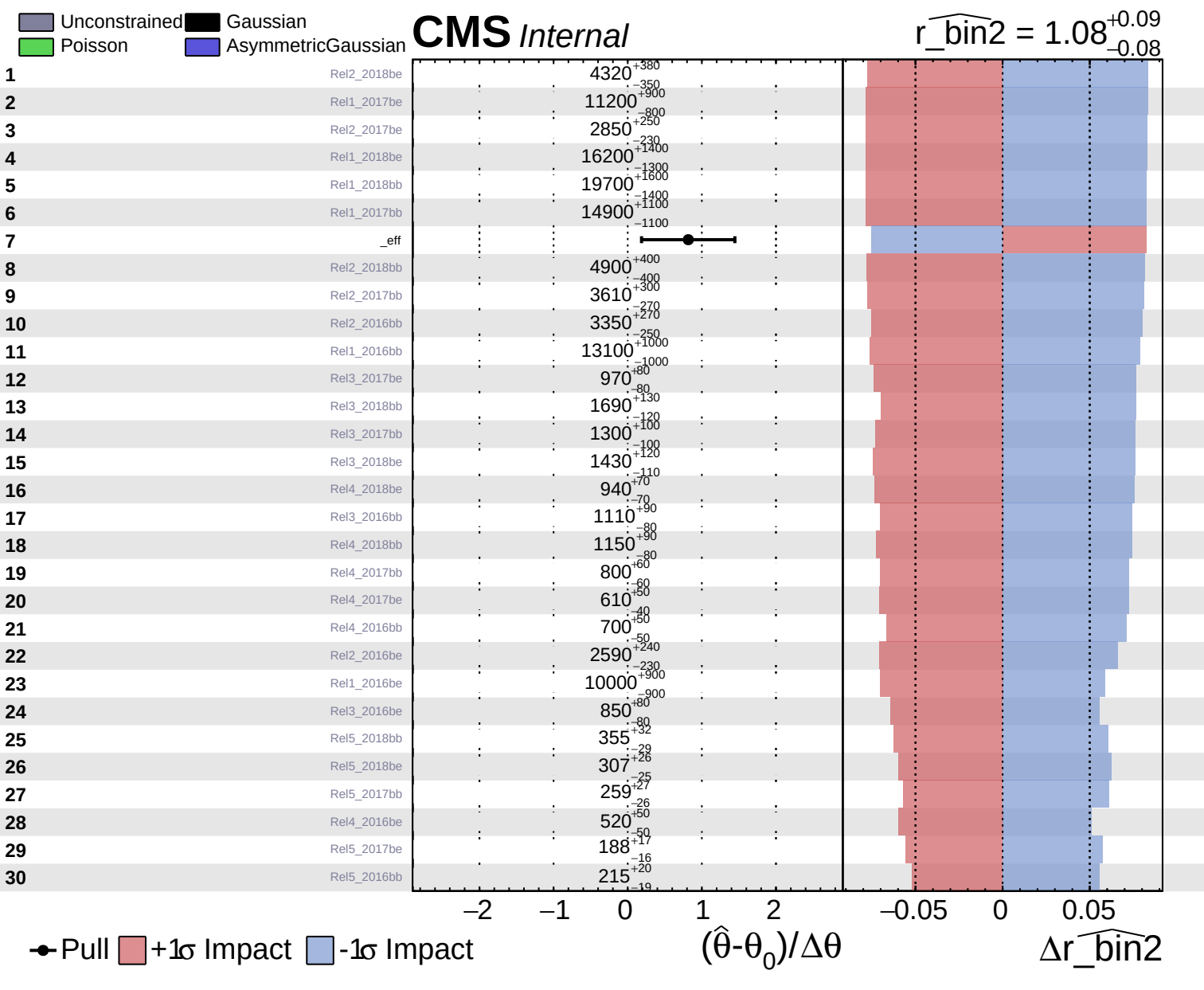
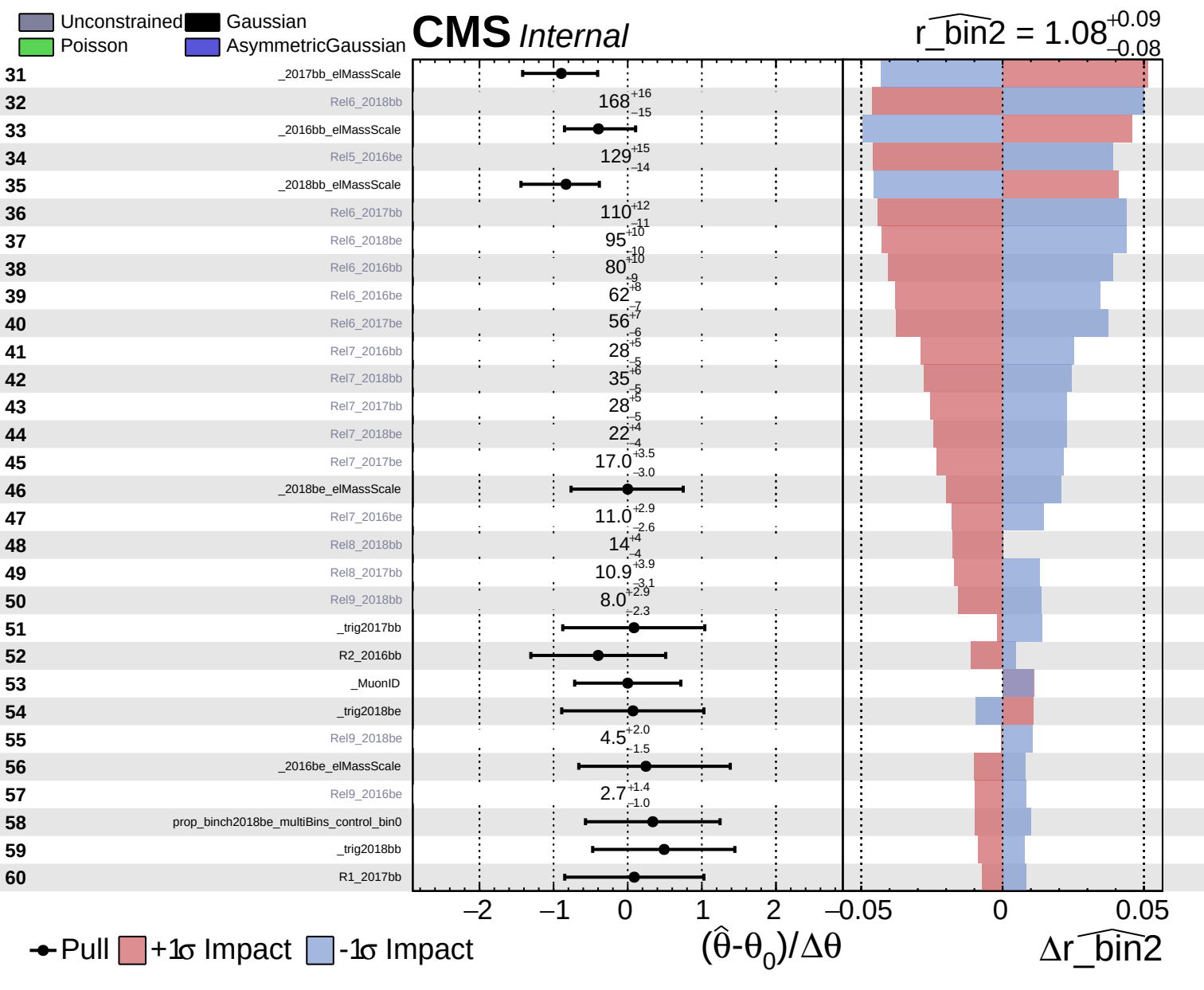
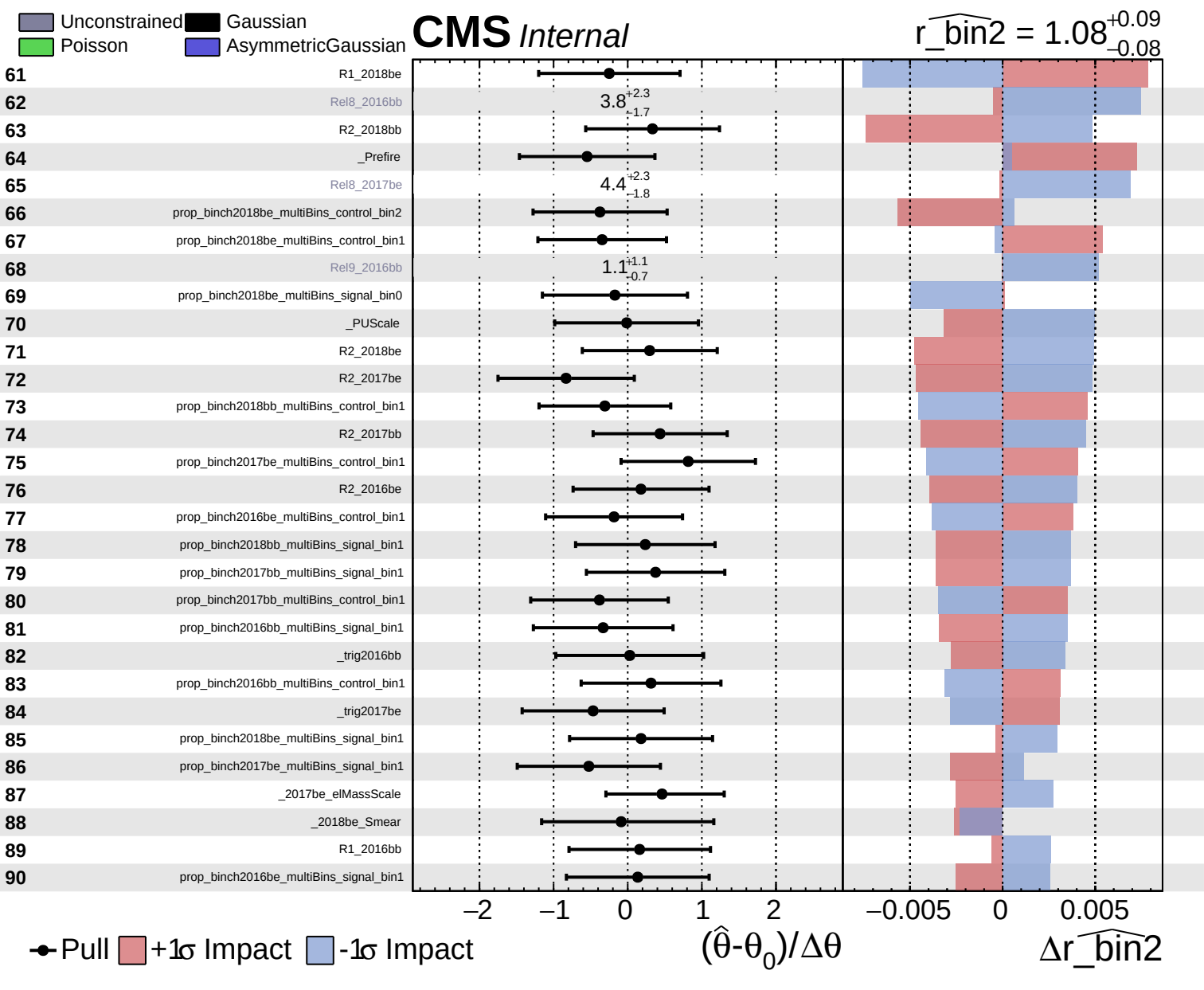
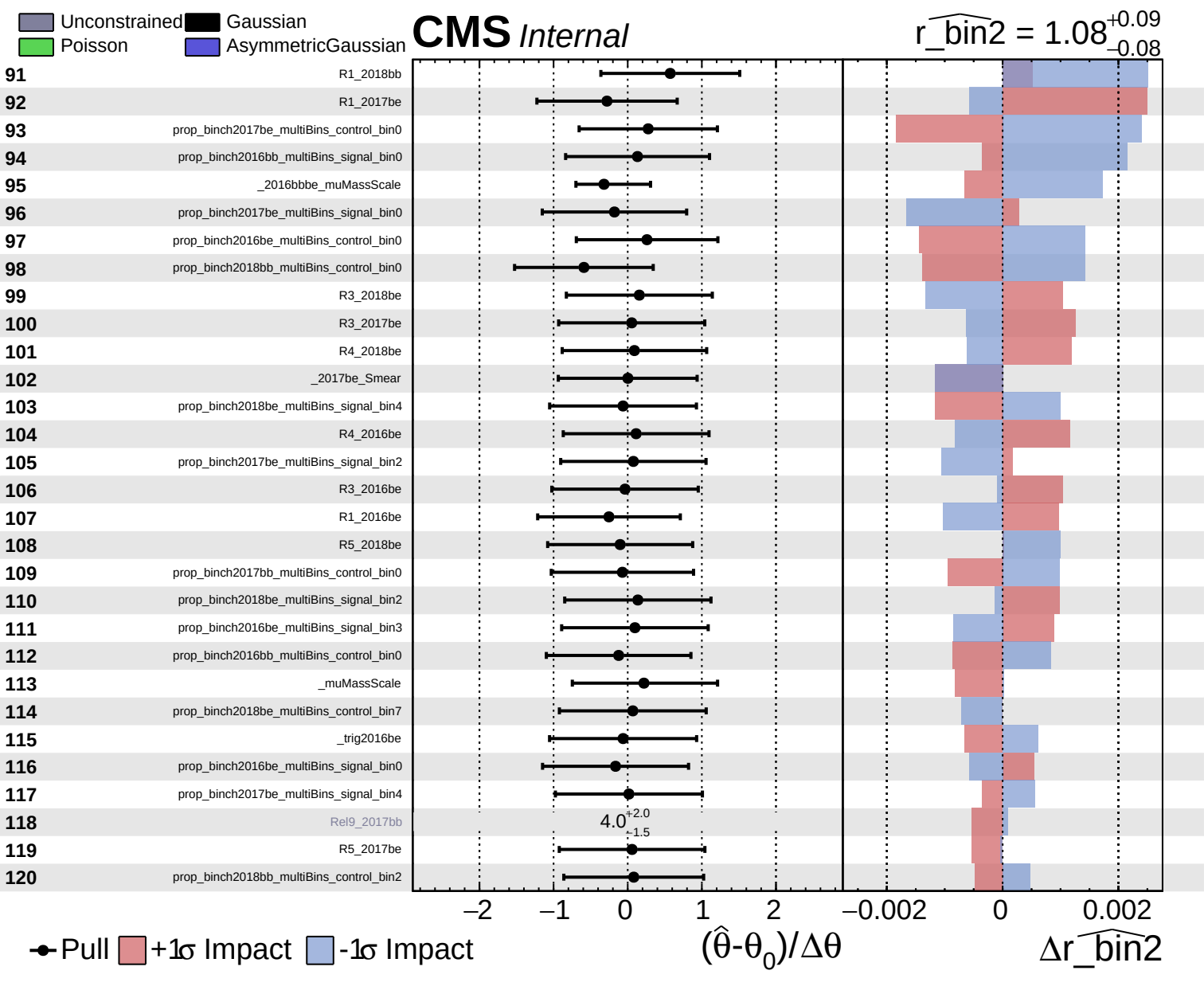
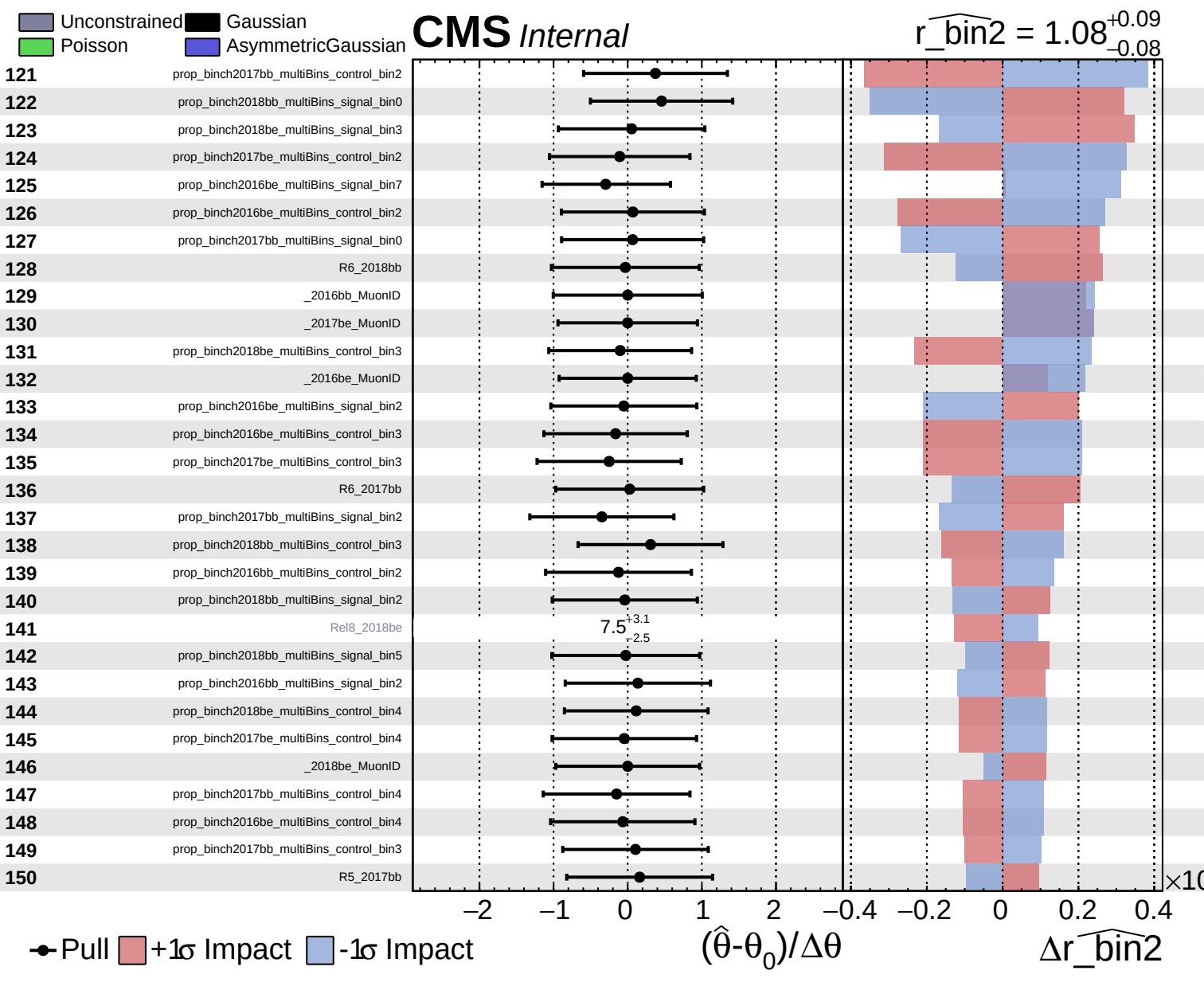
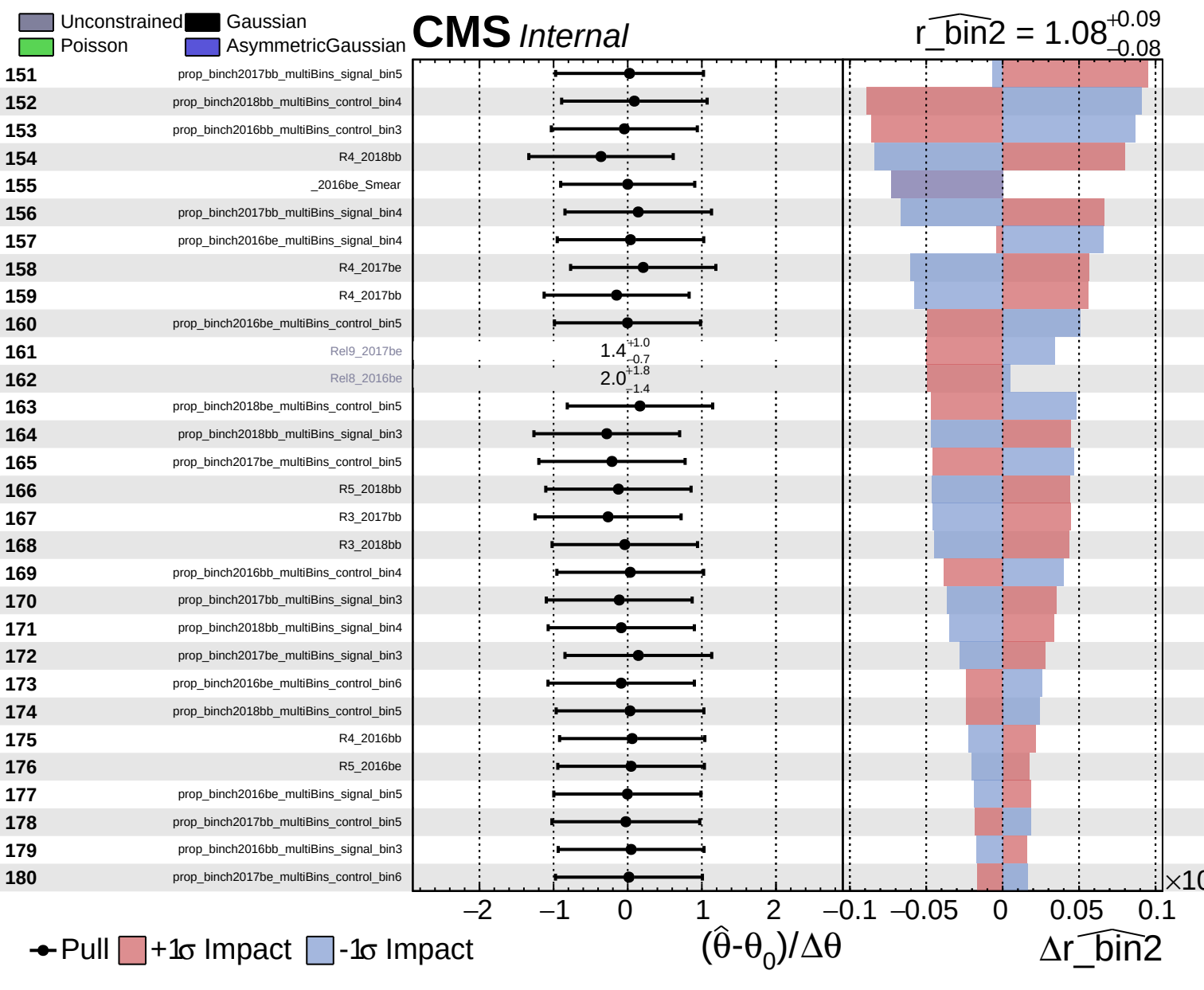

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin2 = 1.08 +0.09 −0.08
1 Rel2_2018be 4320 +380 −350
2 Rel1_2017be 11200 +900 −800
3 Rel2_2017be 2850 +250 −230
4 Rel1_2018be 16200 +1400 −1300
5 Rel1_2018bb 19700 +1600 −1400
6 Rel1_2017bb 14900 +1100 −1100
7 _eff
8 Rel2_2018bb 4900 +400 −400
9 Rel2_2017bb 3610 +300 −270
10 Rel2_2016bb 3350 +270 −250
11 Rel1_2016bb 13100 +1000 −1000
12 Rel3_2017be 970 +80 −80
13 Rel3_2018bb 1690 +130 −120
14 Rel3_2017bb 1300 +100 −100
15 Rel3_2018be 1430 +120 −110
16 Rel4_2018be 940 +70 −70
17 Rel3_2016bb 1110 +90 −80
18 Rel4_2018bb 1150 +90 −80
19 Rel4_2017bb 800 +60 −60
20 Rel4_2017be 610 +50 −40
21 Rel4_2016bb 700 +50 −50
22 Rel2_2016be 2590 +240 −230
23 Rel1_2016be 10000 +900 −900
24 Rel3_2016be 850 +80 −80
25 Rel5_2018bb 355 +32 −29
26 Rel5_2018be 307 +26 −25
27 Rel5_2017bb 259 +27 −26
28 Rel4_2016be 520 +50 −50
29 Rel5_2017be 188 +17 −16
30 Rel5_2016bb 215 +20 −19
−2 −1 0 1 2
−0.05 0 0.05
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr_bin2

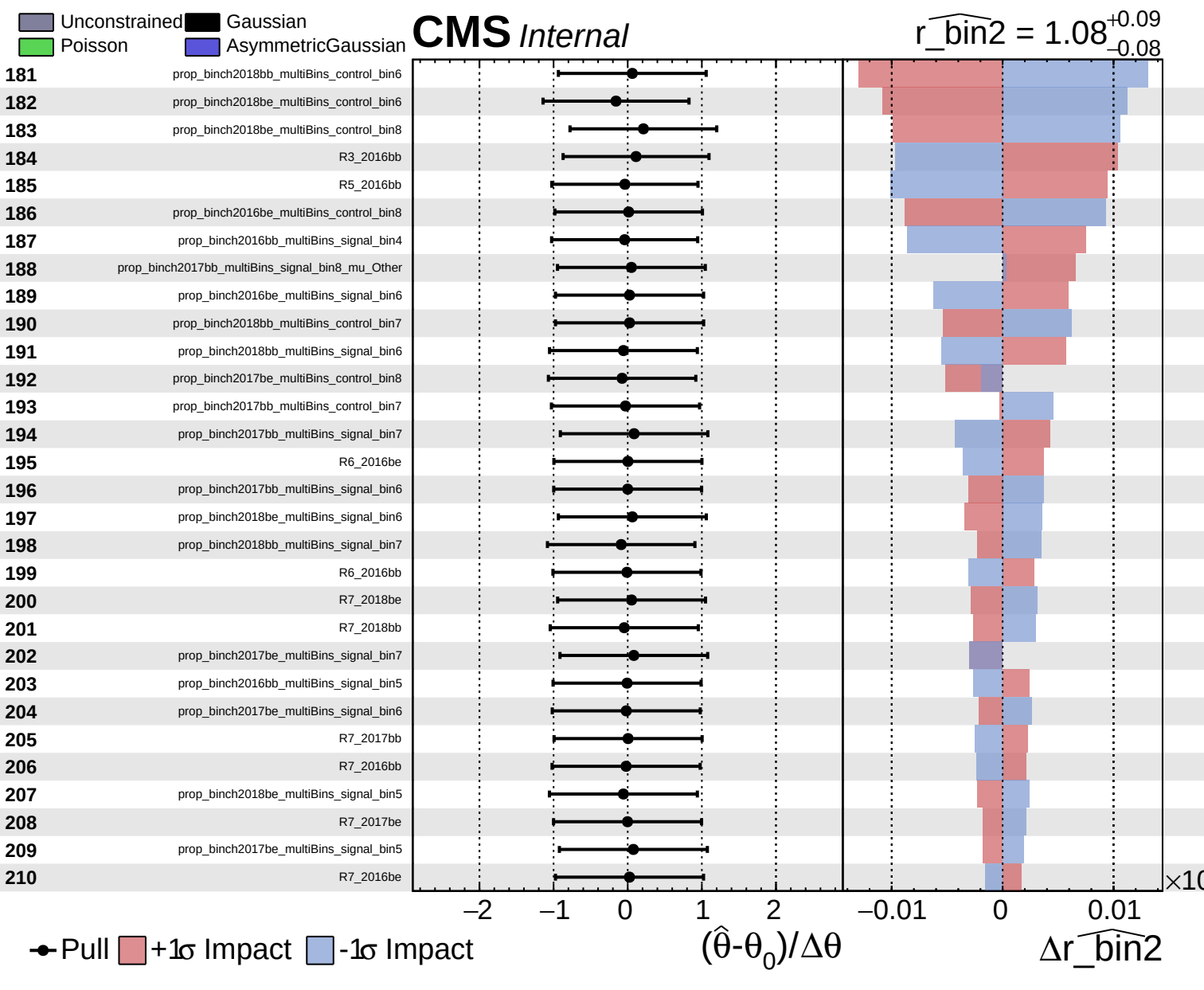

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin2 = 1.08 +0.09 −0.08
31 _2017bb_elMassScale
32 Rel6_2018bb 168 +16 −15
33 _2016bb_elMassScale
34 Rel5_2016be 129 +15 −14
35 _2018bb_elMassScale
36 Rel6_2017bb 110 +12 −11
37 Rel6_2018be 95 +10 −10
38 Rel6_2016bb 80 +10 −9
39 Rel6_2016be 62 +8 −7
40 Rel6_2017be 56 +7 −6
41 Rel7_2016bb 28 +5 −5
42 Rel7_2018bb 35 +6 −5
43 Rel7_2017bb 28 +5 −5
44 Rel7_2018be 22 +4 −4
45 Rel7_2017be 17.0 +3.5 −3.0
46 _2018be_elMassScale
47 Rel7_2016be 11.0 +2.9 −2.6
48 Rel8_2018bb 14 +4 −4
49 Rel8_2017bb 10.9 +3.9 −3.1
50 Rel9_2018bb 8.0 +2.9 −2.3
51 _trig2017bb
52 R2_2016bb
53 _MuonID
54 _trig2018be
55 Rel9_2018be 4.5 +2.0 −1.5
56 _2016be_elMassScale
57 Rel9_2016be 2.7 +1.4 −1.0
58 prop_binch2018be_multiBins_control_bin0
59 _trig2018bb
60 R1_2017bb
−2 −1 0 1 2
−0.05 0 0.05
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr_bin2


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin2 = 1.08 +0.09 −0.08
61 R1_2018be
62 Rel8_2016bb
63 R2_2018bb
64 _Prefire
65 Rel8_2017be
66 prop_binch2018be_multiBins_control_bin2
67 prop_binch2018be_multiBins_control_bin1
68 Rel9_2016bb
69 prop_binch2018be_multiBins_signal_bin0
70 _PUScale
71 R2_2018be
72 R2_2017be
73 prop_binch2018bb_multiBins_control_bin1
74 R2_2017bb
75 prop_binch2017be_multiBins_control_bin1
76 R2_2016be
77 prop_binch2016be_multiBins_control_bin1
78 prop_binch2018bb_multiBins_signal_bin1
79 prop_binch2017bb_multiBins_signal_bin1
80 prop_binch2017bb_multiBins_control_bin1
81 prop_binch2016bb_multiBins_signal_bin1
82 _trig2016bb
83 prop_binch2016bb_multiBins_control_bin1
84 _trig2017be
85 prop_binch2018be_multiBins_signal_bin1
86 prop_binch2017be_multiBins_signal_bin1
87 _2017be_elMassScale
88 _2018be_Smear
89 R1_2016bb
90 prop_binch2016be_multiBins_signal_bin1
3.8 +2.3 −1.7
4.4 +2.3 −1.8
1.1 +1.1 −0.7
−2 −1 0 1 2
−0.005 0 0.005
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin2


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin2 = 1.08 +0.09 −0.08
91 R1_2018bb
92 R1_2017be
93 prop_binch2017be_multiBins_control_bin0
94 prop_binch2016bb_multiBins_signal_bin0
95 _2016bbbe_muMassScale
96 prop_binch2017be_multiBins_signal_bin0
97 prop_binch2016be_multiBins_control_bin0
98 prop_binch2018bb_multiBins_control_bin0
99 R3_2018be
100 R3_2017be
101 R4_2018be
102 _2017be_Smear
103 prop_binch2018be_multiBins_signal_bin4
104 R4_2016be
105 prop_binch2017be_multiBins_signal_bin2
106 R3_2016be
107 R1_2016be
108 R5_2018be
109 prop_binch2017bb_multiBins_control_bin0
110 prop_binch2018be_multiBins_signal_bin2
111 prop_binch2016be_multiBins_signal_bin3
112 prop_binch2016bb_multiBins_control_bin0
113 _muMassScale
114 prop_binch2018be_multiBins_control_bin7
115 _trig2016be
116 prop_binch2016be_multiBins_signal_bin0
117 prop_binch2017be_multiBins_signal_bin4
118 Rel9_2017bb
4.0 +2.0 −1.5
119 R5_2017be
120 prop_binch2018bb_multiBins_control_bin2
−2 −1 0 1 2
−0.002 0 0.002
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin2


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin2 = 1.08 +0.09 −0.08
121 prop_binch2017bb_multiBins_control_bin2
122 prop_binch2018bb_multiBins_signal_bin0
123 prop_binch2018be_multiBins_signal_bin3
124 prop_binch2017be_multiBins_control_bin2
125 prop_binch2016be_multiBins_signal_bin7
126 prop_binch2016be_multiBins_control_bin2
127 prop_binch2017bb_multiBins_signal_bin0
128 R6_2018bb
129 _2016bb_MuonID
130 _2017be_MuonID
131 prop_binch2018be_multiBins_control_bin3
132 _2016be_MuonID
133 prop_binch2016be_multiBins_signal_bin2
134 prop_binch2016be_multiBins_control_bin3
135 prop_binch2017be_multiBins_control_bin3
136 R6_2017bb
137 prop_binch2017bb_multiBins_signal_bin2
138 prop_binch2018bb_multiBins_control_bin3
139 prop_binch2016bb_multiBins_control_bin2
140 prop_binch2018bb_multiBins_signal_bin2
141 Rel8_2018be
7.5 +3.1 −2.5
142 prop_binch2018bb_multiBins_signal_bin5
143 prop_binch2016bb_multiBins_signal_bin2
144 prop_binch2018be_multiBins_control_bin4
145 prop_binch2017be_multiBins_control_bin4
146 _2018be_MuonID
147 prop_binch2017bb_multiBins_control_bin4
148 prop_binch2016be_multiBins_control_bin4
149 prop_binch2017bb_multiBins_control_bin3
150 R5_2017bb
×10
−2 −1 0 1 2
−0.4 −0.2 0 0.2 0.4
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin2


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin2 = 1.08 +0.09 −0.08
151 prop_binch2017bb_multiBins_signal_bin5
152 prop_binch2018bb_multiBins_control_bin4
153 prop_binch2016bb_multiBins_control_bin3
154 R4_2018bb
155 _2016be_Smear
156 prop_binch2017bb_multiBins_signal_bin4
157 prop_binch2016be_multiBins_signal_bin4
158 R4_2017be
159 R4_2017bb
160 prop_binch2016be_multiBins_control_bin5
161 Rel9_2017be
162 Rel8_2016be
1.4 +1.0 −0.7
2.0 +1.8 −1.4
163 prop_binch2018be_multiBins_control_bin5
164 prop_binch2018bb_multiBins_signal_bin3
165 prop_binch2017be_multiBins_control_bin5
166 R5_2018bb
167 R3_2017bb
168 R3_2018bb
169 prop_binch2016bb_multiBins_control_bin4
170 prop_binch2017bb_multiBins_signal_bin3
171 prop_binch2018bb_multiBins_signal_bin4
172 prop_binch2017be_multiBins_signal_bin3
173 prop_binch2016be_multiBins_control_bin6
174 prop_binch2018bb_multiBins_control_bin5
175 R4_2016bb
176 R5_2016be
177 prop_binch2016be_multiBins_signal_bin5
178 prop_binch2017bb_multiBins_control_bin5
179 prop_binch2016bb_multiBins_signal_bin3
180 prop_binch2017be_multiBins_control_bin6
−2 −1 0 1 2
−0.1 −0.05 0 0.05 0.1
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin2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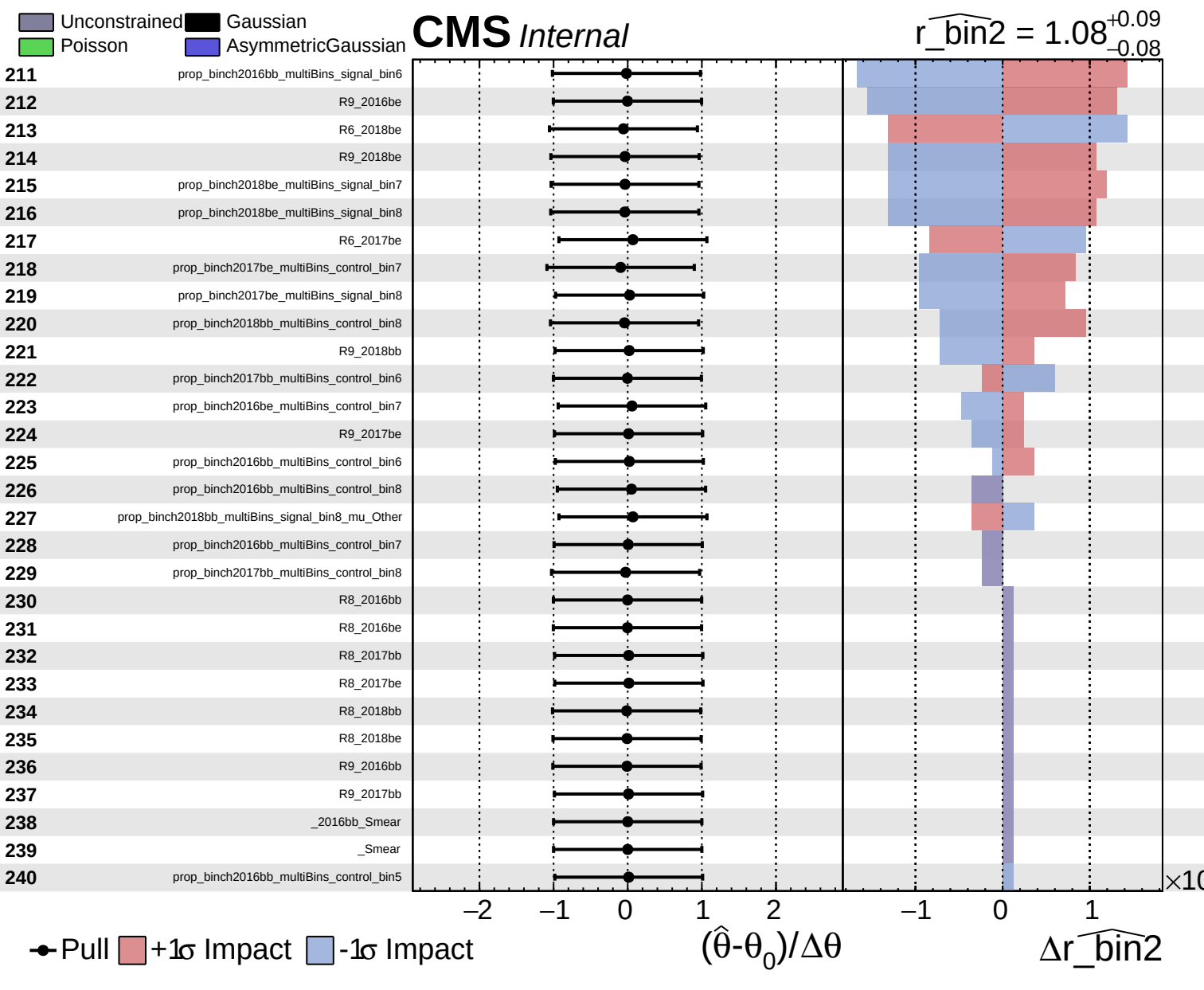
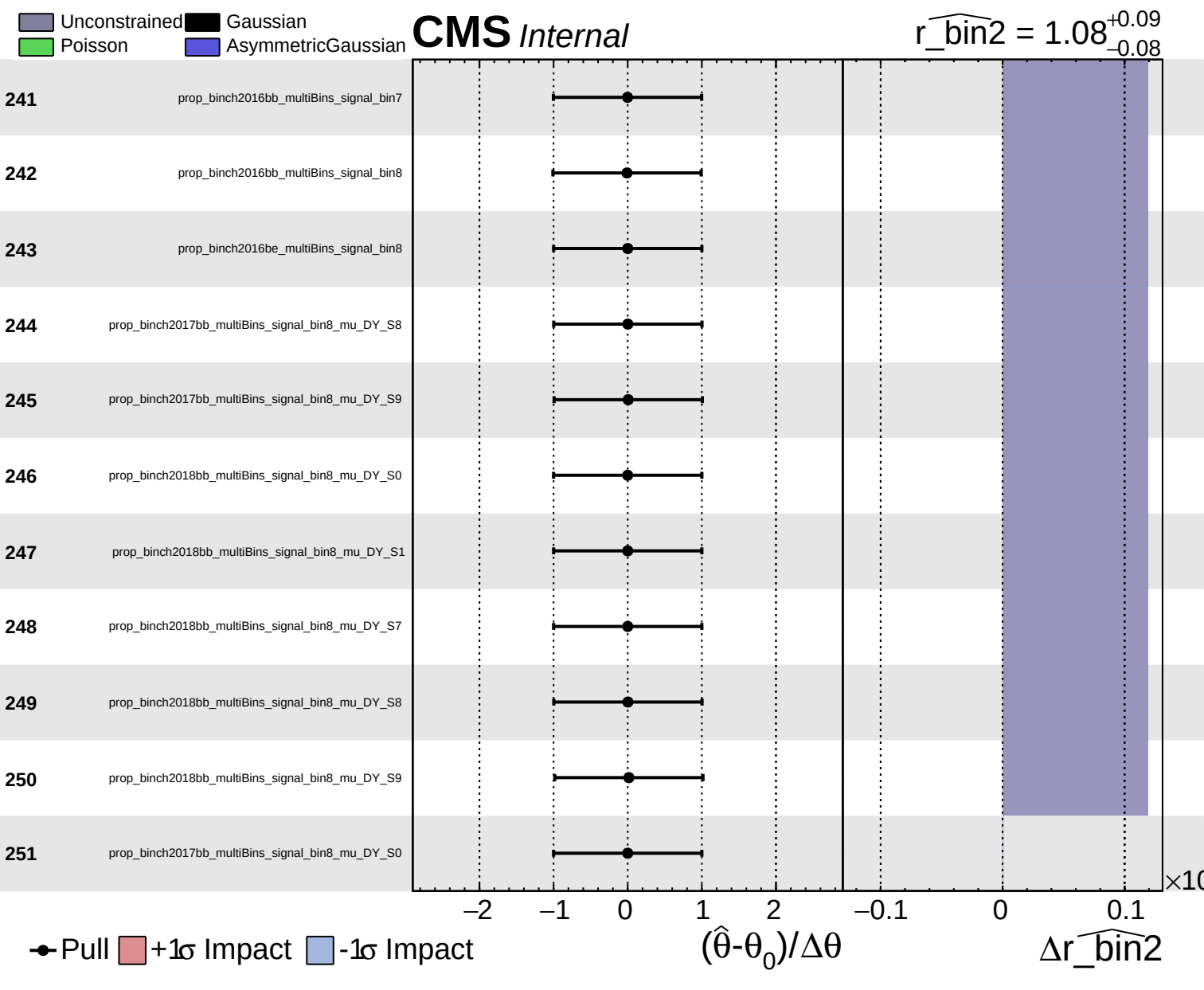
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin2 = 1.08 +0.09 −0.08
181 prop_binch2018bb_multiBins_control_bin6
182 prop_binch2018be_multiBins_control_bin6
183 prop_binch2018be_multiBins_control_bin8
184 R3_2016bb
185 R5_2016bb
186 prop_binch2016be_multiBins_control_bin8
187 prop_binch2016bb_multiBins_signal_bin4
188 prop_binch2017bb_multiBins_signal_bin8_mu_Other
189 prop_binch2016be_multiBins_signal_bin6
190 prop_binch2018bb_multiBins_control_bin7
191 prop_binch2018bb_multiBins_signal_bin6
192 prop_binch2017be_multiBins_control_bin8
193 prop_binch2017bb_multiBins_control_bin7
194 prop_binch2017bb_multiBins_signal_bin7
195 R6_2016be
196 prop_binch2017bb_multiBins_signal_bin6
197 prop_binch2018be_multiBins_signal_bin6
198 prop_binch2018bb_multiBins_signal_bin7
199 R6_2016bb
200 R7_2018be
201 R7_2018bb
202 prop_binch2017be_multiBins_signal_bin7
203 prop_binch2016bb_multiBins_signal_bin5
204 prop_binch2017be_multiBins_signal_bin6
205 R7_2017bb
206 R7_2016bb
207 prop_binch2018be_multiBins_signal_bin5
208 R7_2017be
209 prop_binch2017be_multiBins_signal_bin5
210 R7_2016be
−2
−1
0
1
2
−0.01
0
0.01
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin2


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin2 = 1.08 +0.09 −0.08
211 prop_binch2016bb_multiBins_signal_bin6
212 R9_2016be
213 R6_2018be
214 R9_2018be
215 prop_binch2018be_multiBins_signal_bin7
216 prop_binch2018be_multiBins_signal_bin8
217 R6_2017be
218 prop_binch2017be_multiBins_control_bin7
219 prop_binch2017be_multiBins_signal_bin8
220 prop_binch2018bb_multiBins_control_bin8
221 R9_2018bb
222 prop_binch2017bb_multiBins_control_bin6
223 prop_binch2016be_multiBins_control_bin7
224 R9_2017be
225 prop_binch2016bb_multiBins_control_bin6
226 prop_binch2016bb_multiBins_control_bin8
227 prop_binch2018bb_multiBins_signal_bin8_mu_Other
228 prop_binch2016bb_multiBins_control_bin7
229 prop_binch2017bb_multiBins_control_bin8
230 R8_2016bb
231 R8_2016be
232 R8_2017bb
233 R8_2017be
234 R8_2018bb
235 R8_2018be
236 R9_2016bb
237 R9_2017bb
238 _2016bb_Smear
239 _Smear
240 prop_binch2016bb_multiBins_control_bin5
−2 −1 0 1 2
−1 0 1
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin2


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin2 = 1.08 +0.09 −0.08
241 prop_binch2016bb_multiBins_signal_bin7
242 prop_binch2016bb_multiBins_signal_bin8
243 prop_binch2016be_multiBins_signal_bin8
244 prop_binch2017bb_multiBins_signal_bin8_mu_DY_S8
245 prop_binch2017bb_multiBins_signal_bin8_mu_DY_S9
246 prop_binch2018bb_multiBins_signal_bin8_mu_DY_S0
247 prop_binch2018bb_multiBins_signal_bin8_mu_DY_S1
248 prop_binch2018bb_multiBins_signal_bin8_mu_DY_S7
249 prop_binch2018bb_multiBins_signal_bin8_mu_DY_S8
250 prop_binch2018bb_multiBins_signal_bin8_mu_DY_S9
251 prop_binch2017bb_multiBins_signal_bin8_mu_DY_S0
−2 −1 0 1 2
−0.1 0 0.1
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin2