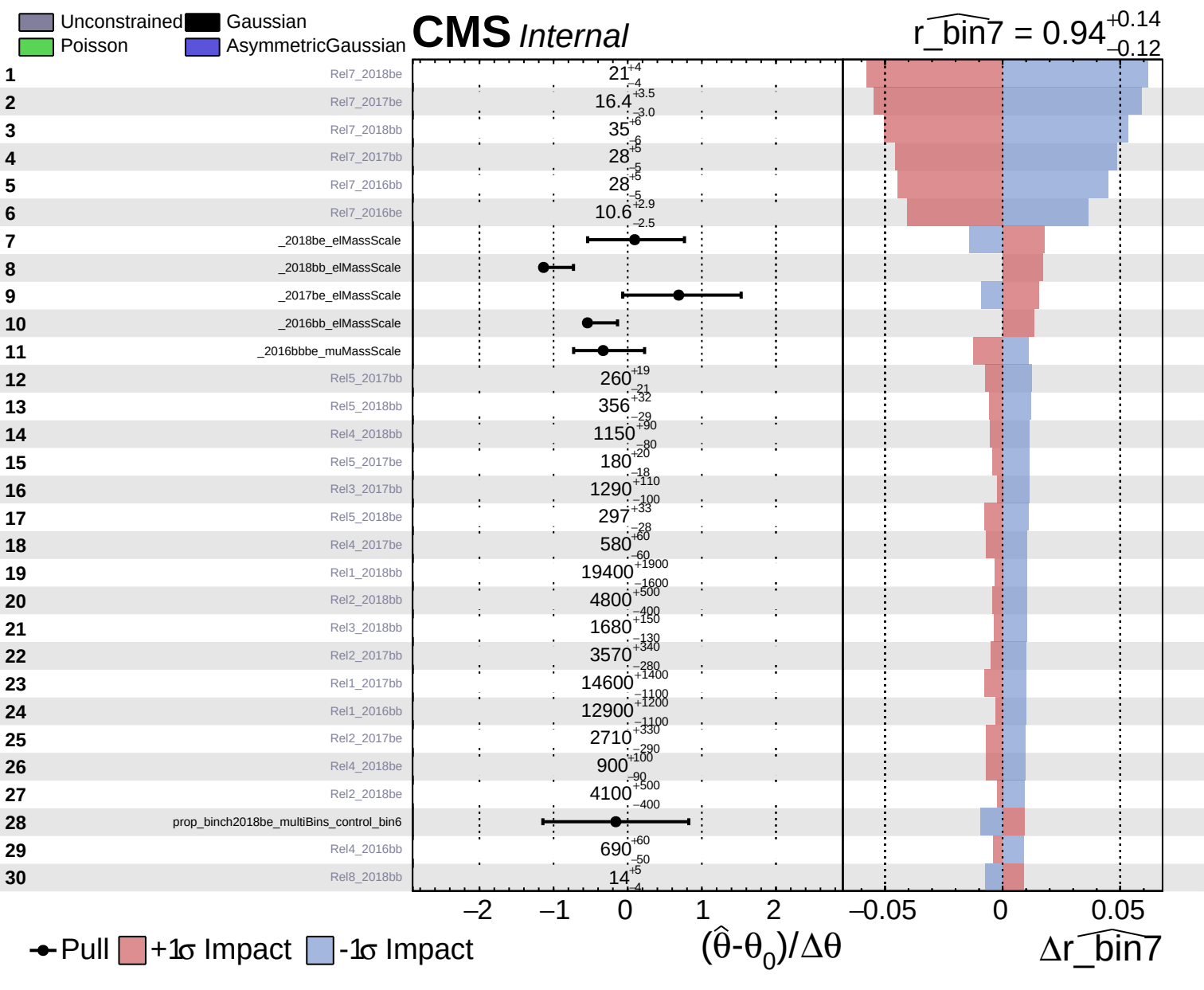
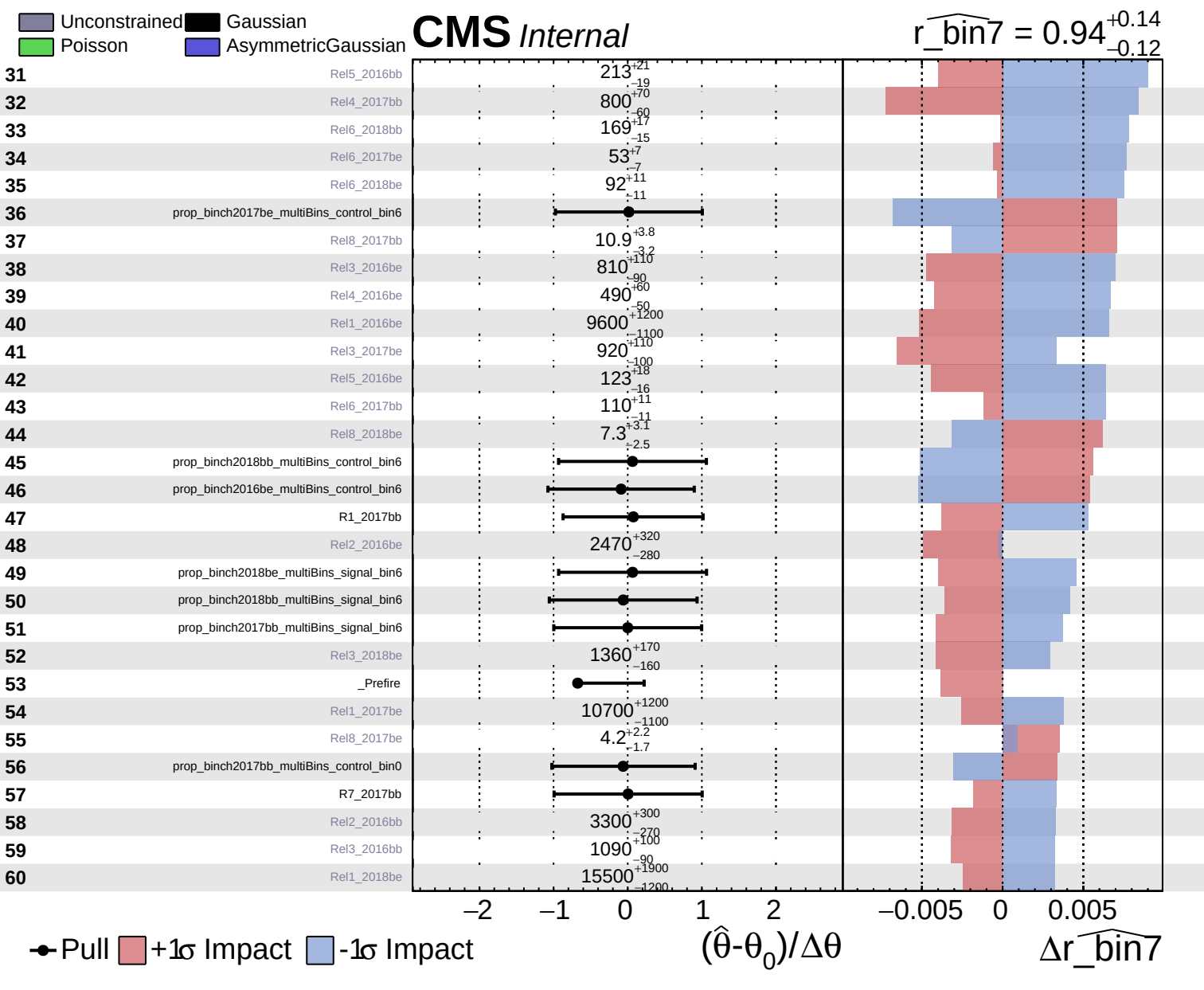
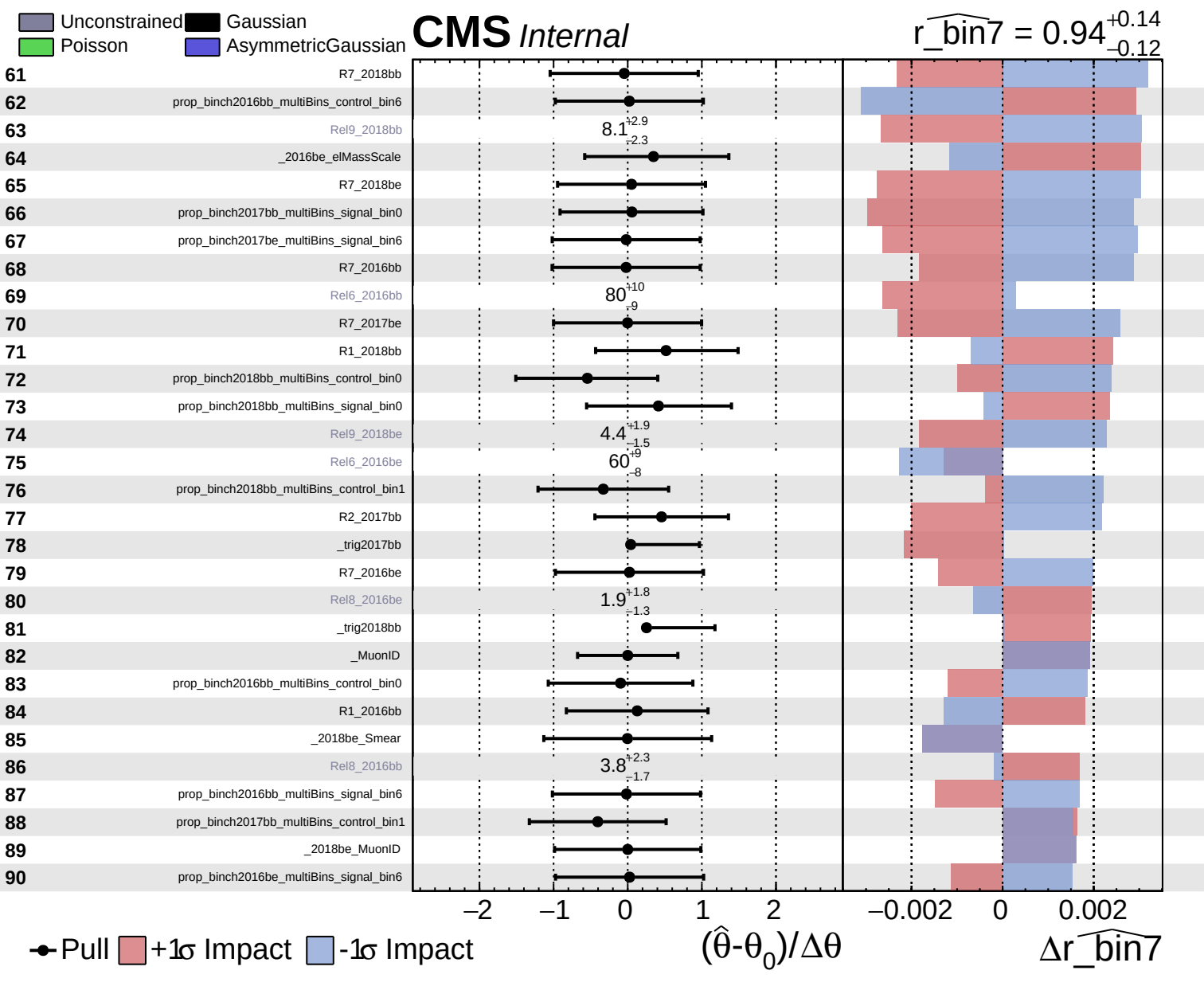
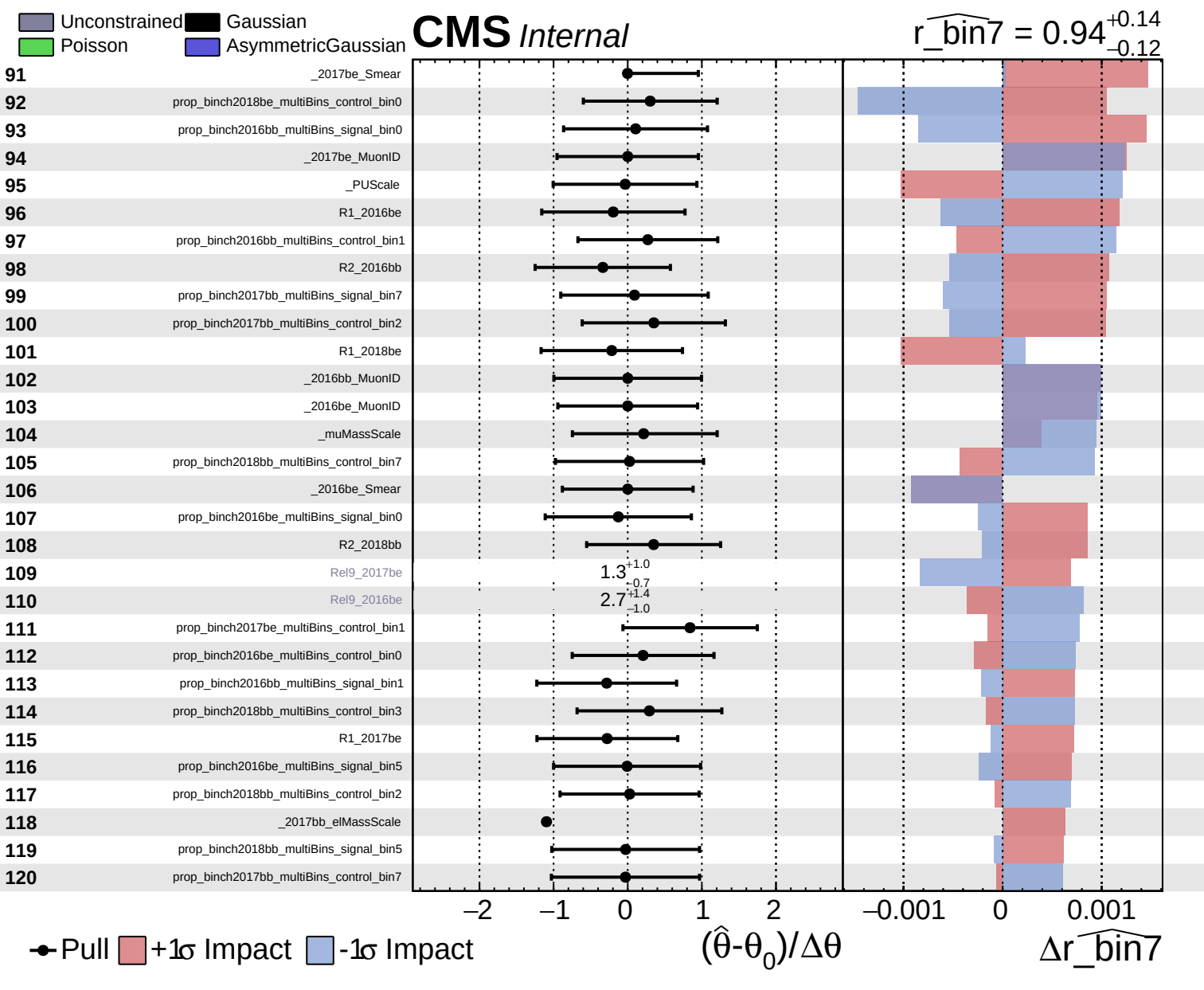
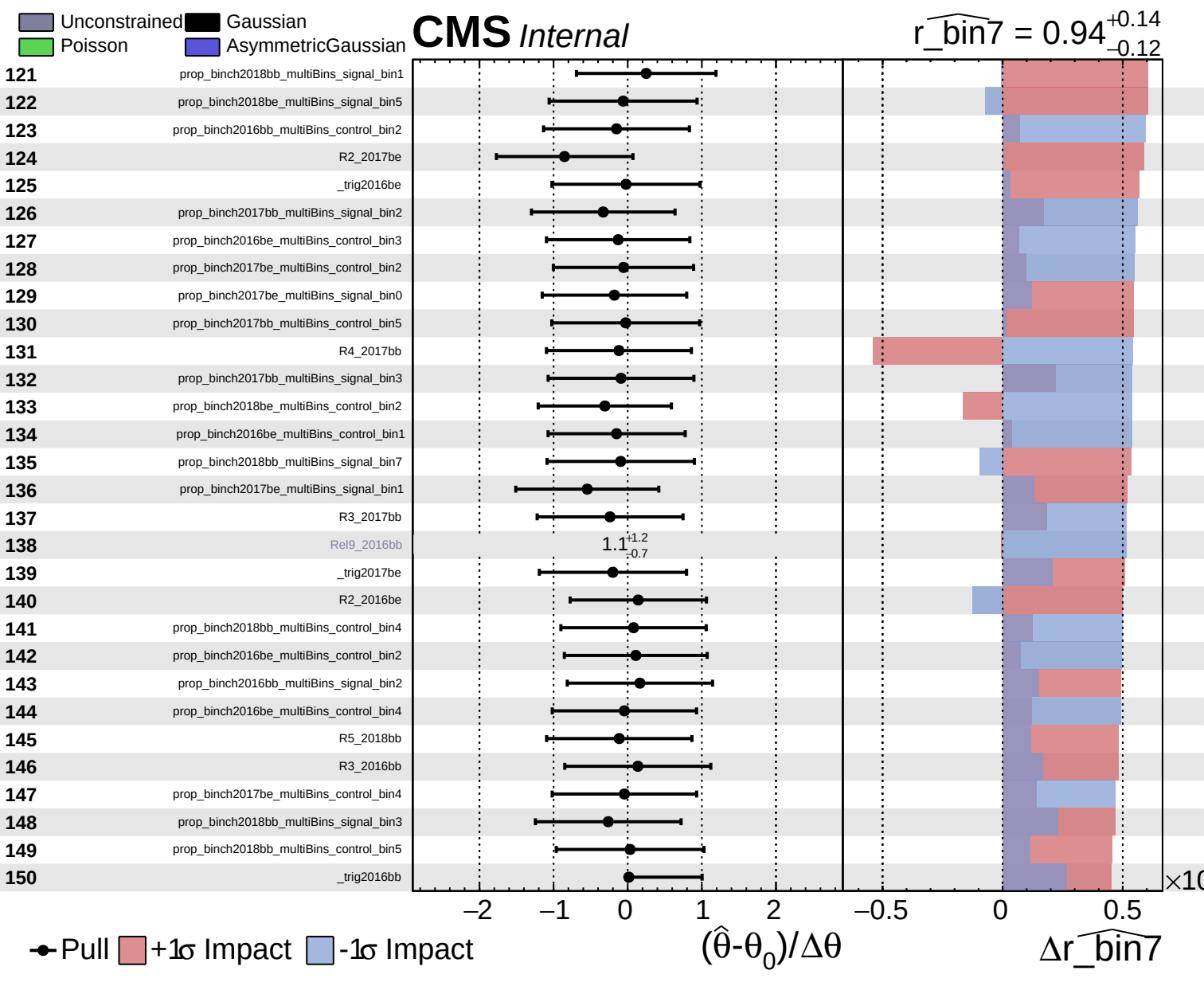
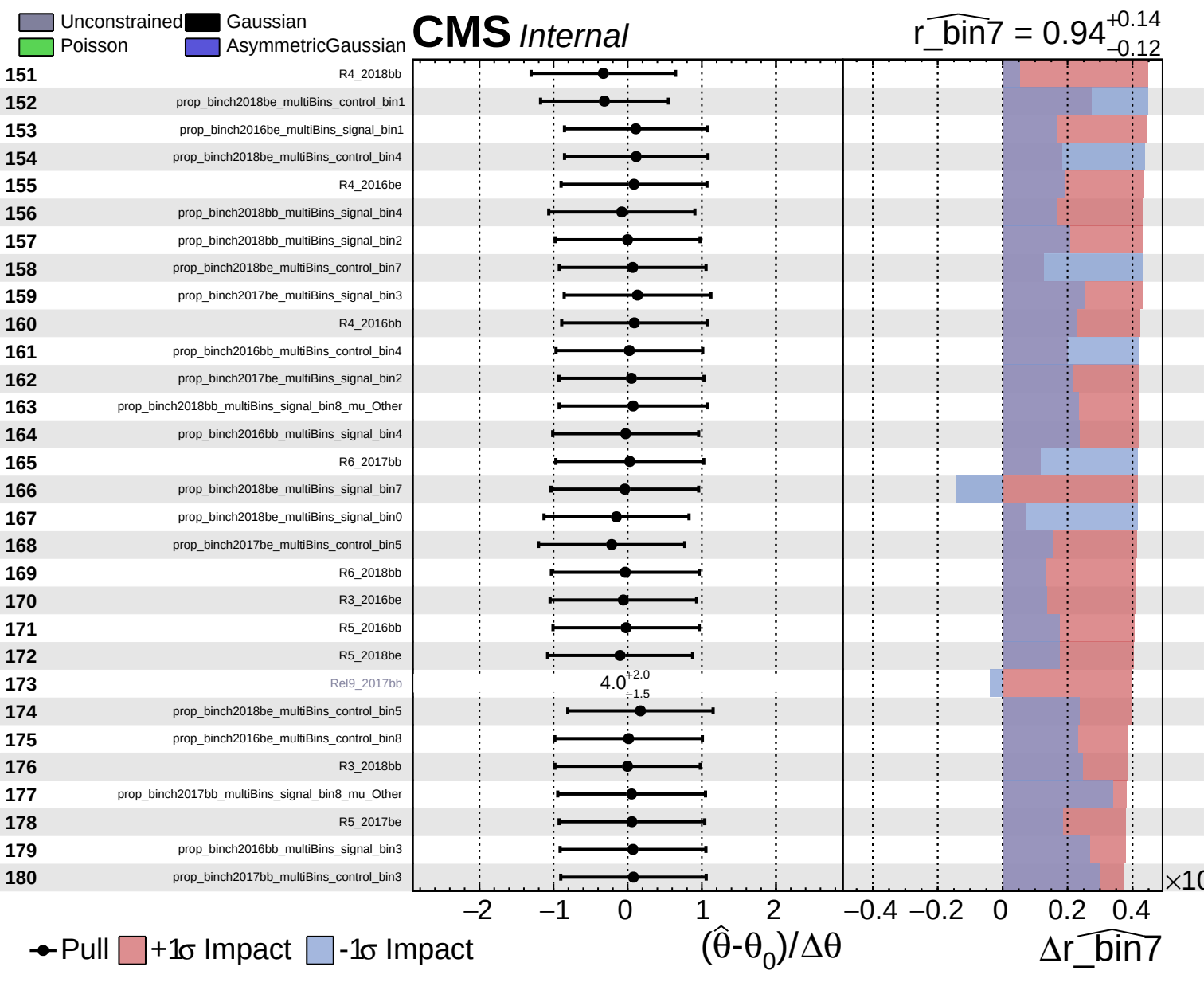

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin7 = 0.94 +0.14 −0.12
1 Rel7_2018be 21 +4 −4
2 Rel7_2017be 16.4 +3.5 −3.0
3 Rel7_2018bb 35 +6 −6
4 Rel7_2017bb 28 +5 −5
5 Rel7_2016bb 28 +5 −5
6 Rel7_2016be 10.6 +2.9 −2.5
7 _2018be_elMassScale
8 _2018bb_elMassScale
9 _2017be_elMassScale
10 _2016bb_elMassScale
11 _2016bbbe_muMassScale
12 Rel5_2017bb 260 +19 −21
13 Rel5_2018bb 356 +32 −29
14 Rel4_2018bb 1150 +90 −80
15 Rel5_2017be 180 +20 −18
16 Rel3_2017bb 1290 +110 −100
17 Rel5_2018be 297 +33 −28
18 Rel4_2017be 580 +60 −60
19 Rel1_2018bb 19400 +1900 −1600
20 Rel2_2018bb 4800 +500 −400
21 Rel3_2018bb 1680 +150 −130
22 Rel2_2017bb 3570 +340 −280
23 Rel1_2017bb 14600 +1400 −1100
24 Rel1_2016bb 12900 +1200 −1100
25 Rel2_2017be 2710 +330 −290
26 Rel4_2018be 900 +100 −90
27 Rel2_2018be 4100 +500 −400
28 prop_binch2018be_multiBins_control_bin6
29 Rel4_2016bb 690 +60 −50
30 Rel8_2018bb 14 +5 −4
−2 −1 0 1 2
−0.05 0 0.05
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin7

