2018
58 CMS_HWW_boosted_SR2a_mcstat_bin7
59 CMS_HWW_boosted_SR2a_mcstat_bin6
60 CMS_HWW_boosted_jmr_2016APV
−2 −1 0 1 2
−0.5 0 0.5
Fit
Pull
+1σ Impact
-1σ Impact
(θ̂-θ_I)/σ_I
(θ̂-θ_I)/√(σ_I² - σ²)
Δr̂

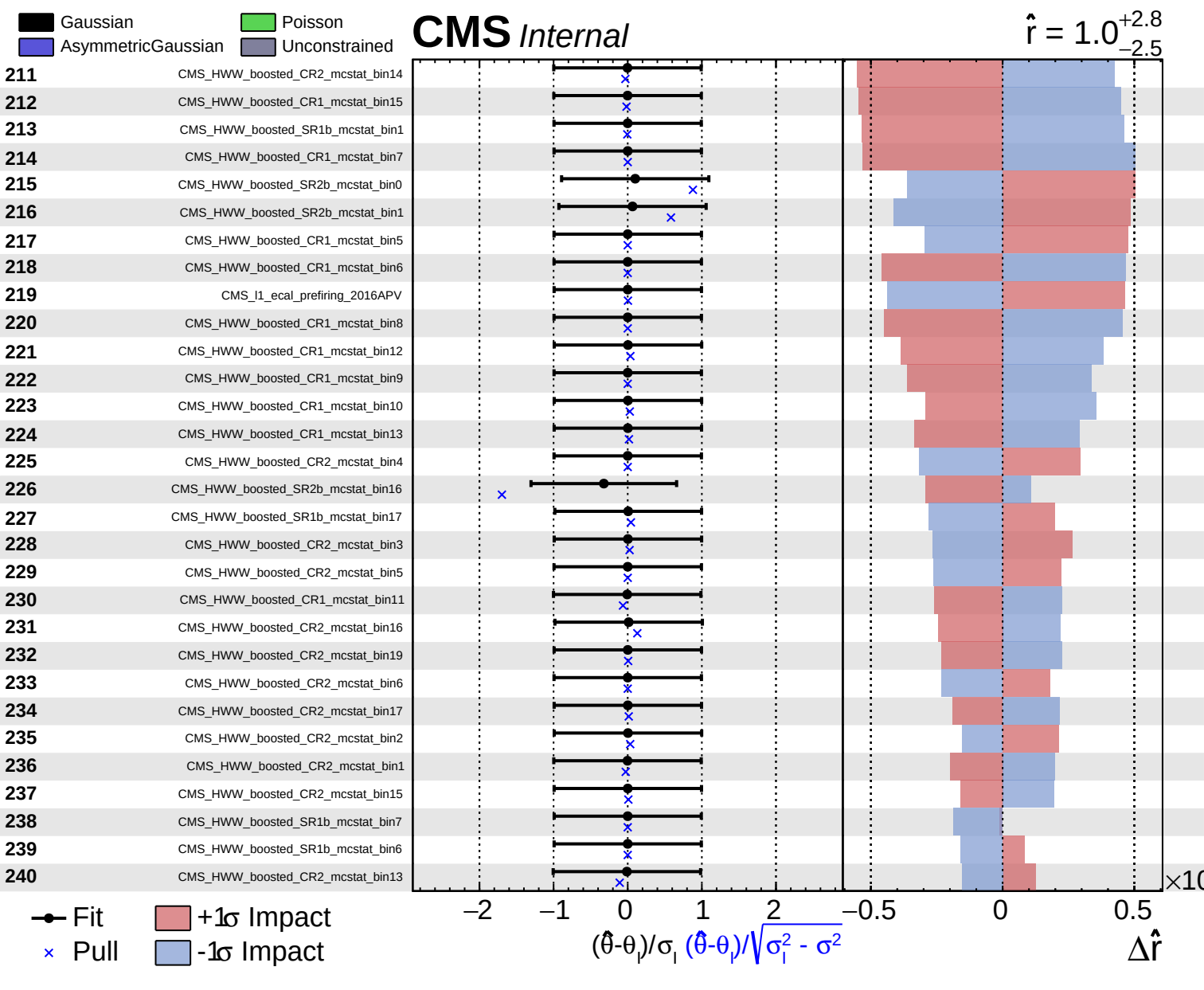

Gaussian
AsymmetricGaussian
Poisson
Unconstrained
CMS Internal
r̂ = 1.0 +2.8 −2.5
61 CMS_HWW_boosted_tf_dataResidual_a_MH_Reco_par1
62 unclustered_Energy
63 CMS_HWW_boosted_tf_dataResidual_b_MH_Reco_par4
64 CMS_HWW_boosted_jmr_2018
65 CMS_HWW_boosted_SR2a_mcstat_bin4
66 CMS_HWW_boosted_tf_dataResidual_b_MH_Reco_par3
67 CMS_scale_j_Abs_2018
68 CMS_HWW_boosted_SR2a_mcstat_bin10
69 CMS_HWW_boosted_tf_dataResidual_b_MH_Reco_par5
70 CMS_HWW_boosted_SR2a_rest_bkg_mcstat_bin18
71 CMS_HWW_boosted_SR2a_mcstat_bin3
72 CMS_HWW_boosted_jmr_2016
73 CMS_HWW_boosted_tf_dataResidual_b_MH_Reco_par2
74 CMS_HWW_boosted_jms_2016
75 CMS_HWW_boosted_SR2a_mcstat_bin15
76 CMS_scale_j_RelBal
77 CMS_HWW_boosted_QCDScaleacc_ggH
78 CMS_HWW_boosted_jms_2016APV
79 CMS_HWW_boosted_rest_bkg_rate
80 CMS_scale_j_BBEC1
81 CMS_HWW_boosted_jms_2017
82 CMS_scale_j_Abs_2016
83 CMS_scale_j_RelSample_2018
84 CMS_HWW_boosted_jmr_2017
85 CMS_pileup_2018
86 CMS_HWW_boosted_QCDScaleacc_single_top
87 CMS_HWW_boosted_SR2a_mcstat_bin13
88 CMS_HWW_boosted_SR2a_mcstat_bin14
89 CMS_pileup_2016
90 triggerEffSF_uncorrelated
0.88 +0.05 −0.05
0.85 +0.13 −0.15
1.49 +0.07 −0.08
1.85 +0.04 −0.04
0.97 +0.07 −0.07
−2
−1
0
1
2
(θ̂-θ_I)/σ_I
−0.1
0
0.1
(θ̂-θ_I)/√(σ_I² - σ²)
Δr̂
Fit
Pull
+1σ Impact
-1σ Impact

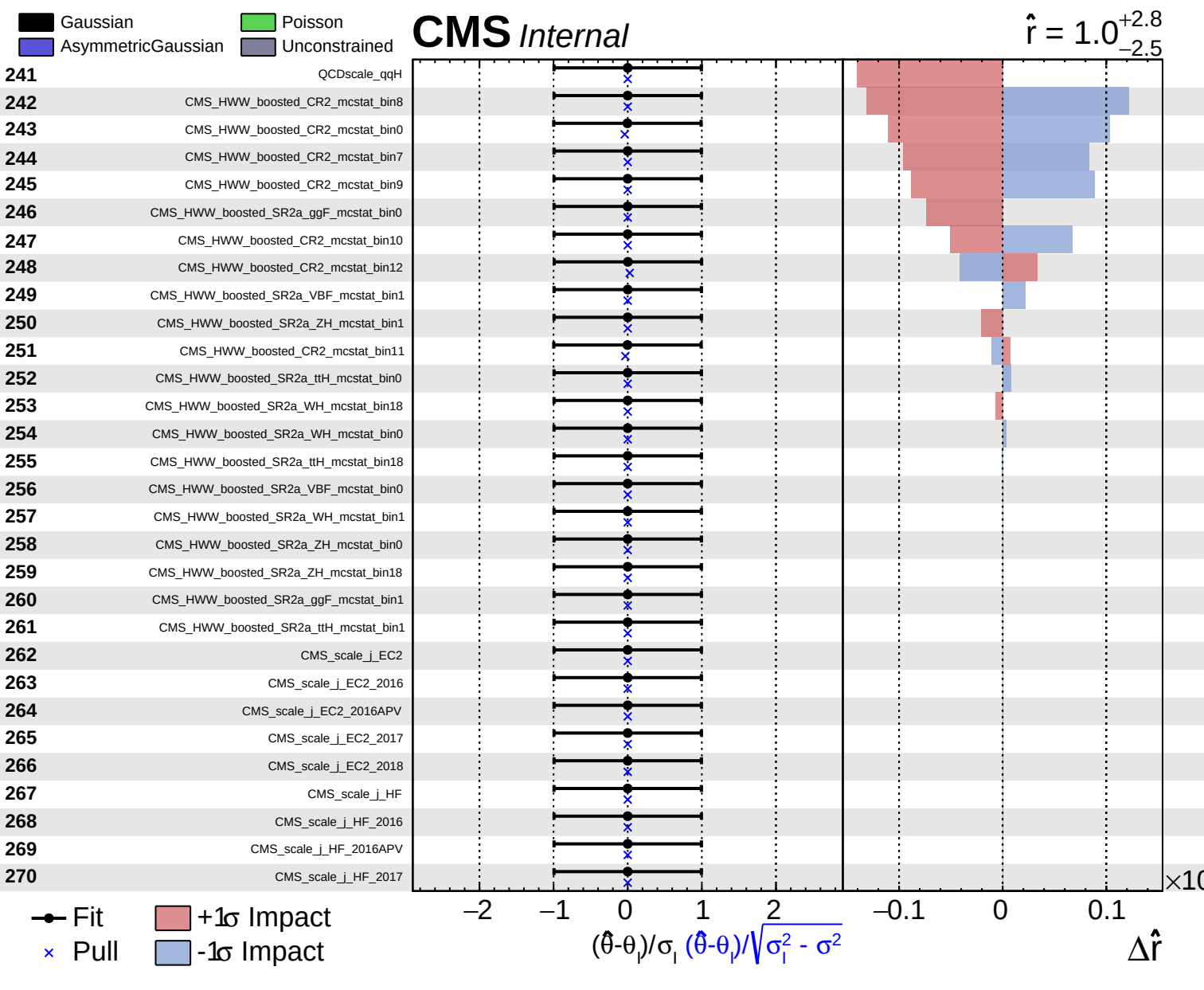

Gaussian
AsymmetricGaussian
Poisson
Unconstrained
CMS Internal
r̂ = 1.0 +2.8 −2.5
91 CMS_scale_j_RelSample_2016
92 CMS_HWW_boosted_SR1a_mcstat_bin3
93 CMS_HWW_boosted_tf_dataResidual_b_MH_Reco_par1
94 CMS_l1_ecal_prefiring_2017
95 CMS_HWW_boosted_ttbar_rate
96 CMS_HWW_boosted_SR2a_mcstat_bin19
97 lumi_13TeV_correlated
98 CMS_HWW_boosted_SR1a_mcstat_bin9
99 CMS_HWW_boosted_SR1a_mcstat_bin12
100 CMS_HWW_boosted_SR1a_mcstat_bin11
101 CMS_HWW_boosted_SR2a_mcstat_bin17
102 CMS_HWW_boosted_SR1a_mcstat_bin19
103 CMS_HWW_boosted_SR2a_mcstat_bin11
104 CMS_HWW_boosted_tf_dataResidual_b_MH_Reco_par0
105 CMS_HWW_boosted_SR2b_mcstat_bin19
106 CMS_HWW_boosted_lp_sf_region_b
107 CMS_l1_ecal_prefiring_2016
108 CMS_HWW_boosted_single_top_rate
109 CMS_res_j_2017
110 CMS_HWW_boosted_PDFacc_ggH
111 CMS_HWW_boosted_SR1a_mcstat_bin5
112 CMS_res_j_2016
113 CMS_HWW_boosted_SR1a_mcstat_bin4
114 CMS_HWW_boosted_SR2a_mcstat_bin2
115 CMS_HWW_boosted_SR1a_mcstat_bin0
116 CMS_pileup_2017
117 CMS_res_j_2018
118 CMS_HWW_boosted_SR2a_mcstat_bin12
119 CMS_scale_j_RelSample_2016APV
120 CMS_HWW_boosted_SR2b_mcstat_bin8
1.216 +0.021 −0.021
0.979 +0 −0.006
Fit
Pull
+1σ Impact
-1σ Impact
−2
−1
0
1
2
−0.05
0
0.05
(θ̂-θ_I)/σ_I
(θ̂-θ_I)/√(σ_I² - σ²)
Δr̂

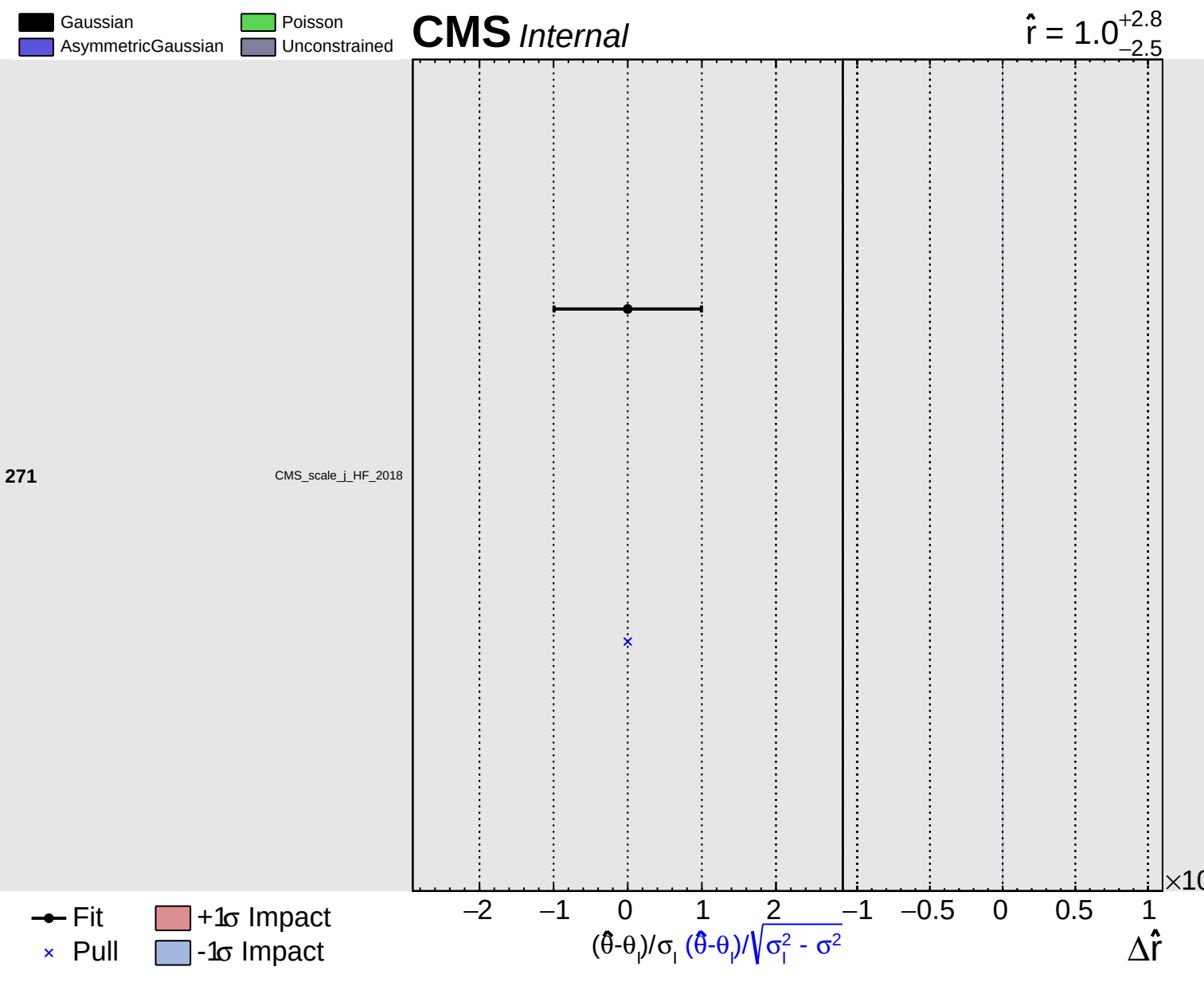

Gaussian
AsymmetricGaussian
Poisson
Unconstrained
CMS Internal
r̂ = 1.0 +2.8 −2.5
121 lumi_13TeV_2018
122 CMS_HWW_boosted_SR1a_mcstat_bin2
123 CMS_scale_j_RelSample_2017
124 CMS_HWW_boosted_SR1a_mcstat_bin8
125 CMS_HWW_boosted_SR1a_mcstat_bin6
126 CMS_HWW_boosted_SR2b_mcstat_bin9
127 CMS_HWW_boosted_SR1a_mcstat_bin13
128 CMS_HWW_boosted_SR2b_mcstat_bin7
129 CMS_HWW_boosted_SR2b_mcstat_bin6
130 CMS_HWW_boosted_SR1a_mcstat_bin18
131 CMS_HWW_boosted_SR2b_mcstat_bin11
132 CMS_pileup_2016APV
133 CMS_HWW_boosted_SR2b_mcstat_bin10
134 CMS_HWW_boosted_SR1a_mcstat_bin15
135 CMS_HWW_boosted_SR1a_mcstat_bin1
136 CMS_HWW_boosted_SR1a_mcstat_bin7
137 CMS_HWW_boosted_SR1a_mcstat_bin14
138 CMS_HWW_boosted_SR2b_mcstat_bin5
139 CMS_HWW_boosted_SR1b_mcstat_bin9
140 CMS_scale_j_BBEC1_2018
141 CMS_scale_j_BBEC1_2017
142 CMS_HWW_boosted_SR2b_mcstat_bin4
143 lumi_13TeV_1718
144 CMS_HWW_boosted_SR2b_mcstat_bin12
145 CMS_scale_j_Abs_2016APV
146 CMS_HWW_boosted_SR2a_mcstat_bin16
147 CMS_HWW_boosted_SR1b_mcstat_bin19
148 CMS_HWW_boosted_SR2b_mcstat_bin13
149 CMS_scale_j_Abs_2017
150 CMS_HWW_boosted_SR2b_mcstat_bin17
Fit
Pull
+1σ Impact
-1σ Impact
−2
−1
0
1
2
(θ̂-θ_I)/σ_I
−0.02
−0.01
0
0.01
0.02
(θ̂-θ_I)/√(σ_I² - σ²)
Δr̂


Gaussian
AsymmetricGaussian
Poisson
Unconstrained
CMS Internal
r̂ = 1.0 +2.8 −2.5
151 CMS_HWW_boosted_SR1a_mcstat_bin16
152 QCDscale_ggH
153 CMS_HWW_boosted_SR2a_wjets_mcstat_bin1
154 CMS_HWW_boosted_SR1a_mcstat_bin17
155 alpha_s
156 BR_hww
157 CMS_HWW_boosted_PDFacc_qqH
158 CMS_HWW_boosted_SR1b_mcstat_bin13
159 lumi_13TeV_2016
160 CMS_HWW_boosted_SR1b_mcstat_bin12
161 CMS_HWW_boosted_SR2a_ttbar_mcstat_bin18
162 CMS_HWW_boosted_SR1b_mcstat_bin8
163 CMS_HWW_boosted_SR2a_wjets_mcstat_bin18
164 CMS_HWW_boosted_SR1b_mcstat_bin10
165 CMS_HWW_boosted_SR1b_mcstat_bin14
166 CMS_HWW_boosted_SR2a_wjets_mcstat_bin0
167 CMS_HWW_boosted_SR2b_mcstat_bin14
168 CMS_res_j_2016APV
169 CMS_HWW_boosted_QCDScaleacc_ttH
170 CMS_HWW_boosted_SR2b_mcstat_bin15
171 CMS_HWW_boosted_SR1b_mcstat_bin15
172 CMS_scale_j_BBEC1_2016
173 CMS_HWW_boosted_SR2a_ttbar_mcstat_bin1
174 CMS_HWW_boosted_SR1b_mcstat_bin4
175 CMS_HWW_boosted_QCDScaleacc_qqH
176 pdf_Higgs_gg
177 pdf_Higgs_qqbar
178 CMS_HWW_boosted_SR2b_mcstat_bin3
179 CMS_HWW_boosted_SR1b_mcstat_bin5
180 CMS_HWW_boosted_QCDScaleacc_VH
Fit
Pull
+1σ Impact
-1σ Impact
−2
−1
0
1
2
(θ̂-θ_I)/σ_I
−0.005
0
0.005
(θ̂-θ_I)/√(σ_I² - σ²)
Δr̂


Gaussian
AsymmetricGaussian
Poisson
Unconstrained
CMS Internal
r̂ = 1.0 +2.8 −2.5
181 CMS_HWW_boosted_SR1b_mcstat_bin11
182 CMS_HWW_boosted_SR2b_mcstat_bin2
183 CMS_HWW_boosted_PDFacc_VH
184 QCDscale_ttH
185 lumi_13TeV_2017
186 CMS_scale_j_BBEC1_2016APV
187 CMS_HWW_boosted_SR1b_mcstat_bin0
188 CMS_HWW_boosted_SR1a_mcstat_bin10
189 CMS_HWW_boosted_CR1_mcstat_bin3
190 QCDscale_VH
191 CMS_HWW_boosted_SR2b_mcstat_bin18
192 CMS_HWW_boosted_CR1_mcstat_bin16
193 CMS_HWW_boosted_CR1_mcstat_bin4
194 CMS_HWW_boosted_CR1_mcstat_bin14
195 CMS_HWW_boosted_SR2a_ttbar_mcstat_bin0
196 CMS_HWW_boosted_PDFacc_ttH
197 CMS_HWW_boosted_SR1b_mcstat_bin16
198 CMS_HWW_boosted_SR1b_mcstat_bin2
199 CMS_HWW_boosted_SR1b_mcstat_bin3
200 CMS_HWW_boosted_CR1_mcstat_bin1
201 CMS_HWW_boosted_CR1_mcstat_bin17
202 CMS_HWW_boosted_CR1_mcstat_bin18
203 CMS_HWW_boosted_SR1b_mcstat_bin18
204 CMS_HWW_boosted_SR2a_single_top_mcstat_bin18
205 CMS_HWW_boosted_CR1_mcstat_bin0
206 CMS_HWW_boosted_SR2a_rest_bkg_mcstat_bin1
207 CMS_HWW_boosted_CR1_mcstat_bin19
208 pdf_Higgs_ttH
209 CMS_HWW_boosted_CR2_mcstat_bin18
210 CMS_HWW_boosted_CR1_mcstat_bin2
Fit
Pull
+1σ Impact
-1σ Impact
−2
−1
0
1
2
(θ̂-θ_I)/σ_I
−0.002
−0.001
0
0.001
0.002
(θ̂-θ_I)/√(σ_I² - σ²)
Δr̂


Gaussian
AsymmetricGaussian
Poisson
Unconstrained
CMS Internal
r̂ = 1.0 +2.8 −2.5
211 CMS_HWW_boosted_CR2_mcstat_bin14
212 CMS_HWW_boosted_CR1_mcstat_bin15
213 CMS_HWW_boosted_SR1b_mcstat_bin1
214 CMS_HWW_boosted_CR1_mcstat_bin7
215 CMS_HWW_boosted_SR2b_mcstat_bin0
216 CMS_HWW_boosted_SR2b_mcstat_bin1
217 CMS_HWW_boosted_CR1_mcstat_bin5
218 CMS_HWW_boosted_CR1_mcstat_bin6
219 CMS_l1_ecal_prefiring_2016APV
220 CMS_HWW_boosted_CR1_mcstat_bin8
221 CMS_HWW_boosted_CR1_mcstat_bin12
222 CMS_HWW_boosted_CR1_mcstat_bin9
223 CMS_HWW_boosted_CR1_mcstat_bin10
224 CMS_HWW_boosted_CR1_mcstat_bin13
225 CMS_HWW_boosted_CR2_mcstat_bin4
226 CMS_HWW_boosted_SR2b_mcstat_bin16
227 CMS_HWW_boosted_SR1b_mcstat_bin17
228 CMS_HWW_boosted_CR2_mcstat_bin3
229 CMS_HWW_boosted_CR2_mcstat_bin5
230 CMS_HWW_boosted_CR1_mcstat_bin11
231 CMS_HWW_boosted_CR2_mcstat_bin16
232 CMS_HWW_boosted_CR2_mcstat_bin19
233 CMS_HWW_boosted_CR2_mcstat_bin6
234 CMS_HWW_boosted_CR2_mcstat_bin17
235 CMS_HWW_boosted_CR2_mcstat_bin2
236 CMS_HWW_boosted_CR2_mcstat_bin1
237 CMS_HWW_boosted_CR2_mcstat_bin15
238 CMS_HWW_boosted_SR1b_mcstat_bin7
239 CMS_HWW_boosted_SR1b_mcstat_bin6
240 CMS_HWW_boosted_CR2_mcstat_bin13
×10
−2
−1
0
1
2
−0.5
0
0.5
Fit
Pull
+1σ Impact
-1σ Impact
(θ̂-θ_I)/σ_I
(θ̂-θ_I)/√(σ_I² - σ²)
Δr̂


Gaussian
AsymmetricGaussian
Poisson
Unconstrained
CMS Internal
r̂ = 1.0 +2.8 −2.5
241 QCDscale_qqH
242 CMS_HWW_boosted_CR2_mcstat_bin8
243 CMS_HWW_boosted_CR2_mcstat_bin0
244 CMS_HWW_boosted_CR2_mcstat_bin7
245 CMS_HWW_boosted_CR2_mcstat_bin9
246 CMS_HWW_boosted_SR2a_ggF_mcstat_bin0
247 CMS_HWW_boosted_CR2_mcstat_bin10
248 CMS_HWW_boosted_CR2_mcstat_bin12
249 CMS_HWW_boosted_SR2a_VBF_mcstat_bin1
250 CMS_HWW_boosted_SR2a_ZH_mcstat_bin1
251 CMS_HWW_boosted_CR2_mcstat_bin11
252 CMS_HWW_boosted_SR2a_ttH_mcstat_bin0
253 CMS_HWW_boosted_SR2a_WH_mcstat_bin18
254 CMS_HWW_boosted_SR2a_WH_mcstat_bin0
255 CMS_HWW_boosted_SR2a_ttH_mcstat_bin18
256 CMS_HWW_boosted_SR2a_VBF_mcstat_bin0
257 CMS_HWW_boosted_SR2a_WH_mcstat_bin1
258 CMS_HWW_boosted_SR2a_ZH_mcstat_bin0
259 CMS_HWW_boosted_SR2a_ZH_mcstat_bin18
260 CMS_HWW_boosted_SR2a_ggF_mcstat_bin1
261 CMS_HWW_boosted_SR2a_ttH_mcstat_bin1
262 CMS_scale_j_EC2
263 CMS_scale_j_EC2_2016
264 CMS_scale_j_EC2_2016APV
265 CMS_scale_j_EC2_2017
266 CMS_scale_j_EC2_2018
267 CMS_scale_j_HF
268 CMS_scale_j_HF_2016
269 CMS_scale_j_HF_2016APV
270 CMS_scale_j_HF_2017
×10
Fit
Pull
+1σ Impact
-1σ Impact
−2
−1
0
1
2
(θ̂-θ_I)/σ_I
−0.1
0
0.1
(θ̂-θ_I)/√(σ_I² - σ²)
Δr̂


Gaussian
AsymmetricGaussian
Poisson
Unconstrained
CMS Internal
r̂ = 1.0 +2.8 −2.5
271
CMS_scale_j_HF_2018
×10
−2
−1
0
1
2
−1
−0.5
0
0.5
1
(θ̂-θ_I)/σ_I
(θ̂-θ_I)/√(σ_I² - σ²)
Δr̂
Fit
Pull
+1σ Impact
-1σ Impact