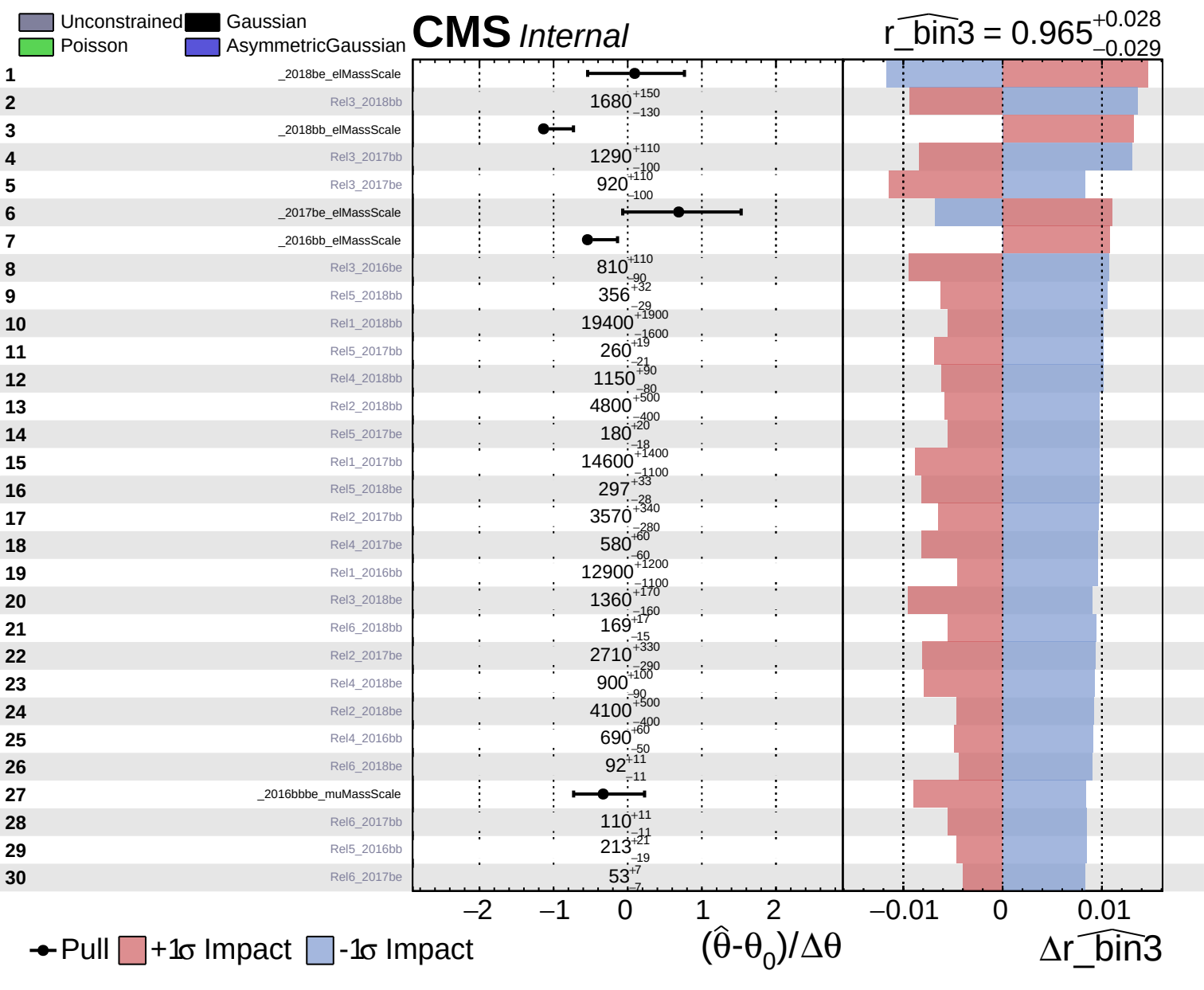
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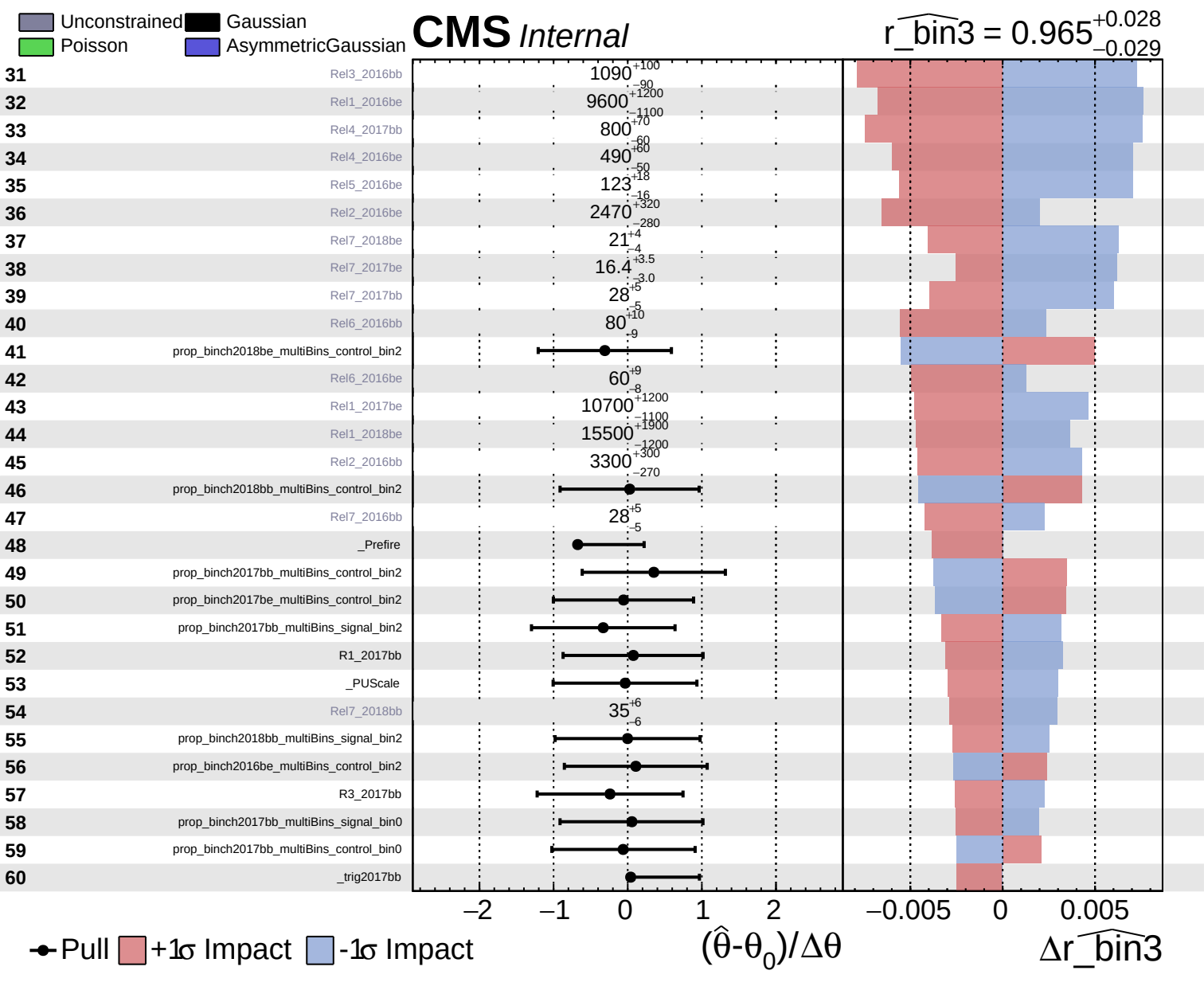
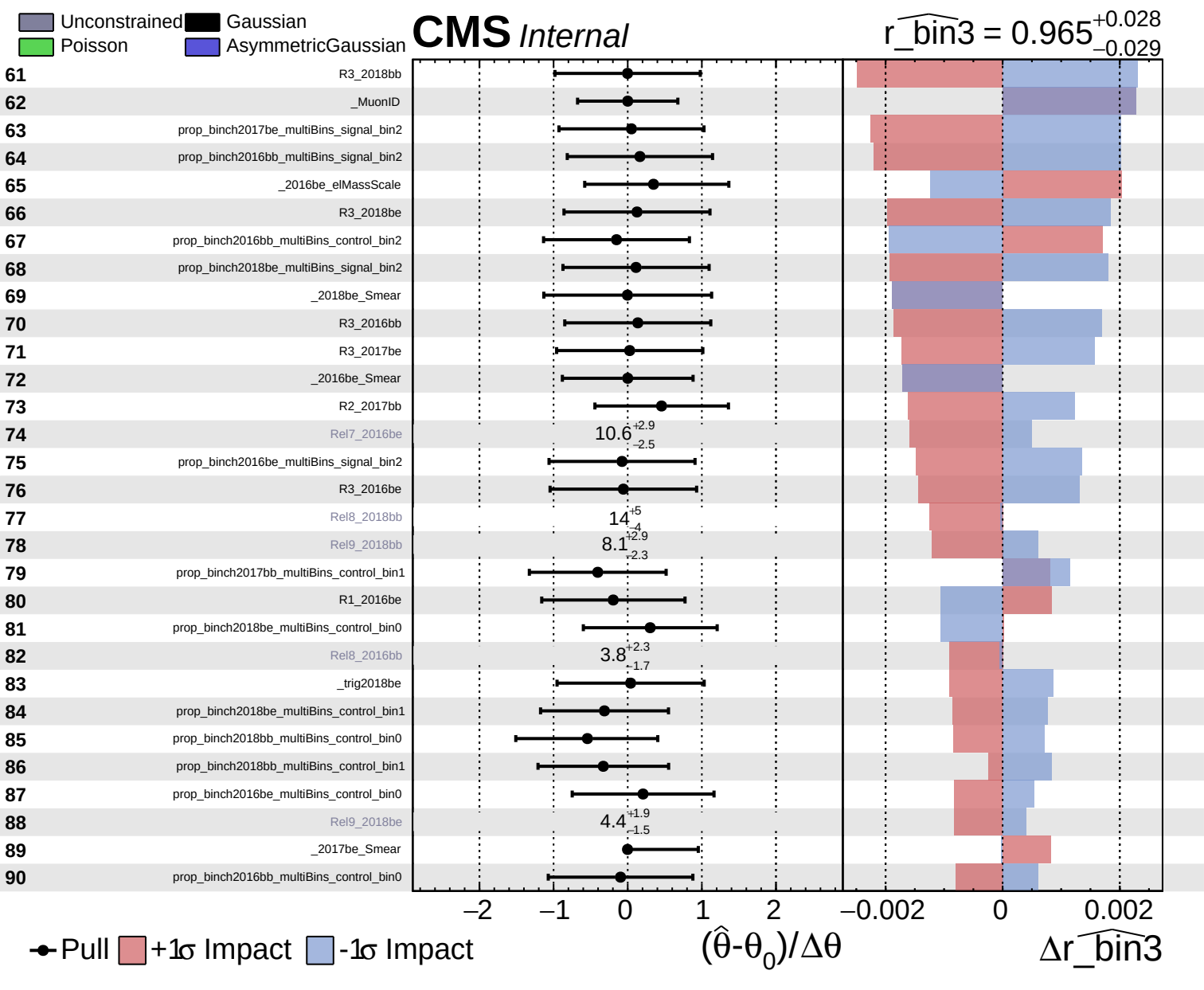
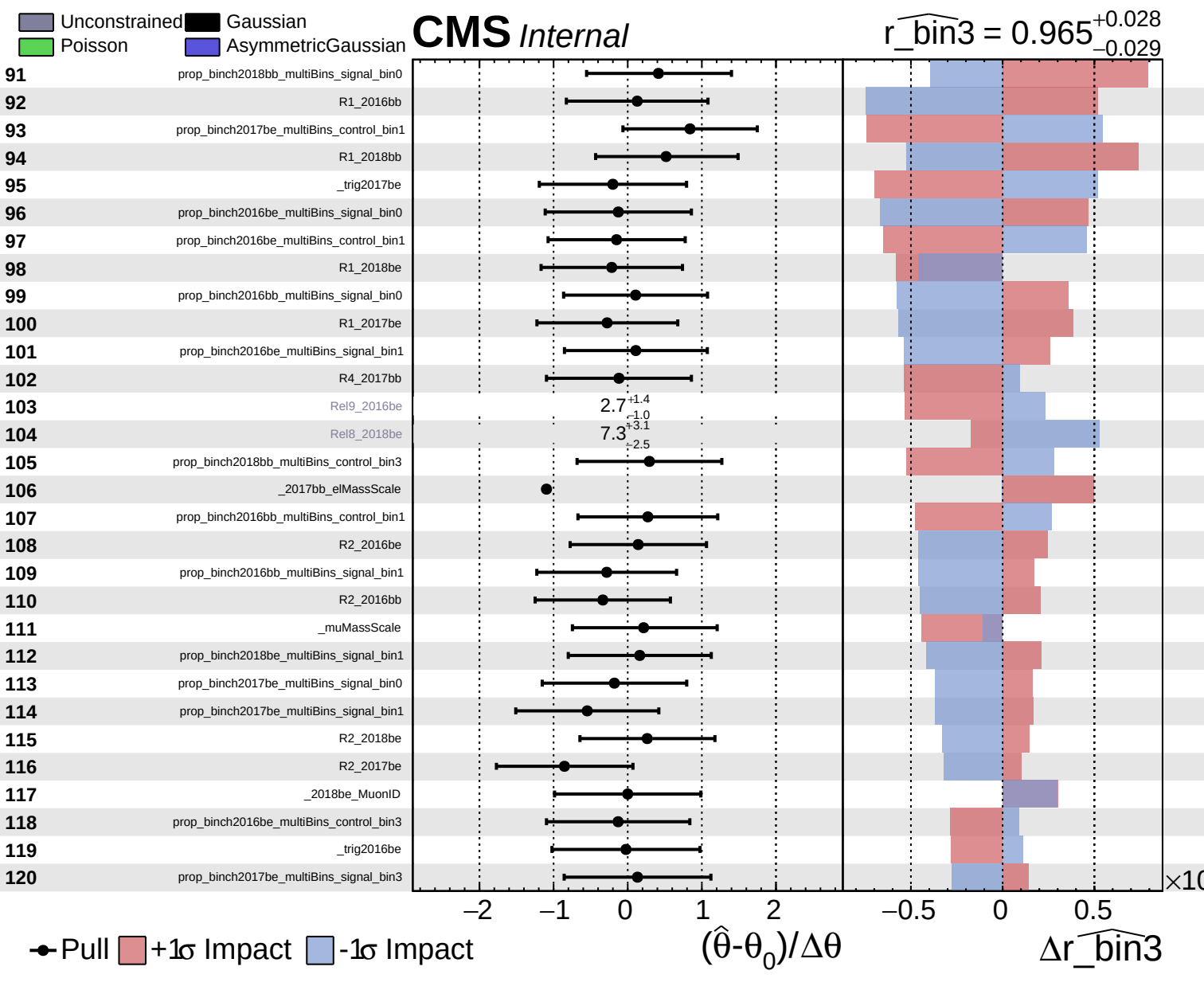
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin3 = 0.965 +0.028 −0.029
1 _2018be_elMassScale
2 Rel3_2018bb 1680 +150 −130
3 _2018bb_elMassScale
4 Rel3_2017bb 1290 +110 −100
5 Rel3_2017be 920 +110 −100
6 _2017be_elMassScale
7 _2016bb_elMassScale
8 Rel3_2016be 810 +110 −90
9 Rel5_2018bb 356 +32 −29
10 Rel1_2018bb 19400 +1900 −1600
11 Rel5_2017bb 260 +19 −21
12 Rel4_2018bb 1150 +90 −80
13 Rel2_2018bb 4800 +500 −400
14 Rel5_2017be 180 +20 −18
15 Rel1_2017bb 14600 +1400 −1100
16 Rel5_2018be 297 +33 −28
17 Rel2_2017bb 3570 +340 −280
18 Rel4_2017be 580 +60 −60
19 Rel1_2016bb 12900 +1200 −1100
20 Rel3_2018be 1360 +170 −160
21 Rel6_2018bb 169 +17 −15
22 Rel2_2017be 2710 +330 −290
23 Rel4_2018be 900 +100 −90
24 Rel2_2018be 4100 +500 −400
25 Rel4_2016bb 690 +60 −50
26 Rel6_2018be 92 +11 −11
27 _2016bbbe_muMassScale
28 Rel6_2017bb 110 +11 −11
29 Rel5_2016bb 213 +21 −19
30 Rel6_2017be 53 +7 −7
−2 −1 0 1 2
−0.01 0 0.01
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin3


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin3 = 0.965 +0.028 −0.029