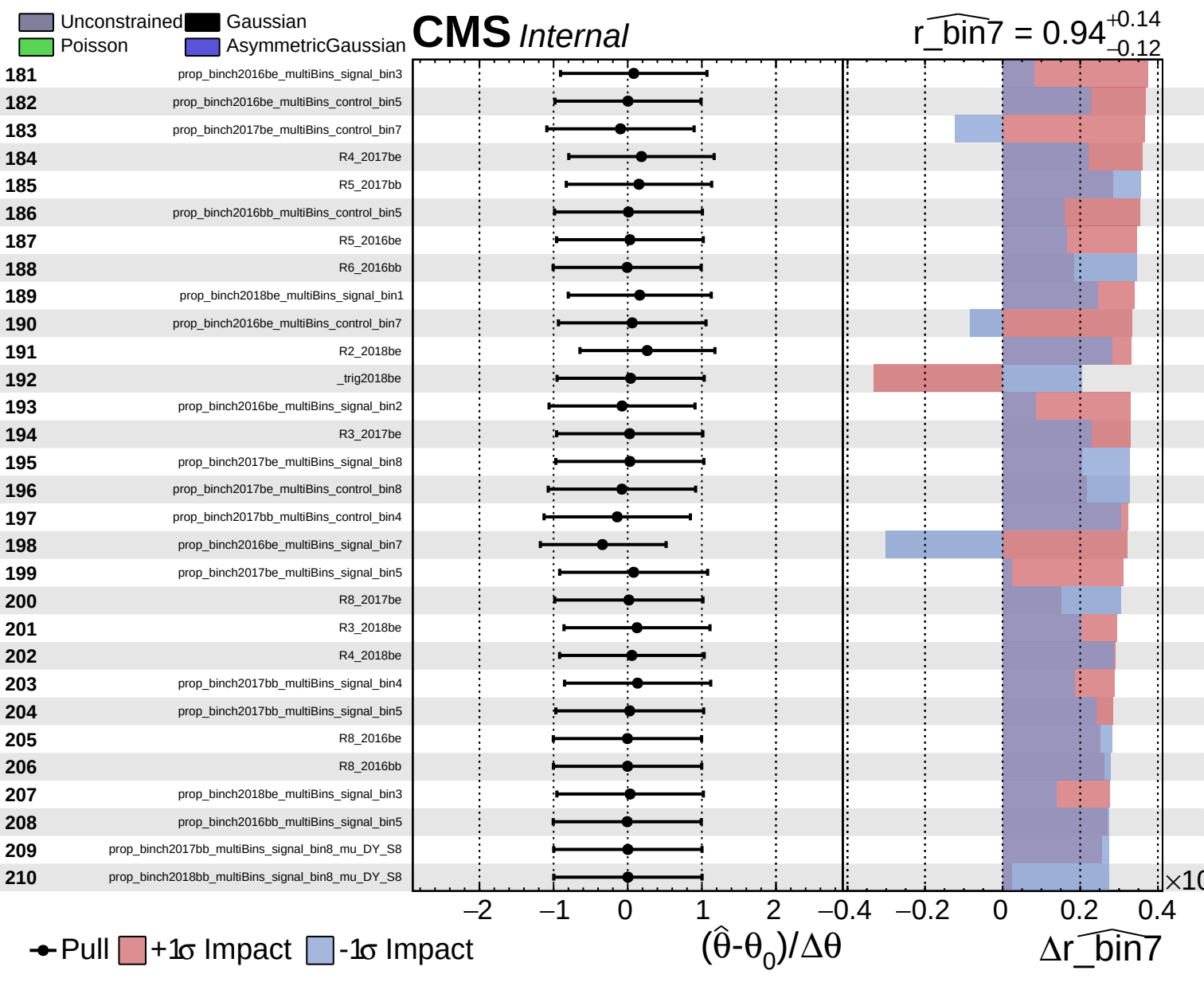

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin7 = 0.94 +0.14 −0.12
31 Rel5_2016bb 213 +21 −19
32 Rel4_2017bb 800 +70 −60
33 Rel6_2018bb 169 +17 −15
34 Rel6_2017be 53 +7 −7
35 Rel6_2018be 92 +11 −11
36 prop_binch2017be_multiBins_control_bin6
37 Rel8_2017bb 10.9 +3.8 −3.2
38 Rel3_2016be 810 +110 −90
39 Rel4_2016be 490 +60 −50
40 Rel1_2016be 9600 +1200 −1100
41 Rel3_2017be 920 +110 −100
42 Rel5_2016be 123 +18 −16
43 Rel6_2017bb 110 +11 −11
44 Rel8_2018be 7.3 +3.1 −2.5
45 prop_binch2018bb_multiBins_control_bin6
46 prop_binch2016be_multiBins_control_bin6
47 R1_2017bb
48 Rel2_2016be 2470 +320 −280
49 prop_binch2018be_multiBins_signal_bin6
50 prop_binch2018bb_multiBins_signal_bin6
51 prop_binch2017bb_multiBins_signal_bin6
52 Rel3_2018be 1360 +170 −160
53 _Prefire
54 Rel1_2017be 10700 +1200 −1100
55 Rel8_2017be 4.2 +2.2 −1.7
56 prop_binch2017bb_multiBins_control_bin0
57 R7_2017bb
58 Rel2_2016bb 3300 +300 −270
59 Rel3_2016bb 1090 +100 −90
60 Rel1_2018be 15500 +1900 −1200
−2 −1 0 1 2
−0.005 0 0.005
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr_bin7

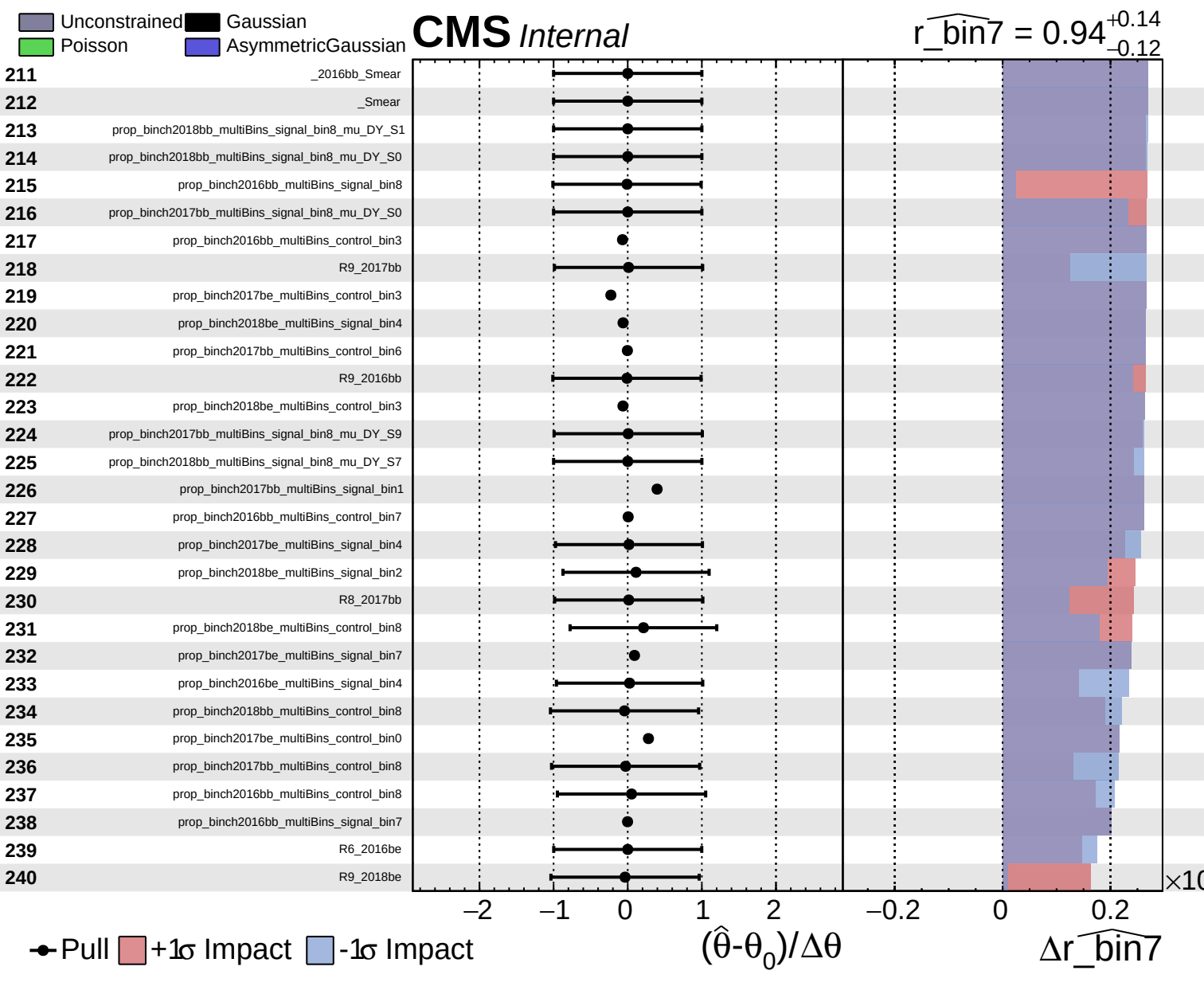