31 Rel3_2016bb 1090 +100 −90
32 Rel1_2016be 9600 +1200 −1100
33 Rel4_2017bb 800 +70 −60
34 Rel4_2016be 490 +60 −50
35 Rel5_2016be 123 +18 −16
36 Rel2_2016be 2470 +320 −280
37 Rel7_2018be 21 +4 −4
38 Rel7_2017be 16.4 +3.5 −3.0
39 Rel7_2017bb 28 +5 −5
40 Rel6_2016bb 80 +10 −9
41 prop_binch2018be_multiBins_control_bin2
42 Rel6_2016be 60 +9 −8
43 Rel1_2017be 10700 +1200 −1100
44 Rel1_2018be 15500 +1900 −1200
45 Rel2_2016bb 3300 +300 −270
46 prop_binch2018bb_multiBins_control_bin2
47 Rel7_2016bb 28 +5 −5
48 _Prefire
49 prop_binch2017bb_multiBins_control_bin2
50 prop_binch2017be_multiBins_control_bin2
51 prop_binch2017bb_multiBins_signal_bin2
52 R1_2017bb
53 _PUScale
54 Rel7_2018bb 35 +6 −6
55 prop_binch2018bb_multiBins_signal_bin2
56 prop_binch2016be_multiBins_control_bin2
57 R3_2017bb
58 prop_binch2017bb_multiBins_signal_bin0
59 prop_binch2017bb_multiBins_control_bin0
60 _trig2017bb
−2 −1 0 1 2
−0.005 0 0.005
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr_bin3


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin3 = 0.965 +0.028 −0.029
61 R3_2018bb
62 _MuonID
63 prop_binch2017be_multiBins_signal_bin2
64 prop_binch2016bb_multiBins_signal_bin2
65 _2016be_elMassScale
66 R3_2018be
67 prop_binch2016bb_multiBins_control_bin2
68 prop_binch2018be_multiBins_signal_bin2
69 _2018be_Smear
70 R3_2016bb
71 R3_2017be
72 _2016be_Smear
73 R2_2017bb
74 Rel7_2016be
10.6 +2.9 −2.5
75 prop_binch2016be_multiBins_signal_bin2
76 R3_2016be
77 Rel8_2018bb
14 +5 −4
78 Rel9_2018bb
8.1 +2.9 −2.3
79 prop_binch2017bb_multiBins_control_bin1
80 R1_2016be
81 prop_binch2018be_multiBins_control_bin0
82 Rel8_2016bb
3.8 +2.3 −1.7
83 _trig2018be
84 prop_binch2018be_multiBins_control_bin1
85 prop_binch2018bb_multiBins_control_bin0
86 prop_binch2018bb_multiBins_control_bin1
87 prop_binch2016be_multiBins_control_bin0
88 Rel9_2018be
4.4 +1.9 −1.5
89 _2017be_Smear
90 prop_binch2016bb_multiBins_control_bin0
−2 −1 0 1 2
−0.002 0 0.002
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin3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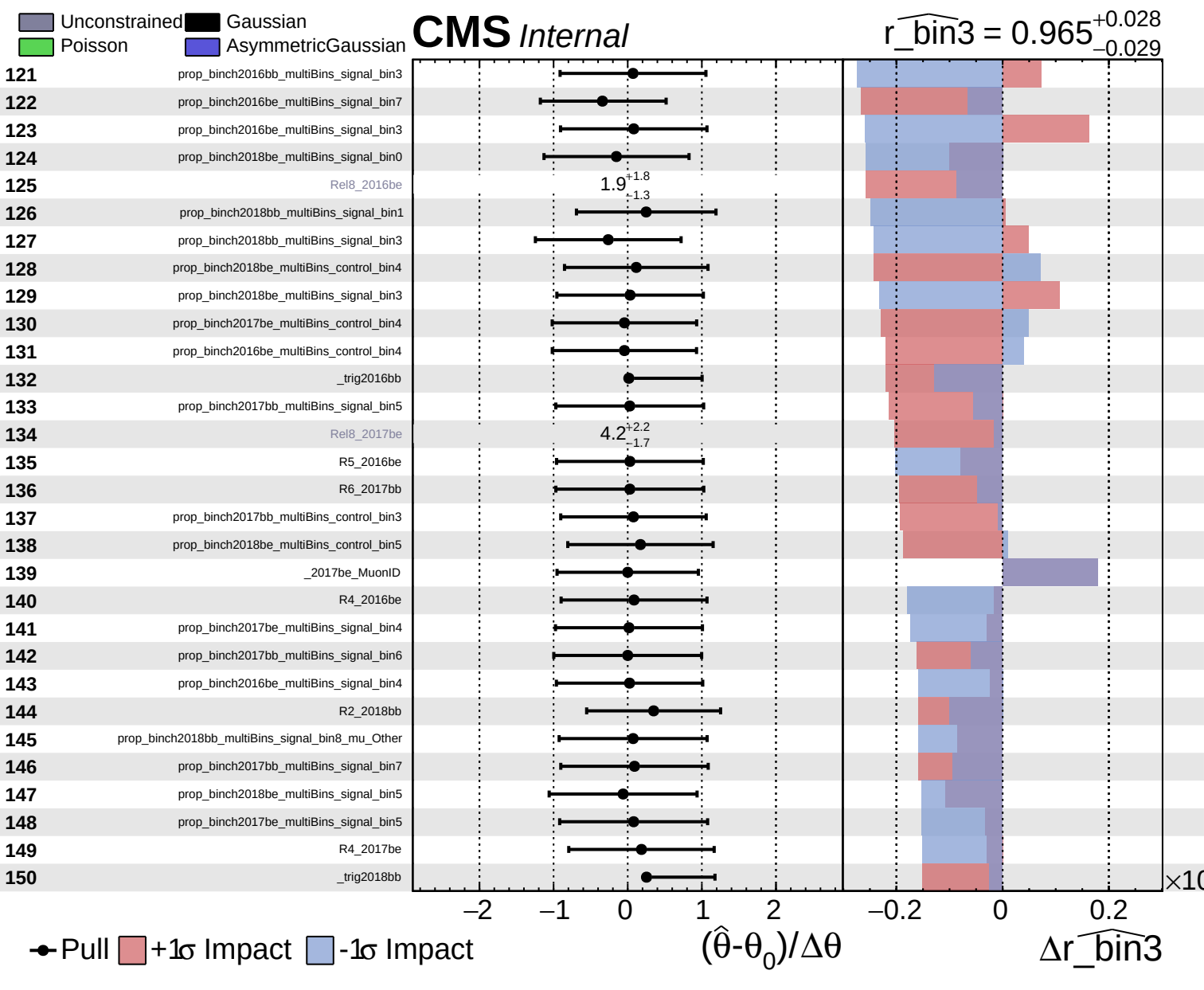
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin3 = 0.965 +0.028 −0.029
91 prop_binch2018bb_multiBins_signal_bin0
92 R1_2016bb
93 prop_binch2017be_multiBins_control_bin1
94 R1_2018bb
95 _trig2017be
96 prop_binch2016be_multiBins_signal_bin0
97 prop_binch2016be_multiBins_control_bin1
98 R1_2018be
99 prop_binch2016bb_multiBins_signal_bin0
100 R1_2017be
101 prop_binch2016be_multiBins_signal_bin1
102 R4_2017bb
103 Rel9_2016be
104 Rel8_2018be
2.7 +1.4 −1.0
7.3 +3.1 −2.5
105 prop_binch2018bb_multiBins_control_bin3
106 _2017bb_elMassScale
107 prop_binch2016bb_multiBins_control_bin1
108 R2_2016be
109 prop_binch2016bb_multiBins_signal_bin1
110 R2_2016bb
111 _muMassScale
112 prop_binch2018be_multiBins_signal_bin1
113 prop_binch2017be_multiBins_signal_bin0
114 prop_binch2017be_multiBins_signal_bin1
115 R2_2018be
116 R2_2017be
117 _2018be_MuonID
118 prop_binch2016be_multiBins_control_bin3
119 _trig2016be
120 prop_binch2017be_multiBins_signal_bin3
−2 −1 0 1 2
−0.5 0 0.5
×10
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr_bin3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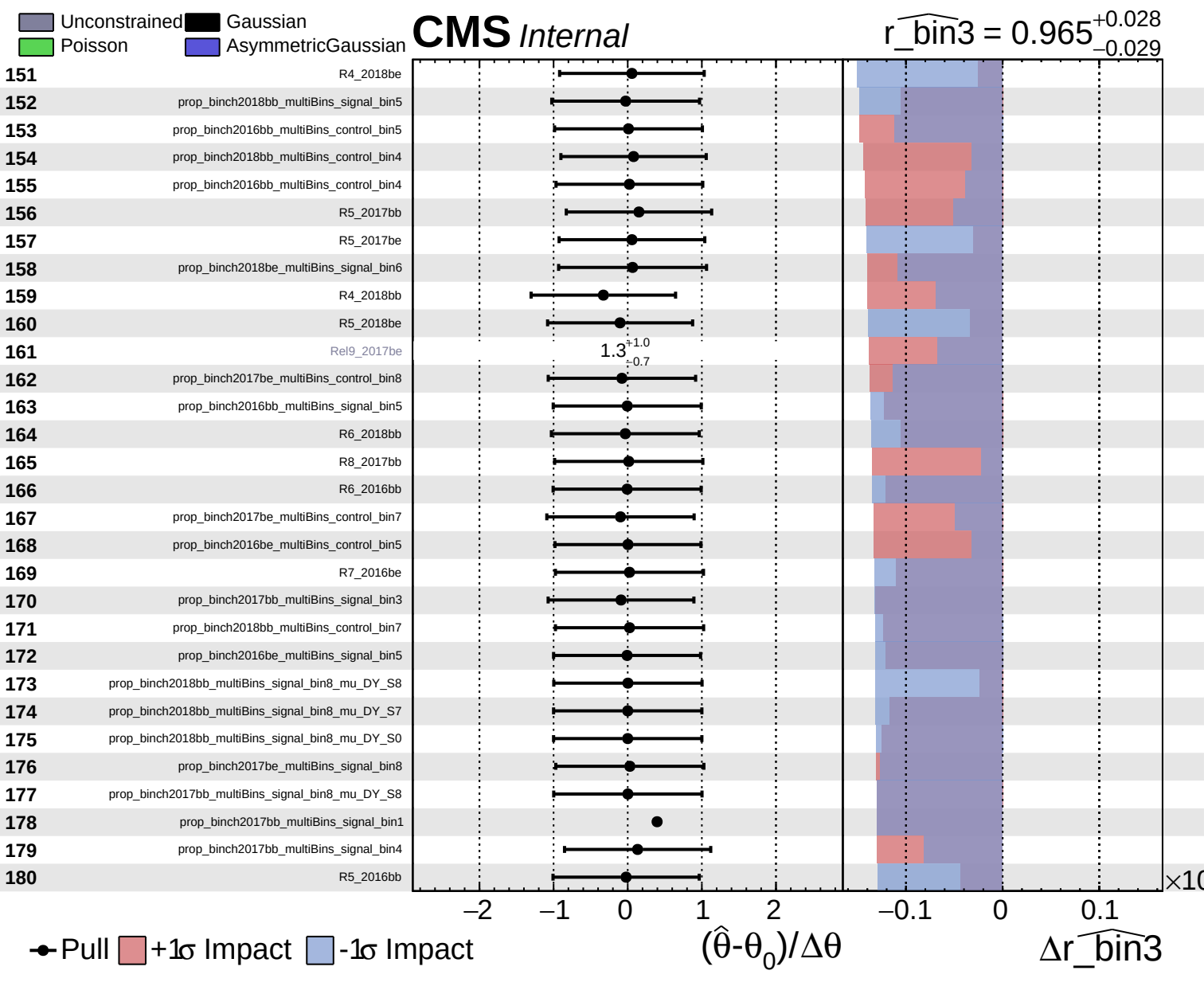
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin3 = 0.965 +0.028 −0.029
121 prop_binch2016bb_multiBins_signal_bin3
122 prop_binch2016be_multiBins_signal_bin7
123 prop_binch2016be_multiBins_signal_bin3
124 prop_binch2018be_multiBins_signal_bin0
125 Rel8_2016be
1.9 +1.8 −1.3
126 prop_binch2018bb_multiBins_signal_bin1
127 prop_binch2018bb_multiBins_signal_bin3
128 prop_binch2018be_multiBins_control_bin4
129 prop_binch2018be_multiBins_signal_bin3
130 prop_binch2017be_multiBins_control_bin4
131 prop_binch2016be_multiBins_control_bin4
132 _trig2016bb
133 prop_binch2017bb_multiBins_signal_bin5
134 Rel8_2017be
4.2 +2.2 −1.7
135 R5_2016be
136 R6_2017bb
137 prop_binch2017bb_multiBins_control_bin3
138 prop_binch2018be_multiBins_control_bin5
139 _2017be_MuonID
140 R4_2016be
141 prop_binch2017be_multiBins_signal_bin4
142 prop_binch2017bb_multiBins_signal_bin6
143 prop_binch2016be_multiBins_signal_bin4
144 R2_2018bb
145 prop_binch2018bb_multiBins_signal_bin8_mu_Other
146 prop_binch2017bb_multiBins_signal_bin7
147 prop_binch2018be_multiBins_signal_bin5
148 prop_binch2017be_multiBins_signal_bin5
149 R4_2017be
150 _trig2018bb
−2 −1 0 1 2
−0.2 0 0.2
×10
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr_bin3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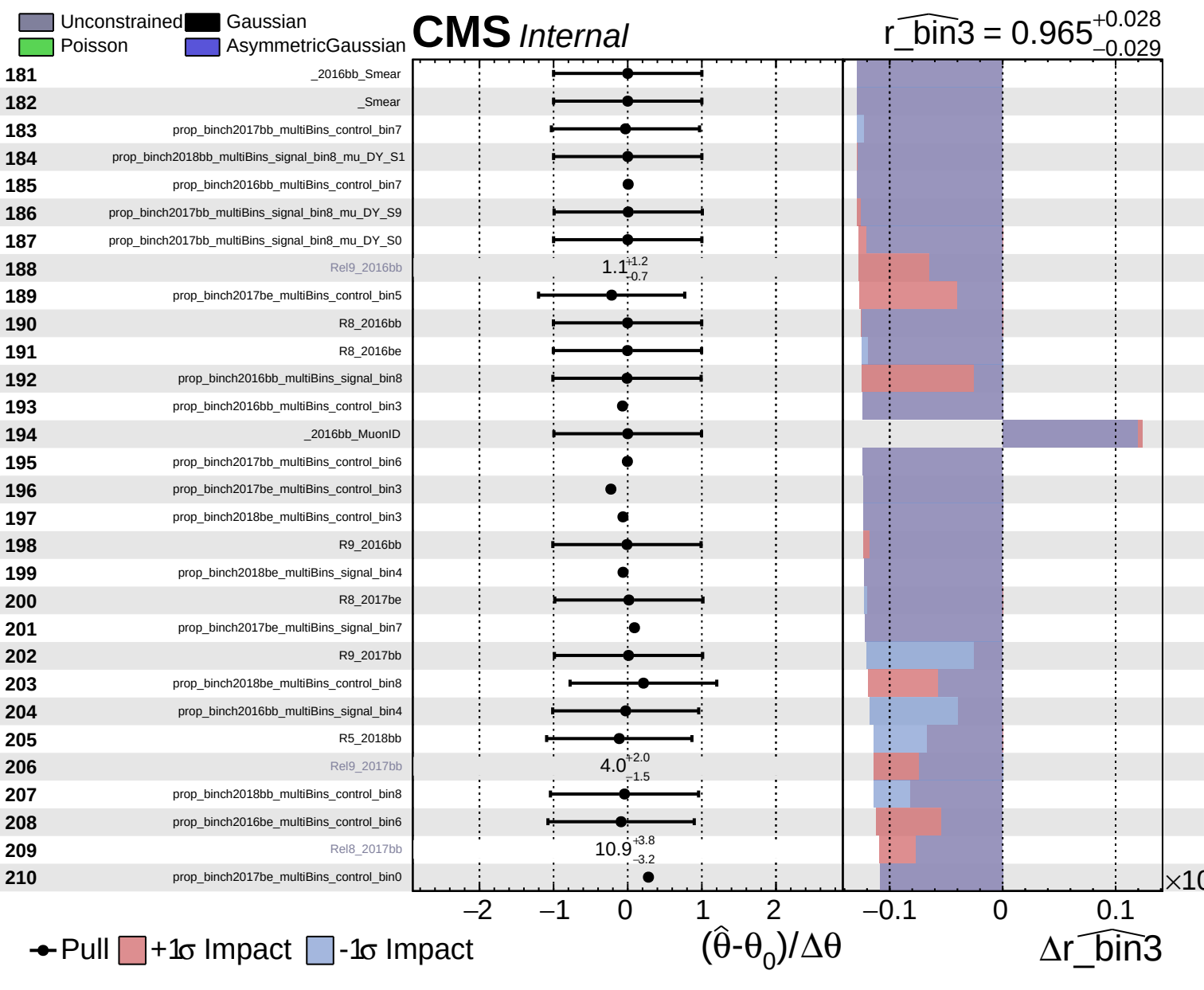
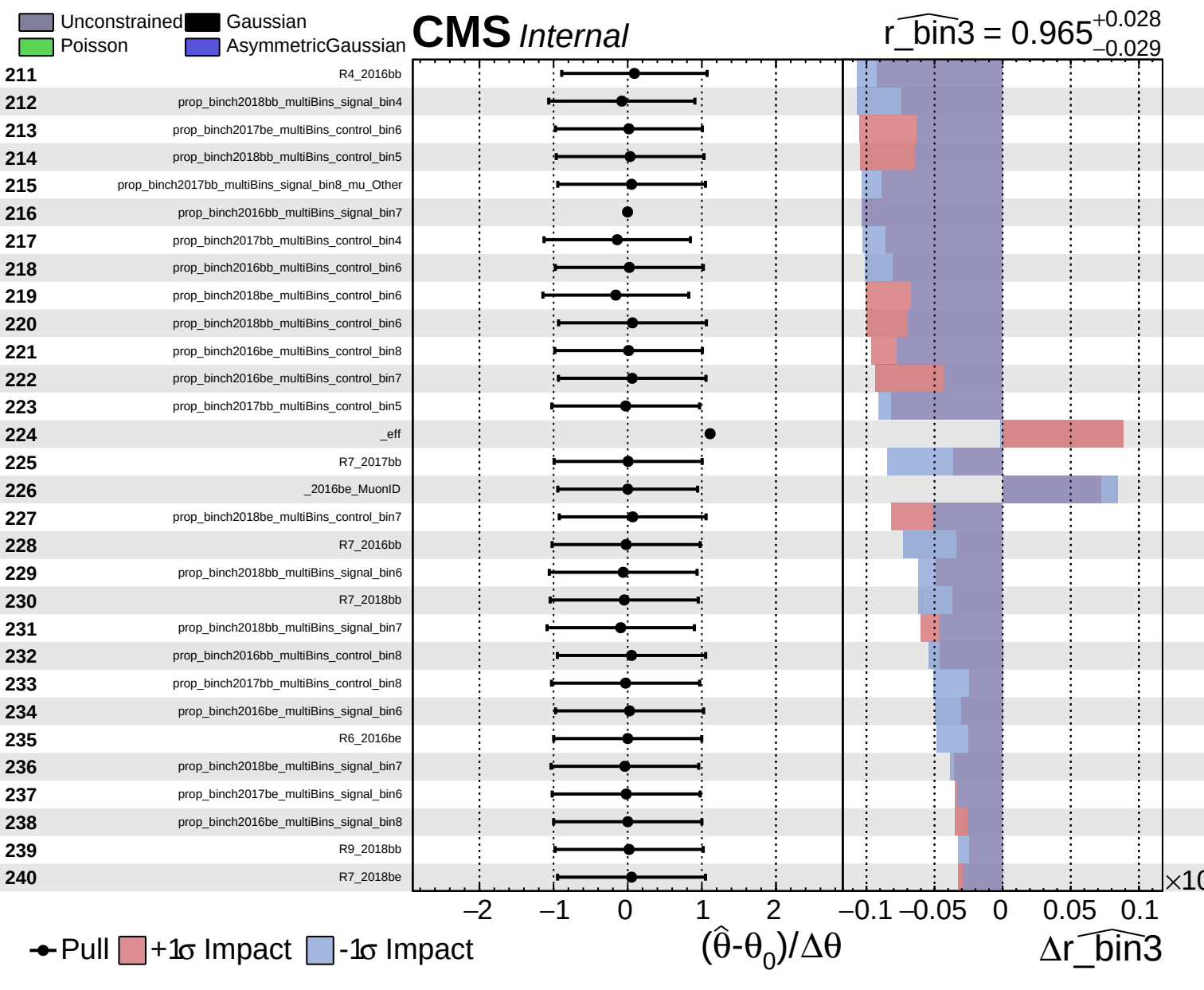
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin3 = 0.965 +0.028 −0.029
151 R4_2018be
152 prop_binch2018bb_multiBins_signal_bin5
153 prop_binch2016bb_multiBins_control_bin5
154 prop_binch2018bb_multiBins_control_bin4
155 prop_binch2016bb_multiBins_control_bin4
156 R5_2017bb
157 R5_2017be
158 prop_binch2018be_multiBins_signal_bin6
159 R4_2018bb
160 R5_2018be
161 Rel9_2017be
1.3 +1.0 −0.7
162 prop_binch2017be_multiBins_control_bin8
163 prop_binch2016bb_multiBins_signal_bin5
164 R6_2018bb
165 R8_2017bb
166 R6_2016bb
167 prop_binch2017be_multiBins_control_bin7
168 prop_binch2016be_multiBins_control_bin5
169 R7_2016be
170 prop_binch2017bb_multiBins_signal_bin3
171 prop_binch2018bb_multiBins_control_bin7
172 prop_binch2016be_multiBins_signal_bin5
173 prop_binch2018bb_multiBins_signal_bin8_mu_DY_S8
174 prop_binch2018bb_multiBins_signal_bin8_mu_DY_S7
175 prop_binch2018bb_multiBins_signal_bin8_mu_DY_S0
176 prop_binch2017be_multiBins_signal_bin8
177 prop_binch2017bb_multiBins_signal_bin8_mu_DY_S8
178 prop_binch2017bb_multiBins_signal_bin1
179 prop_binch2017bb_multiBins_signal_bin4
180 R5_2016bb
−2 −1 0 1 2
−0.1 0 0.1
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin3


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin3 = 0.965 +0.028 −0.029
181 _2016bb_Smear
182 _Smear
183 prop_binch2017bb_multiBins_control_bin7
184 prop_binch2018bb_multiBins_signal_bin8_mu_DY_S1
185 prop_binch2016bb_multiBins_control_bin7
186 prop_binch2017bb_multiBins_signal_bin8_mu_DY_S9
187 prop_binch2017bb_multiBins_signal_bin8_mu_DY_S0
188 Rel9_2016bb
189 prop_binch2017be_multiBins_control_bin5
190 R8_2016bb
191 R8_2016be
192 prop_binch2016bb_multiBins_signal_bin8
193 prop_binch2016bb_multiBins_control_bin3
194 _2016bb_MuonID
195 prop_binch2017bb_multiBins_control_bin6
196 prop_binch2017be_multiBins_control_bin3
197 prop_binch2018be_multiBins_control_bin3
198 R9_2016bb
199 prop_binch2018be_multiBins_signal_bin4
200 R8_2017be
201 prop_binch2017be_multiBins_signal_bin7
202 R9_2017bb
203 prop_binch2018be_multiBins_control_bin8
204 prop_binch2016bb_multiBins_signal_bin4
205 R5_2018bb
206 Rel9_2017bb
207 prop_binch2018bb_multiBins_control_bin8
208 prop_binch2016be_multiBins_control_bin6
209 Rel8_2017bb
210 prop_binch2017be_multiBins_control_bin0
1.1 +1.2 −0.7
4.0 +2.0 −1.5
10.9 +3.8 −3.2
−2 −1 0 1 2
−0.1 0 0.1
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin3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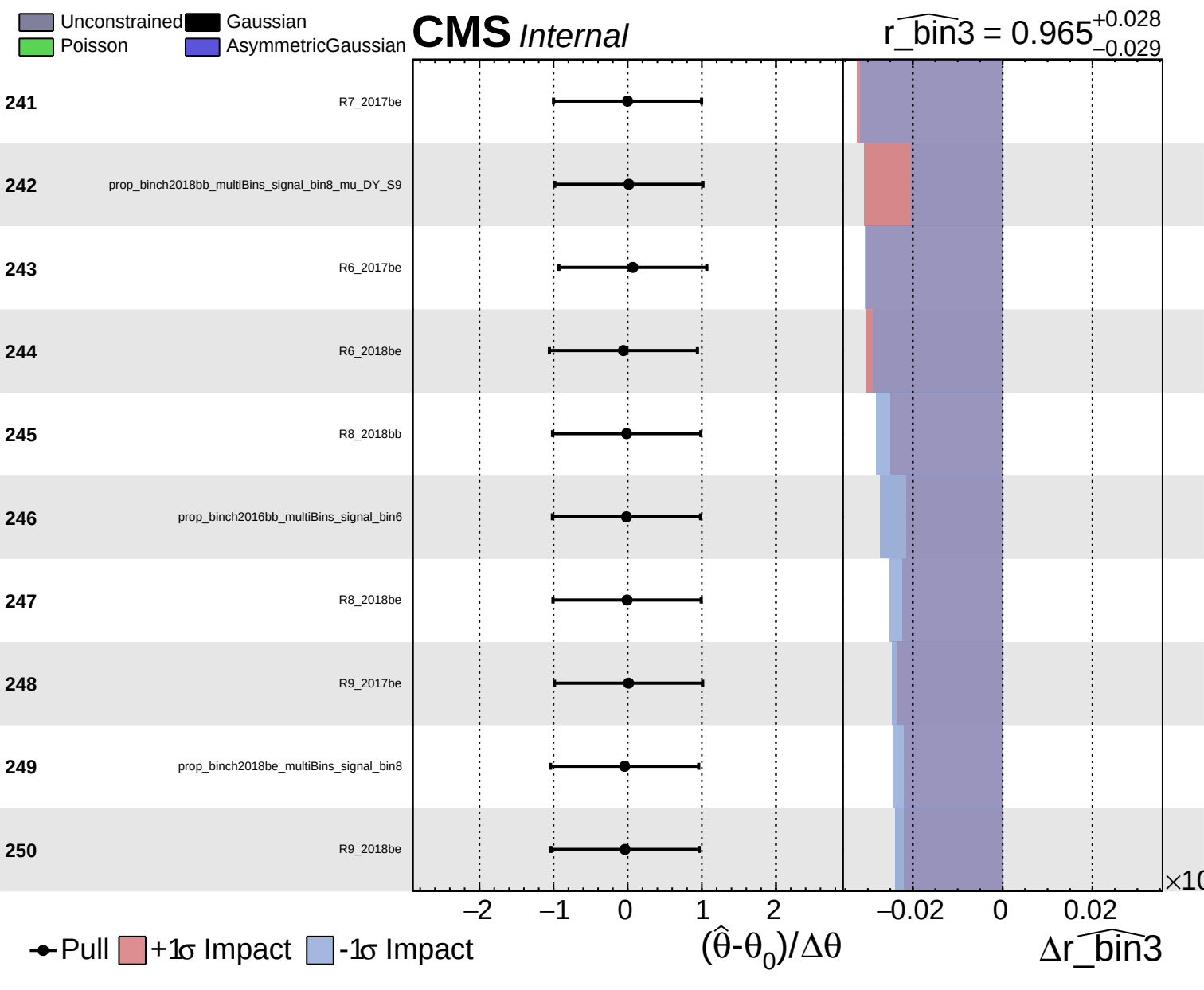
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin3 = 0.965 +0.028 −0.029
211 R4_2016bb
212 prop_binch2018bb_multiBins_signal_bin4
213 prop_binch2017be_multiBins_control_bin6
214 prop_binch2018bb_multiBins_control_bin5
215 prop_binch2017bb_multiBins_signal_bin8_mu_Other
216 prop_binch2016bb_multiBins_signal_bin7
217 prop_binch2017bb_multiBins_control_bin4
218 prop_binch2016bb_multiBins_control_bin6
219 prop_binch2018be_multiBins_control_bin6
220 prop_binch2018bb_multiBins_control_bin6
221 prop_binch2016be_multiBins_control_bin8
222 prop_binch2016be_multiBins_control_bin7
223 prop_binch2017bb_multiBins_control_bin5
224 _eff
225 R7_2017bb
226 _2016be_MuonID
227 prop_binch2018be_multiBins_control_bin7
228 R7_2016bb
229 prop_binch2018bb_multiBins_signal_bin6
230 R7_2018bb
231 prop_binch2018bb_multiBins_signal_bin7
232 prop_binch2016bb_multiBins_control_bin8
233 prop_binch2017bb_multiBins_control_bin8
234 prop_binch2016be_multiBins_signal_bin6
235 R6_2016be
236 prop_binch2018be_multiBins_signal_bin7
237 prop_binch2017be_multiBins_signal_bin6
238 prop_binch2016be_multiBins_signal_bin8
239 R9_2018bb
240 R7_2018be
−2 −1 0 1 2
−0.1 −0.05 0 0.05 0.1
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin3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Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r_bin3 = 0.965 +0.028 −0.029
241
R7_2017be
242
prop_binch2018bb_multiBins_signal_bin8_mu_DY_S9
243
R6_2017be
244
R6_2018be
245
R8_2018bb
246
prop_binch2016bb_multiBins_signal_bin6
247
R8_2018be
248
R9_2017be
249
prop_binch2018be_multiBins_signal_bin8
250
R9_2018be
−2
−1
0
1
2
−0.02
0
0.02
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr_bin3