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin7 = 0.94 +0.14 −0.12
61 R7_2018bb
62 prop_binch2016bb_multiBins_control_bin6
63 Rel9_2018bb
64 _2016be_elMassScale
65 R7_2018be
66 prop_binch2017bb_multiBins_signal_bin0
67 prop_binch2017be_multiBins_signal_bin6
68 R7_2016bb
69 Rel6_2016bb
70 R7_2017be
71 R1_2018bb
72 prop_binch2018bb_multiBins_control_bin0
73 prop_binch2018bb_multiBins_signal_bin0
74 Rel9_2018be
75 Rel6_2016be
76 prop_binch2018bb_multiBins_control_bin1
77 R2_2017bb
78 _trig2017bb
79 R7_2016be
80 Rel8_2016be
81 _trig2018bb
82 _MuonID
83 prop_binch2016bb_multiBins_control_bin0
84 R1_2016bb
85 _2018be_Smear
86 Rel8_2016bb
87 prop_binch2016bb_multiBins_signal_bin6
88 prop_binch2017bb_multiBins_control_bin1
89 _2018be_MuonID
90 prop_binch2016be_multiBins_signal_bin6
8.1 +2.9 −2.3
80 +10 −9
4.4 +1.9 −1.5
60 +9 −8
1.9 +1.8 −1.3
3.8 +2.3 −1.7
−2
−1
0
1
2
−0.002
0
0.002
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin7

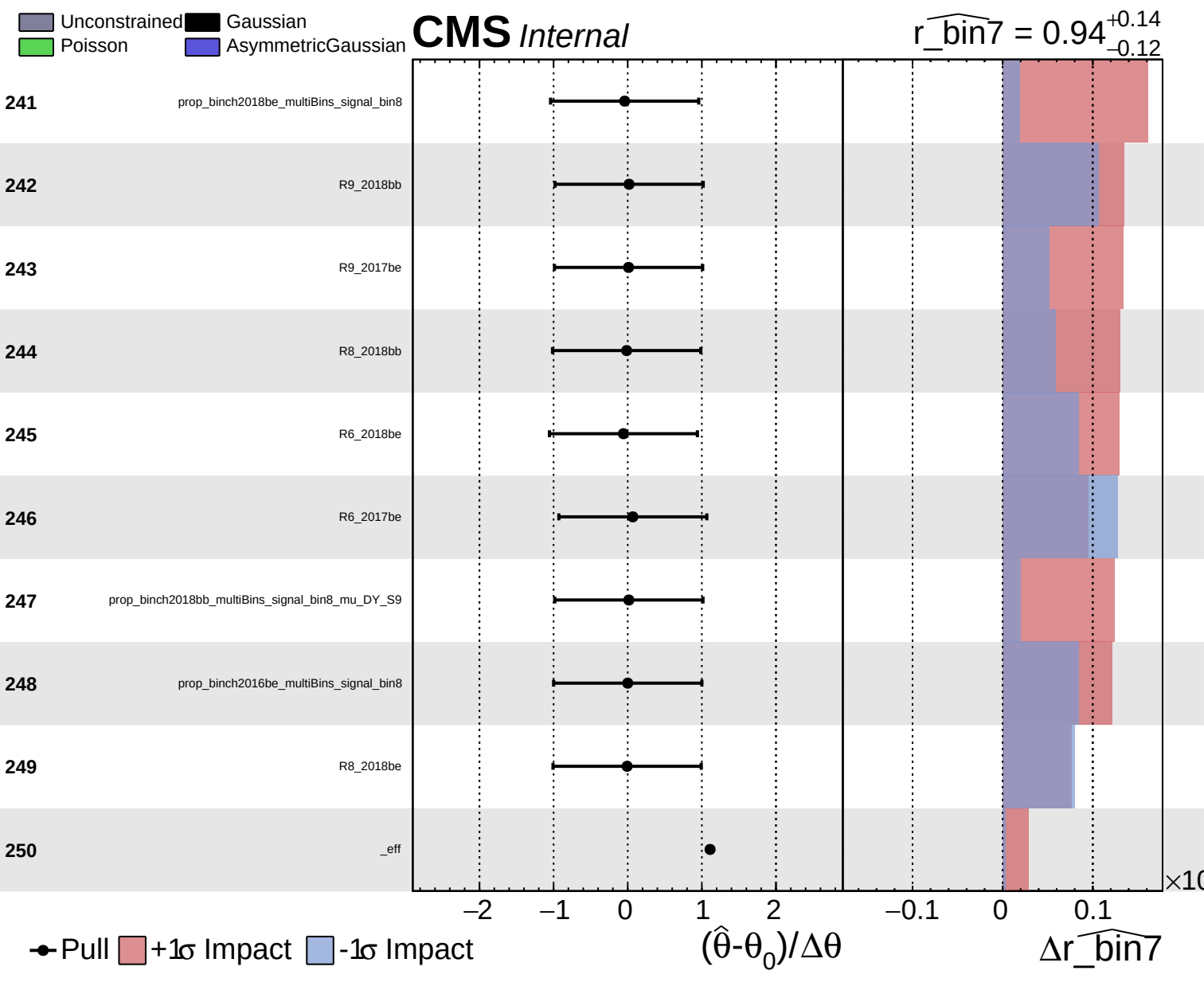

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin7 = 0.94 +0.14 −0.12
91 _2017be_Smear
92 prop_binch2018be_multiBins_control_bin0
93 prop_binch2016bb_multiBins_signal_bin0
94 _2017be_MuonID
95 _PUScale
96 R1_2016be
97 prop_binch2016bb_multiBins_control_bin1
98 R2_2016bb
99 prop_binch2017bb_multiBins_signal_bin7
100 prop_binch2017bb_multiBins_control_bin2
101 R1_2018be
102 _2016bb_MuonID
103 _2016be_MuonID
104 _muMassScale
105 prop_binch2018bb_multiBins_control_bin7
106 _2016be_Smear
107 prop_binch2016be_multiBins_signal_bin0
108 R2_2018bb
109 Rel9_2017be
110 Rel9_2016be
1.3 +1.0 −0.7
2.7 +1.4 −1.0
111 prop_binch2017be_multiBins_control_bin1
112 prop_binch2016be_multiBins_control_bin0
113 prop_binch2016bb_multiBins_signal_bin1
114 prop_binch2018bb_multiBins_control_bin3
115 R1_2017be
116 prop_binch2016be_multiBins_signal_bin5
117 prop_binch2018bb_multiBins_control_bin2
118 _2017bb_elMassScale
119 prop_binch2018bb_multiBins_signal_bin5
120 prop_binch2017bb_multiBins_control_bin7
−2 −1 0 1 2
−0.001 0 0.001
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin7


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin7 = 0.94 +0.14 −0.12
121 prop_binch2018bb_multiBins_signal_bin1
122 prop_binch2018be_multiBins_signal_bin5
123 prop_binch2016bb_multiBins_control_bin2
124 R2_2017be
125 _trig2016be
126 prop_binch2017bb_multiBins_signal_bin2
127 prop_binch2016be_multiBins_control_bin3
128 prop_binch2017be_multiBins_control_bin2
129 prop_binch2017be_multiBins_signal_bin0
130 prop_binch2017bb_multiBins_control_bin5
131 R4_2017bb
132 prop_binch2017bb_multiBins_signal_bin3
133 prop_binch2018be_multiBins_control_bin2
134 prop_binch2016be_multiBins_control_bin1
135 prop_binch2018bb_multiBins_signal_bin7
136 prop_binch2017be_multiBins_signal_bin1
137 R3_2017bb
138 Rel9_2016bb
1.1 +1.2 −0.7
139 _trig2017be
140 R2_2016be
141 prop_binch2018bb_multiBins_control_bin4
142 prop_binch2016be_multiBins_control_bin2
143 prop_binch2016bb_multiBins_signal_bin2
144 prop_binch2016be_multiBins_control_bin4
145 R5_2018bb
146 R3_2016bb
147 prop_binch2017be_multiBins_control_bin4
148 prop_binch2018bb_multiBins_signal_bin3
149 prop_binch2018bb_multiBins_control_bin5
150 _trig2016bb
−2 −1 0 1 2
−0.5 0 0.5
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin7


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin7 = 0.94 +0.14 −0.12
151 R4_2018bb
152 prop_binch2018be_multiBins_control_bin1
153 prop_binch2016be_multiBins_signal_bin1
154 prop_binch2018be_multiBins_control_bin4
155 R4_2016be
156 prop_binch2018bb_multiBins_signal_bin4
157 prop_binch2018bb_multiBins_signal_bin2
158 prop_binch2018be_multiBins_control_bin7
159 prop_binch2017be_multiBins_signal_bin3
160 R4_2016bb
161 prop_binch2016bb_multiBins_control_bin4
162 prop_binch2017be_multiBins_signal_bin2
163 prop_binch2018bb_multiBins_signal_bin8_mu_Other
164 prop_binch2016bb_multiBins_signal_bin4
165 R6_2017bb
166 prop_binch2018be_multiBins_signal_bin7
167 prop_binch2018be_multiBins_signal_bin0
168 prop_binch2017be_multiBins_control_bin5
169 R6_2018bb
170 R3_2016be
171 R5_2016bb
172 R5_2018be
173 Rel9_2017bb
4.0 +2.0 −1.5
174 prop_binch2018be_multiBins_control_bin5
175 prop_binch2016be_multiBins_control_bin8
176 R3_2018bb
177 prop_binch2017bb_multiBins_signal_bin8_mu_Other
178 R5_2017be
179 prop_binch2016bb_multiBins_signal_bin3
180 prop_binch2017bb_multiBins_control_bin3
−2 −1 0 1 2
−0.4 −0.2 0 0.2 0.4
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin7


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin7 = 0.94 +0.14 −0.12
181 prop_binch2016be_multiBins_signal_bin3
182 prop_binch2016be_multiBins_control_bin5
183 prop_binch2017be_multiBins_control_bin7
184 R4_2017be
185 R5_2017bb
186 prop_binch2016bb_multiBins_control_bin5
187 R5_2016be
188 R6_2016bb
189 prop_binch2018be_multiBins_signal_bin1
190 prop_binch2016be_multiBins_control_bin7
191 R2_2018be
192 _trig2018be
193 prop_binch2016be_multiBins_signal_bin2
194 R3_2017be
195 prop_binch2017be_multiBins_signal_bin8
196 prop_binch2017be_multiBins_control_bin8
197 prop_binch2017bb_multiBins_control_bin4
198 prop_binch2016be_multiBins_signal_bin7
199 prop_binch2017be_multiBins_signal_bin5
200 R8_2017be
201 R3_2018be
202 R4_2018be
203 prop_binch2017bb_multiBins_signal_bin4
204 prop_binch2017bb_multiBins_signal_bin5
205 R8_2016be
206 R8_2016bb
207 prop_binch2018be_multiBins_signal_bin3
208 prop_binch2016bb_multiBins_signal_bin5
209 prop_binch2017bb_multiBins_signal_bin8_mu_DY_S8
210 prop_binch2018bb_multiBins_signal_bin8_mu_DY_S8
−2 −1 0 1 2
−0.4 −0.2 0 0.2 0.4
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin7


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin7 = 0.94 +0.14 −0.12
211 _2016bb_Smear
212 _Smear
213 prop_binch2018bb_multiBins_signal_bin8_mu_DY_S1
214 prop_binch2018bb_multiBins_signal_bin8_mu_DY_S0
215 prop_binch2016bb_multiBins_signal_bin8
216 prop_binch2017bb_multiBins_signal_bin8_mu_DY_S0
217 prop_binch2016bb_multiBins_control_bin3
218 R9_2017bb
219 prop_binch2017be_multiBins_control_bin3
220 prop_binch2018be_multiBins_signal_bin4
221 prop_binch2017bb_multiBins_control_bin6
222 R9_2016bb
223 prop_binch2018be_multiBins_control_bin3
224 prop_binch2017bb_multiBins_signal_bin8_mu_DY_S9
225 prop_binch2018bb_multiBins_signal_bin8_mu_DY_S7
226 prop_binch2017bb_multiBins_signal_bin1
227 prop_binch2016bb_multiBins_control_bin7
228 prop_binch2017be_multiBins_signal_bin4
229 prop_binch2018be_multiBins_signal_bin2
230 R8_2017bb
231 prop_binch2018be_multiBins_control_bin8
232 prop_binch2017be_multiBins_signal_bin7
233 prop_binch2016be_multiBins_signal_bin4
234 prop_binch2018bb_multiBins_control_bin8
235 prop_binch2017be_multiBins_control_bin0
236 prop_binch2017bb_multiBins_control_bin8
237 prop_binch2016bb_multiBins_control_bin8
238 prop_binch2016bb_multiBins_signal_bin7
239 R6_2016be
240 R9_2018be
×10
−2 −1 0 1 2
−0.2 0 0.2
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin7


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin7 = 0.94 +0.14 −0.12
241
prop_binch2018be_multiBins_signal_bin8
242
R9_2018bb
243
R9_2017be
244
R8_2018bb
245
R6_2018be
246
R6_2017be
247
prop_binch2018bb_multiBins_signal_bin8_mu_DY_S9
248
prop_binch2016be_multiBins_signal_bin8
249
R8_2018be
250
_eff
−2
−1
0
1
2
−0.1
0
0.1
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin7