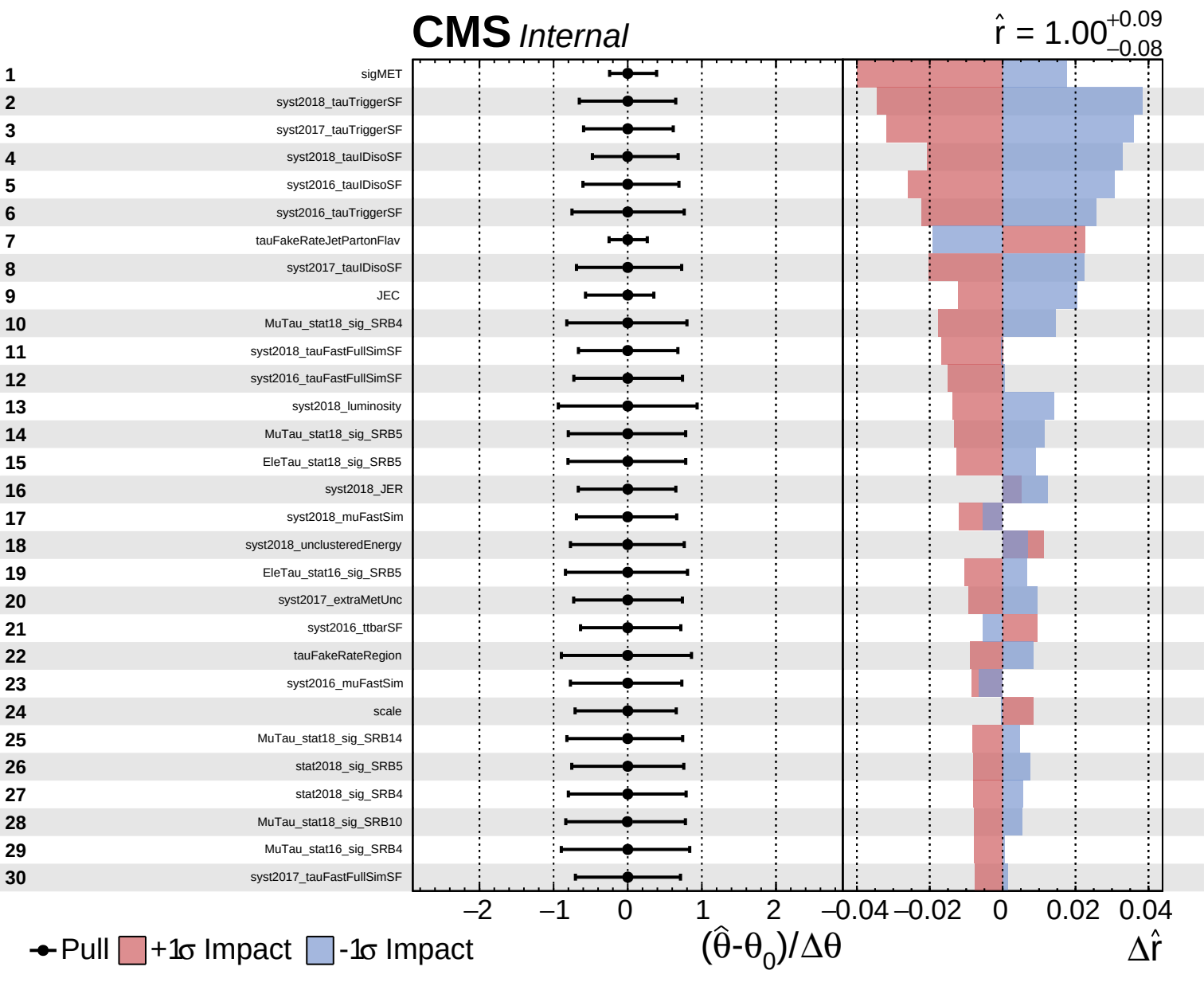
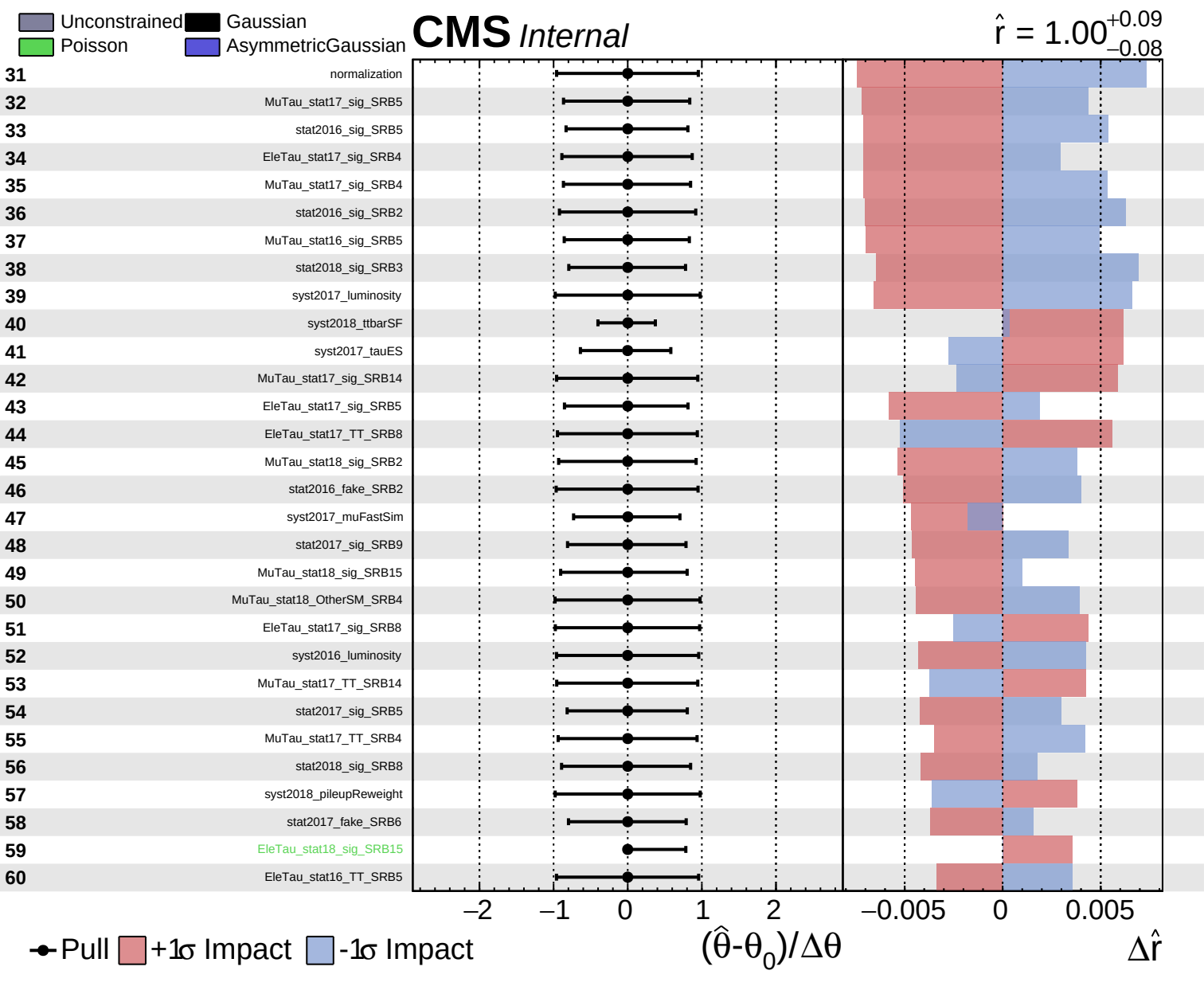
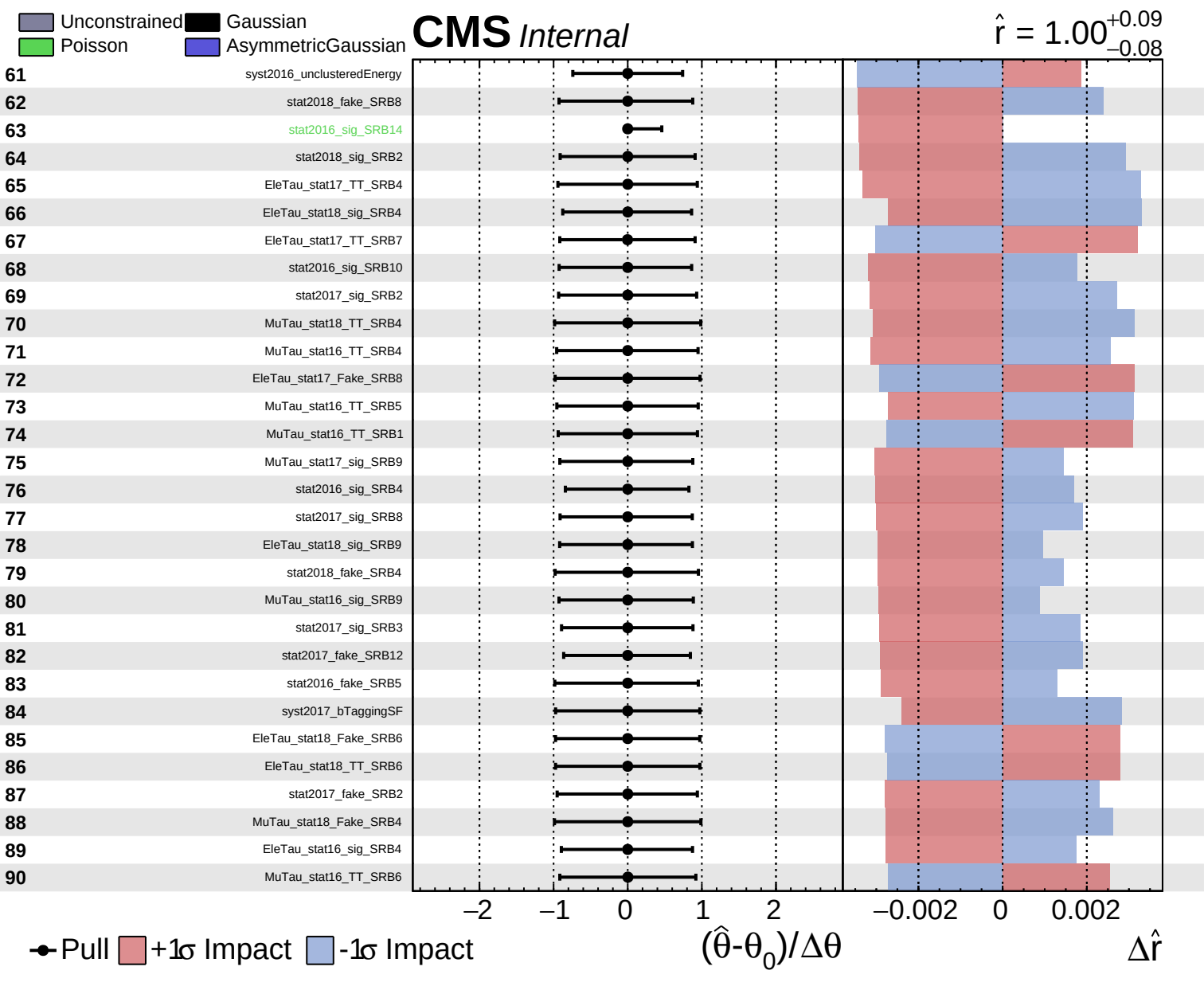
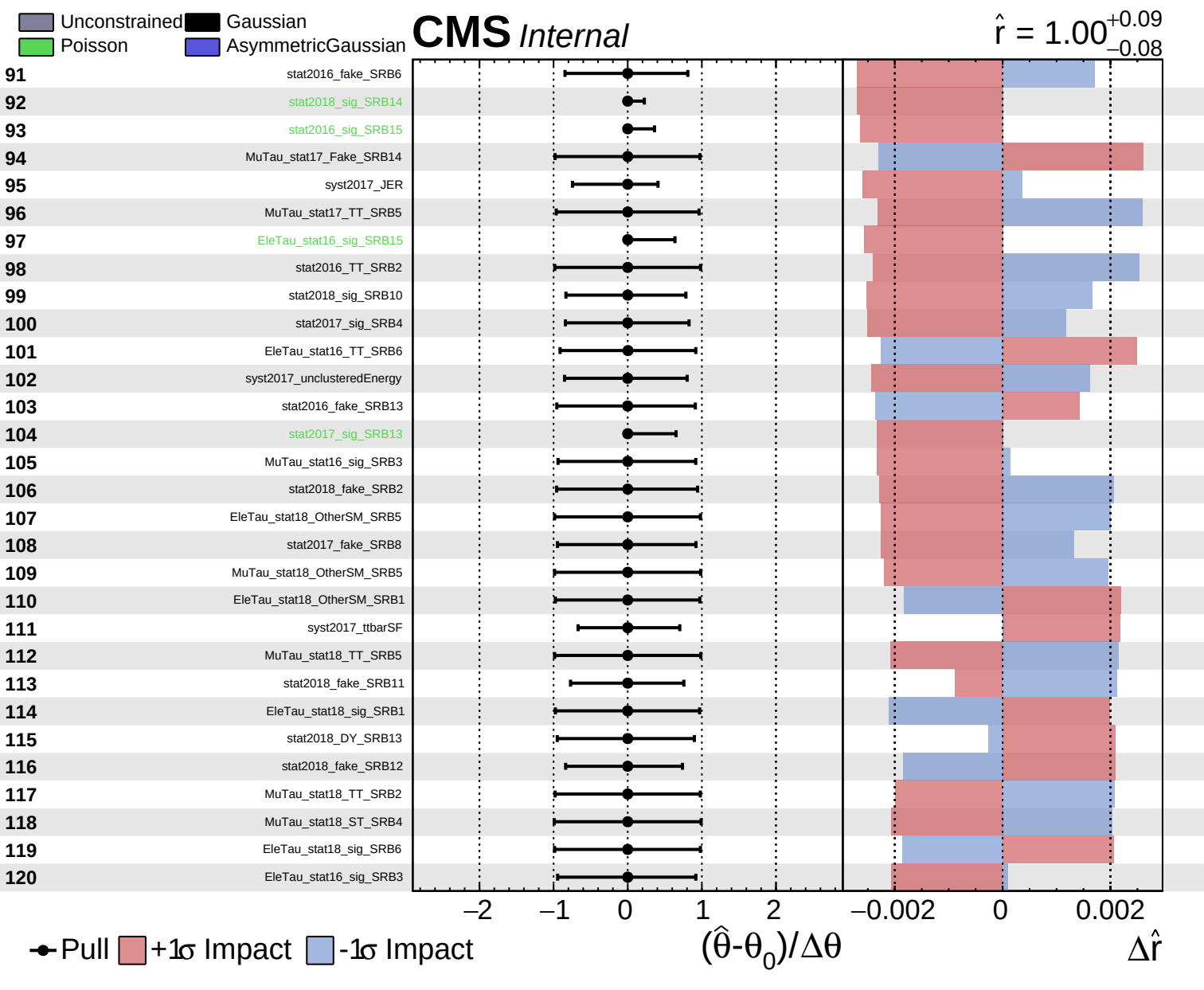
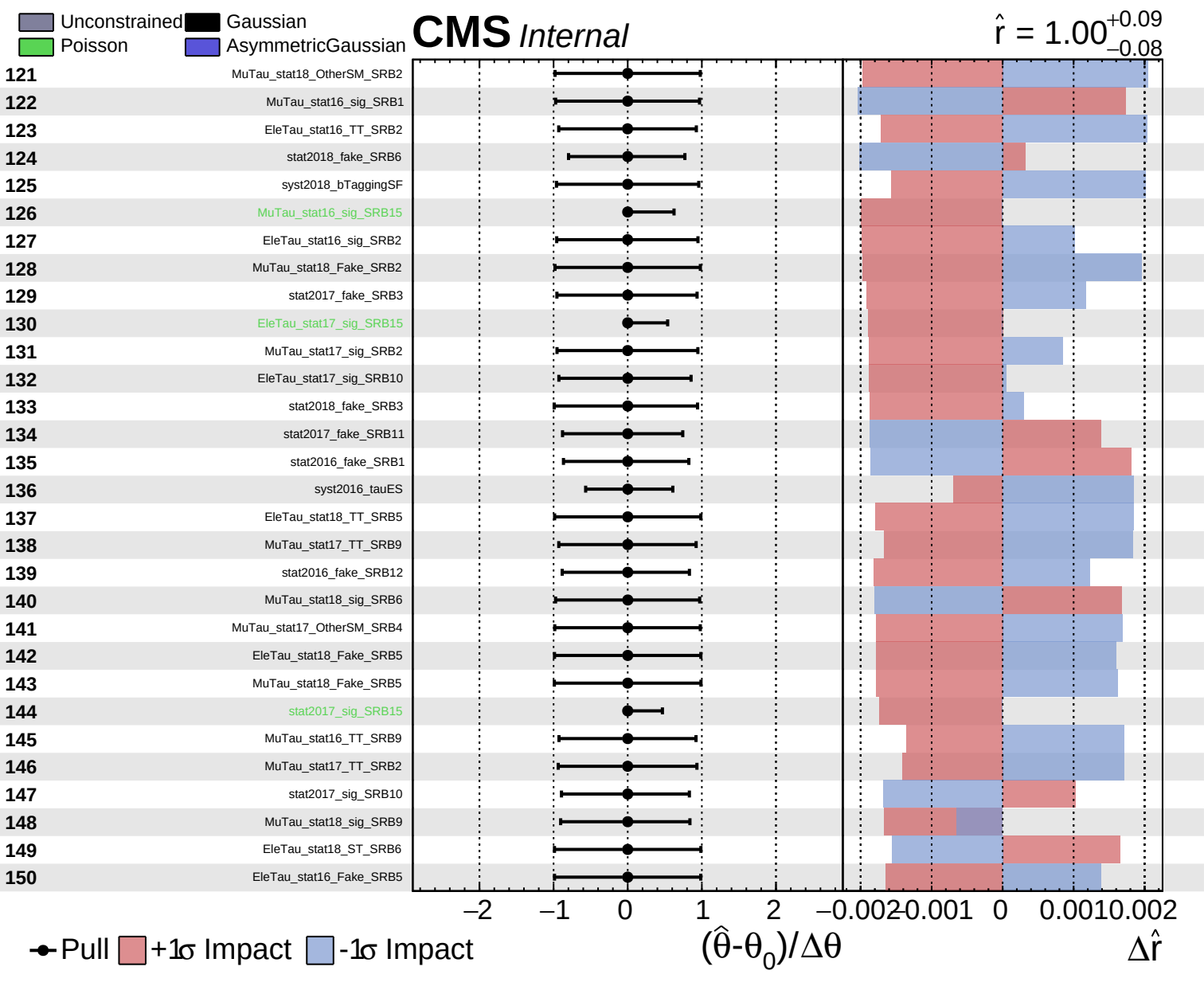
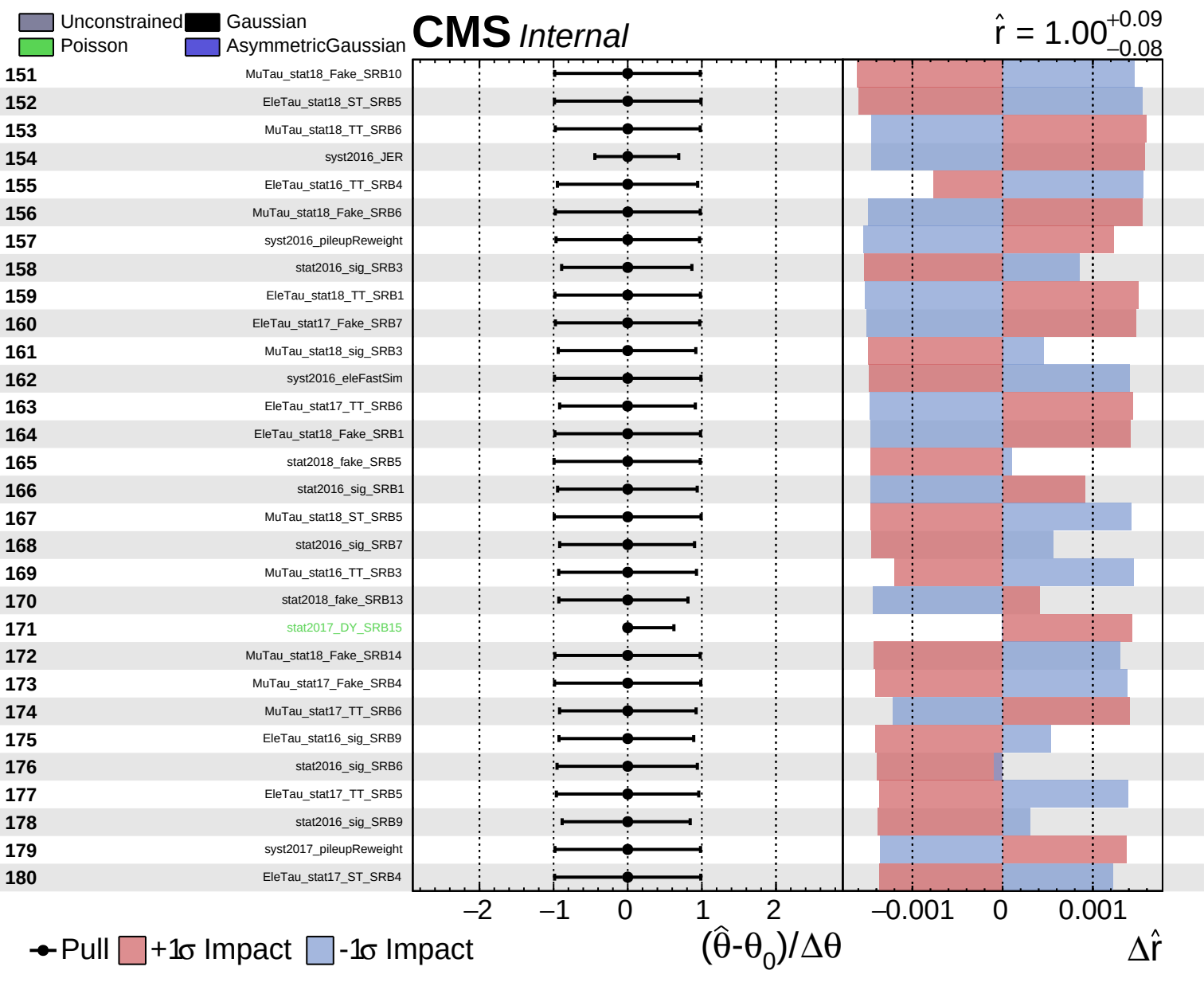

CMS Internal
r̂ = 1.00 +0.09 −0.08
1 sigMET
2 syst2018_tauTriggerSF
3 syst2017_tauTriggerSF
4 syst2018_tauIDisoSF
5 syst2016_tauIDisoSF
6 syst2016_tauTriggerSF
7 tauFakeRateJetPartonFlav
8 syst2017_tauIDisoSF
9 JEC
10 MuTau_stat18_sig_SRB4
11 syst2018_tauFastFullSimSF
12 syst2016_tauFastFullSimSF
13 syst2018_luminosity
14 MuTau_stat18_sig_SRB5
15 EleTau_stat18_sig_SRB5
16 syst2018_JER
17 syst2018_muFastSim
18 syst2018_unclusteredEnergy
19 EleTau_stat16_sig_SRB5
20 syst2017_extraMetUnc
21 syst2016_ttbarSF
22 tauFakeRateRegion
23 syst2016_muFastSim
24 scale
25 MuTau_stat18_sig_SRB14
26 stat2018_sig_SRB5
27 stat2018_sig_SRB4
28 MuTau_stat18_sig_SRB10
29 MuTau_stat16_sig_SRB4
30 syst2017_tauFastFullSimSF
−2 −1 0 1 2
−0.04 −0.02 0 0.02 0.04
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr̂

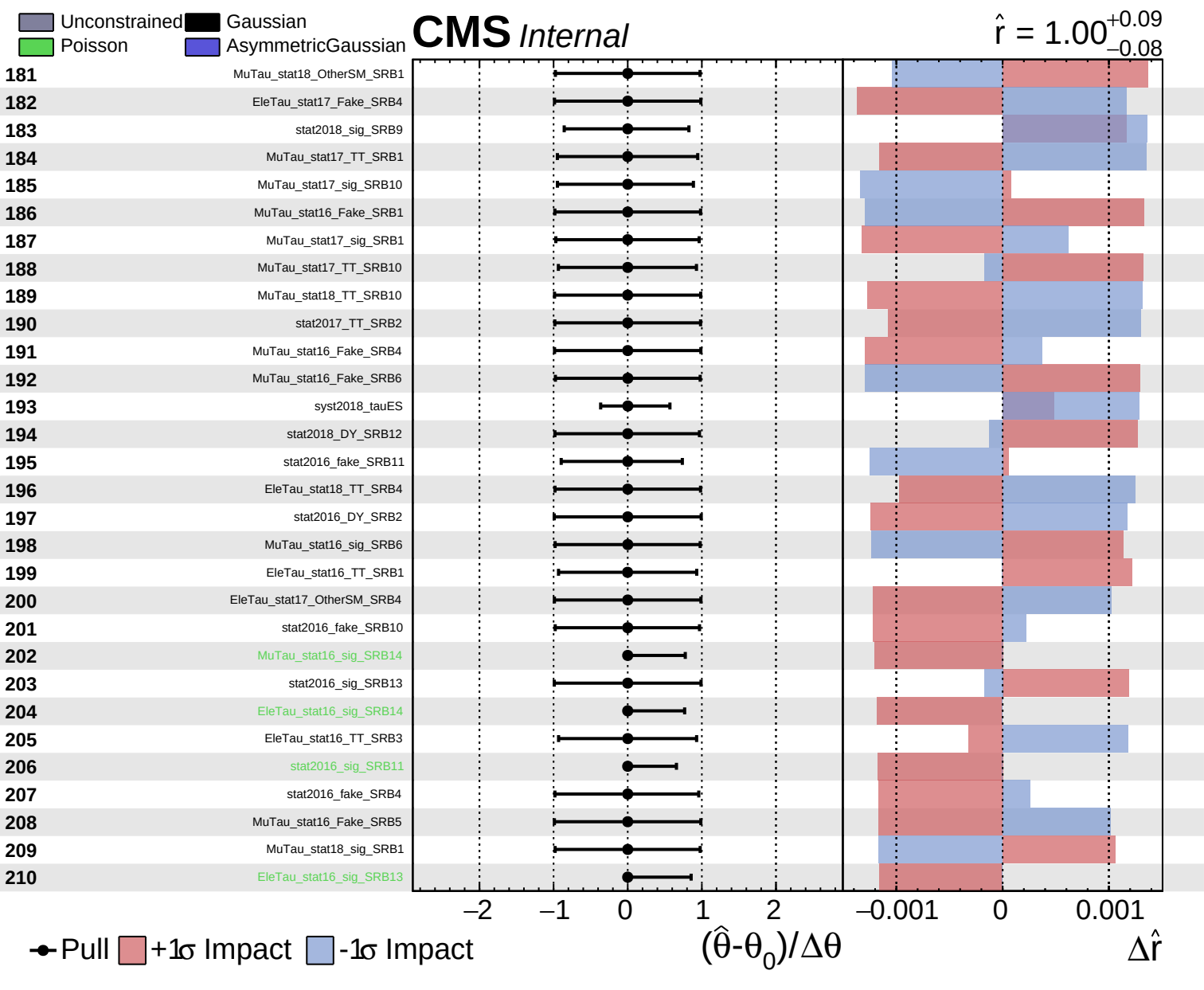

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
31 normalization
32 MuTau_stat17_sig_SRB5
33 stat2016_sig_SRB5
34 EleTau_stat17_sig_SRB4
35 MuTau_stat17_sig_SRB4
36 stat2016_sig_SRB2
37 MuTau_stat16_sig_SRB5
38 stat2018_sig_SRB3
39 syst2017_luminosity
40 syst2018_ttbarSF
41 syst2017_tauES
42 MuTau_stat17_sig_SRB14
43 EleTau_stat17_sig_SRB5
44 EleTau_stat17_TT_SRB8
45 MuTau_stat18_sig_SRB2
46 stat2016_fake_SRB2
47 syst2017_muFastSim
48 stat2017_sig_SRB9
49 MuTau_stat18_sig_SRB15
50 MuTau_stat18_OtherSM_SRB4
51 EleTau_stat17_sig_SRB8
52 syst2016_luminosity
53 MuTau_stat17_TT_SRB14
54 stat2017_sig_SRB5
55 MuTau_stat17_TT_SRB4
56 stat2018_sig_SRB8
57 syst2018_pileupReweight
58 stat2017_fake_SRB6
59 EleTau_stat18_sig_SRB15
60 EleTau_stat16_TT_SRB5
−2 −1 0 1 2
−0.005 0 0.005
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr̂

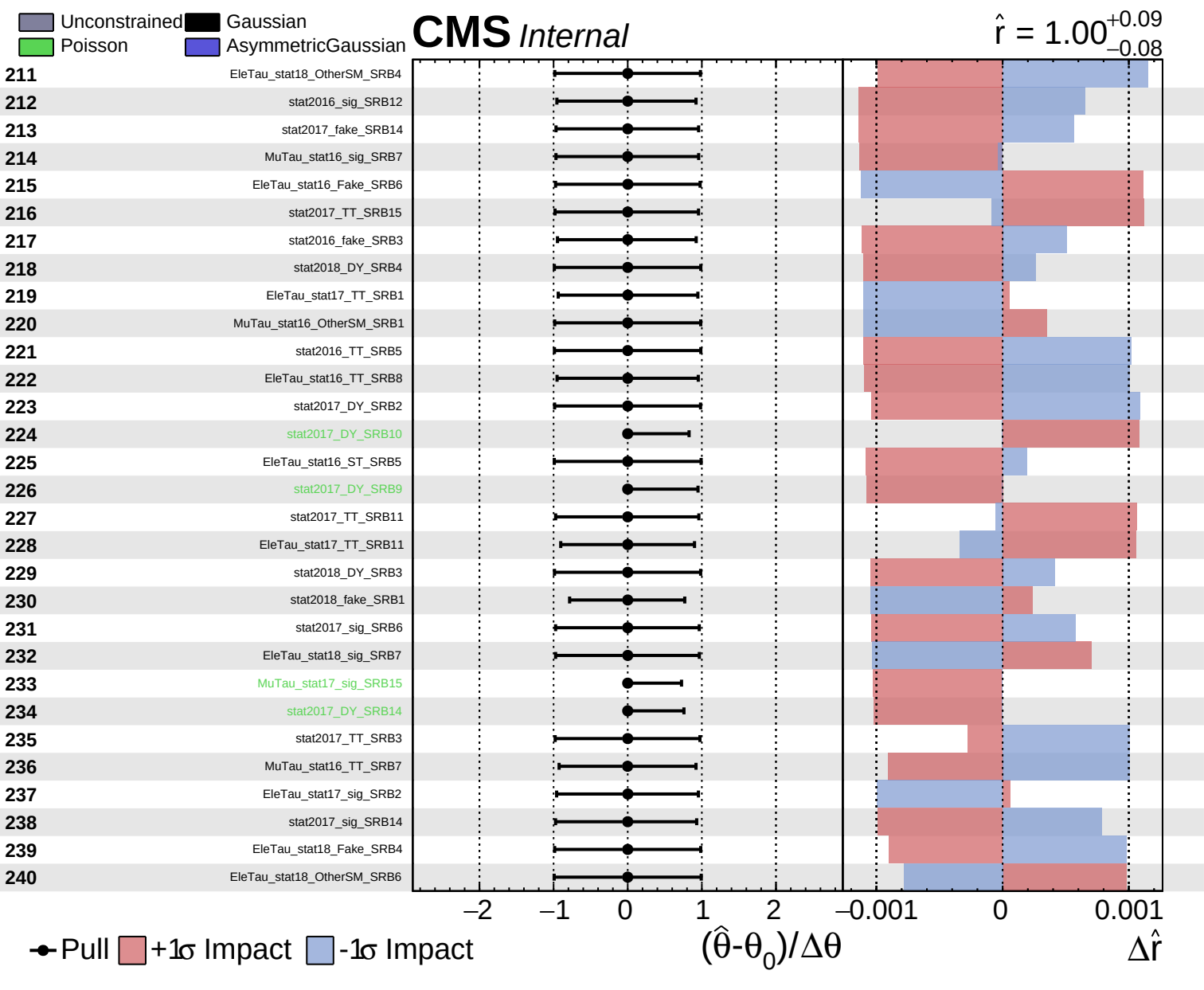

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
61 syst2016_unclusteredEnergy
62 stat2018_fake_SRB8
63 stat2016_sig_SRB14
64 stat2018_sig_SRB2
65 EleTau_stat17_TT_SRB4
66 EleTau_stat18_sig_SRB4
67 EleTau_stat17_TT_SRB7
68 stat2016_sig_SRB10
69 stat2017_sig_SRB2
70 MuTau_stat18_TT_SRB4
71 MuTau_stat16_TT_SRB4
72 EleTau_stat17_Fake_SRB8
73 MuTau_stat16_TT_SRB5
74 MuTau_stat16_TT_SRB1
75 MuTau_stat17_sig_SRB9
76 stat2016_sig_SRB4
77 stat2017_sig_SRB8
78 EleTau_stat18_sig_SRB9
79 stat2018_fake_SRB4
80 MuTau_stat16_sig_SRB9
81 stat2017_sig_SRB3
82 stat2017_fake_SRB12
83 stat2016_fake_SRB5
84 syst2017_bTaggingSF
85 EleTau_stat18_Fake_SRB6
86 EleTau_stat18_TT_SRB6
87 stat2017_fake_SRB2
88 MuTau_stat18_Fake_SRB4
89 EleTau_stat16_sig_SRB4
90 MuTau_stat16_TT_SRB6
−2 −1 0 1 2
−0.002 0 0.002
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr̂

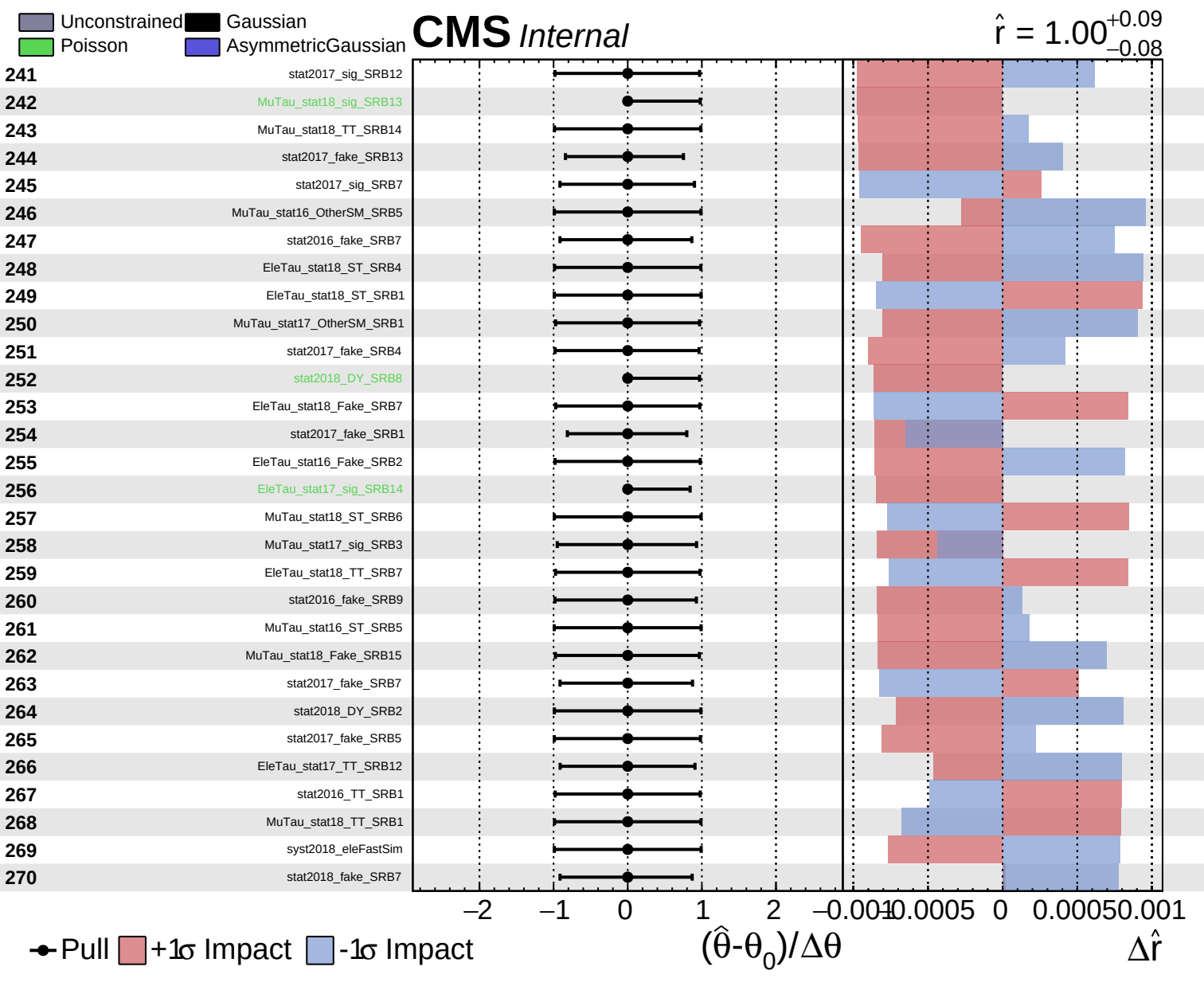

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
91 stat2016_fake_SRB6
92 stat2018_sig_SRB14
93 stat2016_sig_SRB15
94 MuTau_stat17_Fake_SRB14
95 syst2017_JER
96 MuTau_stat17_TT_SRB5
97 EleTau_stat16_sig_SRB15
98 stat2016_TT_SRB2
99 stat2018_sig_SRB10
100 stat2017_sig_SRB4
101 EleTau_stat16_TT_SRB6
102 syst2017_unclusteredEnergy
103 stat2016_fake_SRB13
104 stat2017_sig_SRB13
105 MuTau_stat16_sig_SRB3
106 stat2018_fake_SRB2
107 EleTau_stat18_OtherSM_SRB5
108 stat2017_fake_SRB8
109 MuTau_stat18_OtherSM_SRB5
110 EleTau_stat18_OtherSM_SRB1
111 syst2017_ttbarSF
112 MuTau_stat18_TT_SRB5
113 stat2018_fake_SRB11
114 EleTau_stat18_sig_SRB1
115 stat2018_DY_SRB13
116 stat2018_fake_SRB12
117 MuTau_stat18_TT_SRB2
118 MuTau_stat18_ST_SRB4
119 EleTau_stat18_sig_SRB6
120 EleTau_stat16_sig_SRB3
−2 −1 0 1 2
−0.002 0 0.002
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr̂

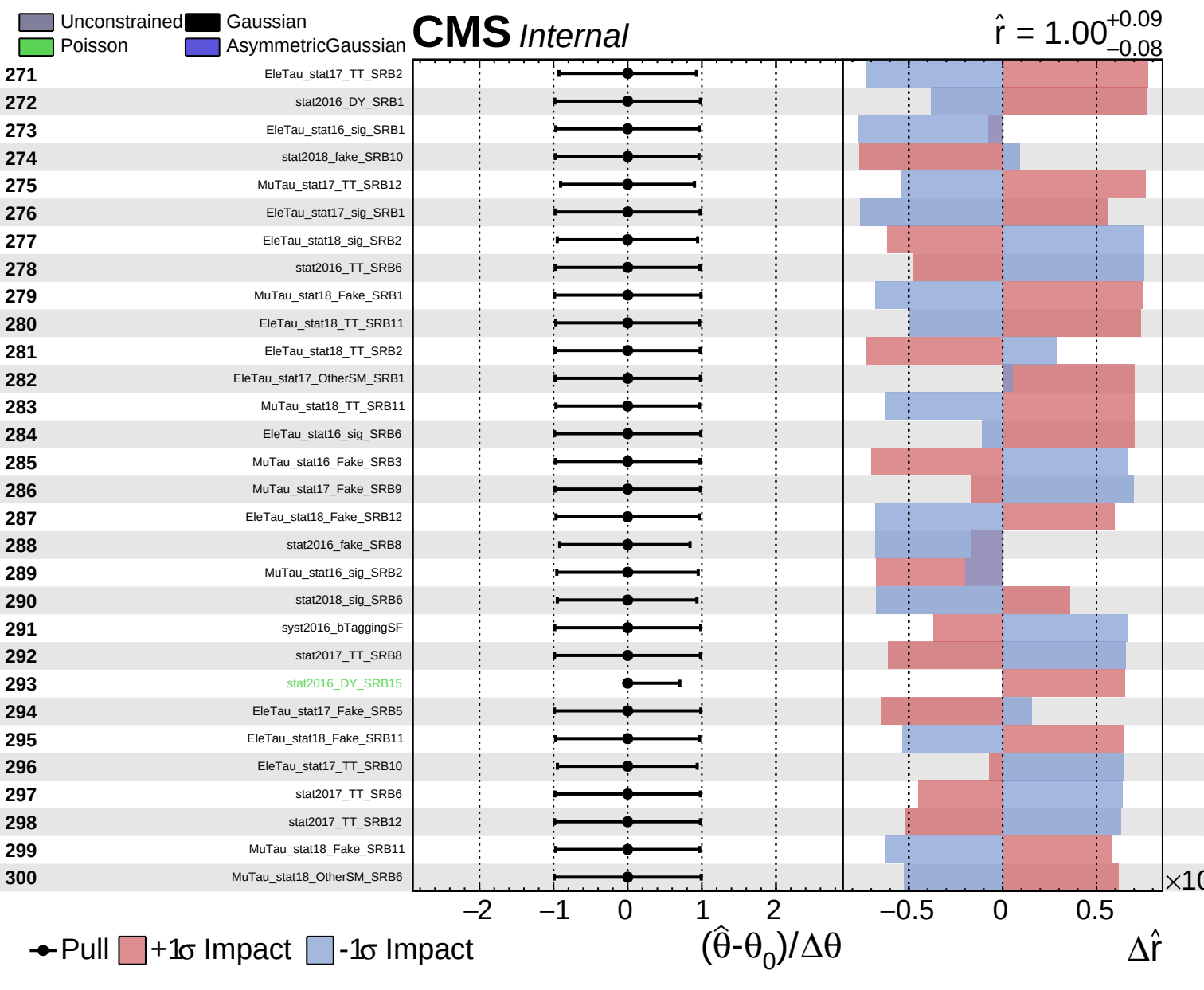

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
121 MuTau_stat18_OtherSM_SRB2
122 MuTau_stat16_sig_SRB1
123 EleTau_stat16_TT_SRB2
124 stat2018_fake_SRB6
125 syst2018_bTaggingSF
126 MuTau_stat16_sig_SRB15
127 EleTau_stat16_sig_SRB2
128 MuTau_stat18_Fake_SRB2
129 stat2017_fake_SRB3
130 EleTau_stat17_sig_SRB15
131 MuTau_stat17_sig_SRB2
132 EleTau_stat17_sig_SRB10
133 stat2018_fake_SRB3
134 stat2017_fake_SRB11
135 stat2016_fake_SRB1
136 syst2016_tauES
137 EleTau_stat18_TT_SRB5
138 MuTau_stat17_TT_SRB9
139 stat2016_fake_SRB12
140 MuTau_stat18_sig_SRB6
141 MuTau_stat17_OtherSM_SRB4
142 EleTau_stat18_Fake_SRB5
143 MuTau_stat18_Fake_SRB5
144 stat2017_sig_SRB15
145 MuTau_stat16_TT_SRB9
146 MuTau_stat17_TT_SRB2
147 stat2017_sig_SRB10
148 MuTau_stat18_sig_SRB9
149 EleTau_stat18_ST_SRB6
150 EleTau_stat16_Fake_SRB5
−2 −1 0 1 2
−0.002 −0.001 0 0.001 0.002
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr̂

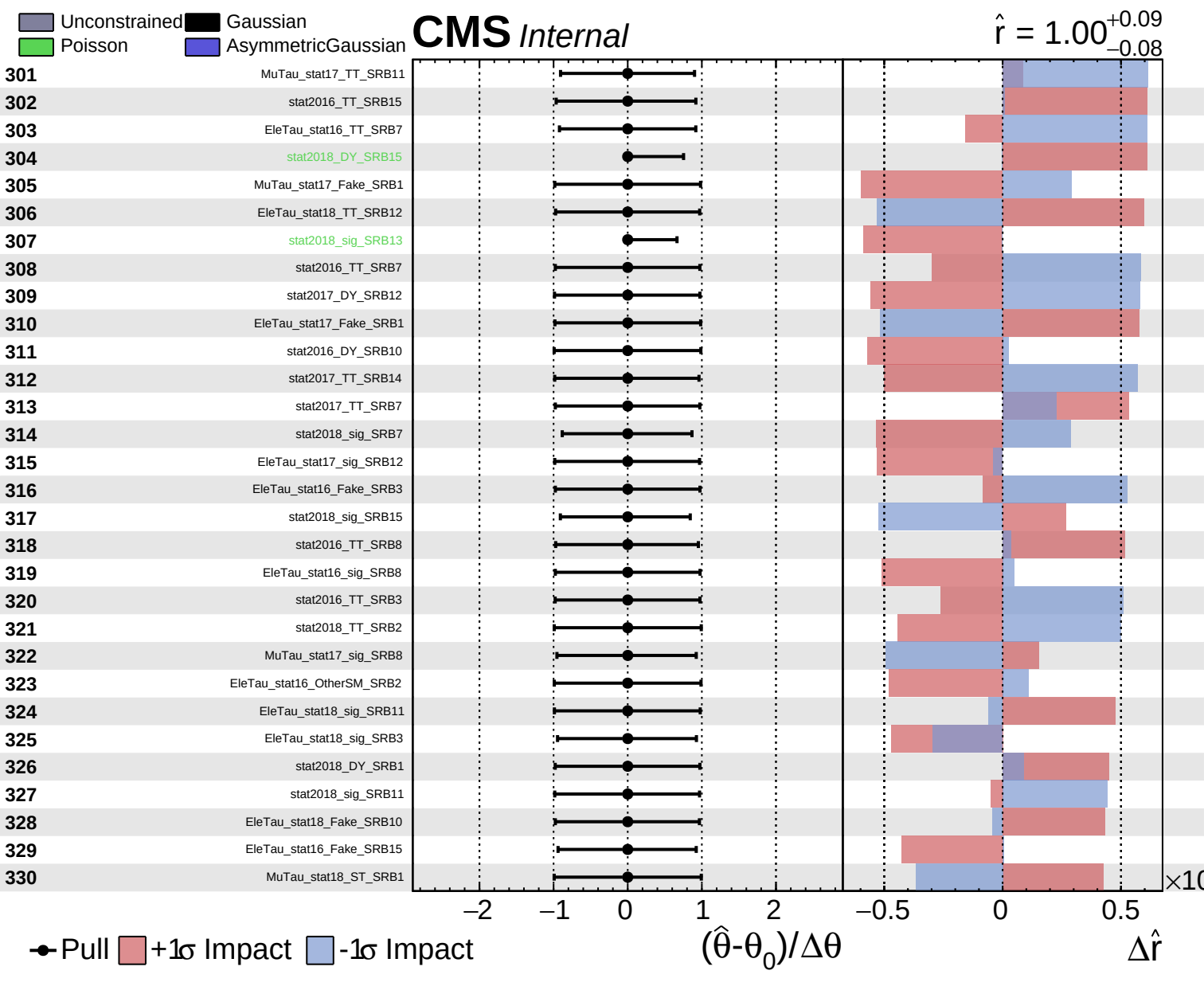

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
151 MuTau_stat18_Fake_SRB10
152 EleTau_stat18_ST_SRB5
153 MuTau_stat18_TT_SRB6
154 syst2016_JER
155 EleTau_stat16_TT_SRB4
156 MuTau_stat18_Fake_SRB6
157 syst2016_pileupReweight
158 stat2016_sig_SRB3
159 EleTau_stat18_TT_SRB1
160 EleTau_stat17_Fake_SRB7
161 MuTau_stat18_sig_SRB3
162 syst2016_eleFastSim
163 EleTau_stat17_TT_SRB6
164 EleTau_stat18_Fake_SRB1
165 stat2018_fake_SRB5
166 stat2016_sig_SRB1
167 MuTau_stat18_ST_SRB5
168 stat2016_sig_SRB7
169 MuTau_stat16_TT_SRB3
170 stat2018_fake_SRB13
171 stat2017_DY_SRB15
172 MuTau_stat18_Fake_SRB14
173 MuTau_stat17_Fake_SRB4
174 MuTau_stat17_TT_SRB6
175 EleTau_stat16_sig_SRB9
176 stat2016_sig_SRB6
177 EleTau_stat17_TT_SRB5
178 stat2016_sig_SRB9
179 syst2017_pileupReweight
180 EleTau_stat17_ST_SRB4
−2 −1 0 1 2
−0.001 0 0.001
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr̂

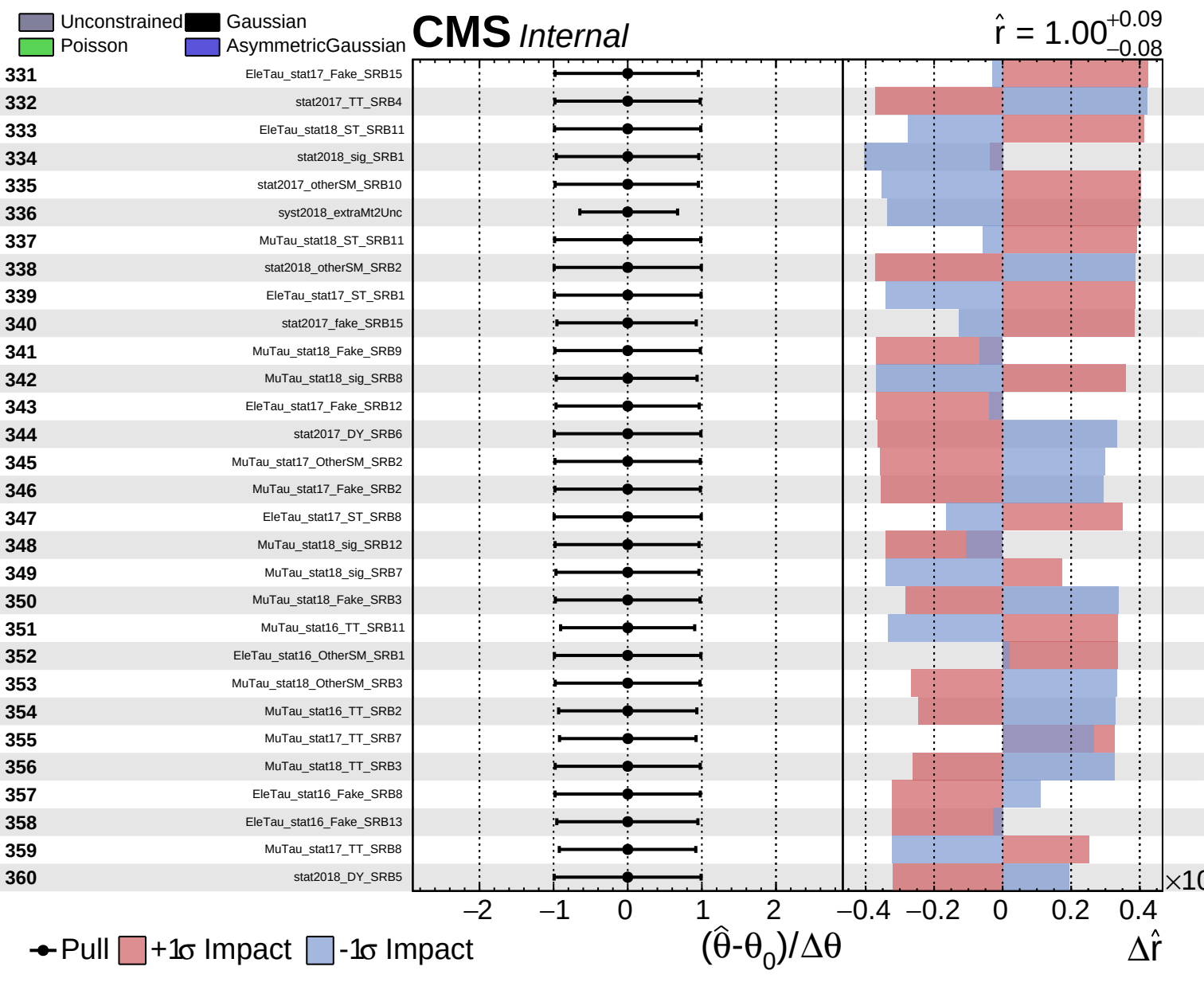

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
181 MuTau_stat18_OtherSM_SRB1
182 EleTau_stat17_Fake_SRB4
183 stat2018_sig_SRB9
184 MuTau_stat17_TT_SRB1
185 MuTau_stat17_sig_SRB10
186 MuTau_stat16_Fake_SRB1
187 MuTau_stat17_sig_SRB1
188 MuTau_stat17_TT_SRB10
189 MuTau_stat18_TT_SRB10
190 stat2017_TT_SRB2
191 MuTau_stat16_Fake_SRB4
192 MuTau_stat16_Fake_SRB6
193 syst2018_tauES
194 stat2018_DY_SRB12
195 stat2016_fake_SRB11
196 EleTau_stat18_TT_SRB4
197 stat2016_DY_SRB2
198 MuTau_stat16_sig_SRB6
199 EleTau_stat16_TT_SRB1
200 EleTau_stat17_OtherSM_SRB4
201 stat2016_fake_SRB10
202 MuTau_stat16_sig_SRB14
203 stat2016_sig_SRB13
204 EleTau_stat16_sig_SRB14
205 EleTau_stat16_TT_SRB3
206 stat2016_sig_SRB11
207 stat2016_fake_SRB4
208 MuTau_stat16_Fake_SRB5
209 MuTau_stat18_sig_SRB1
210 EleTau_stat16_sig_SRB13
−2
−1
0
1
2
−0.001
0
0.001
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr̂

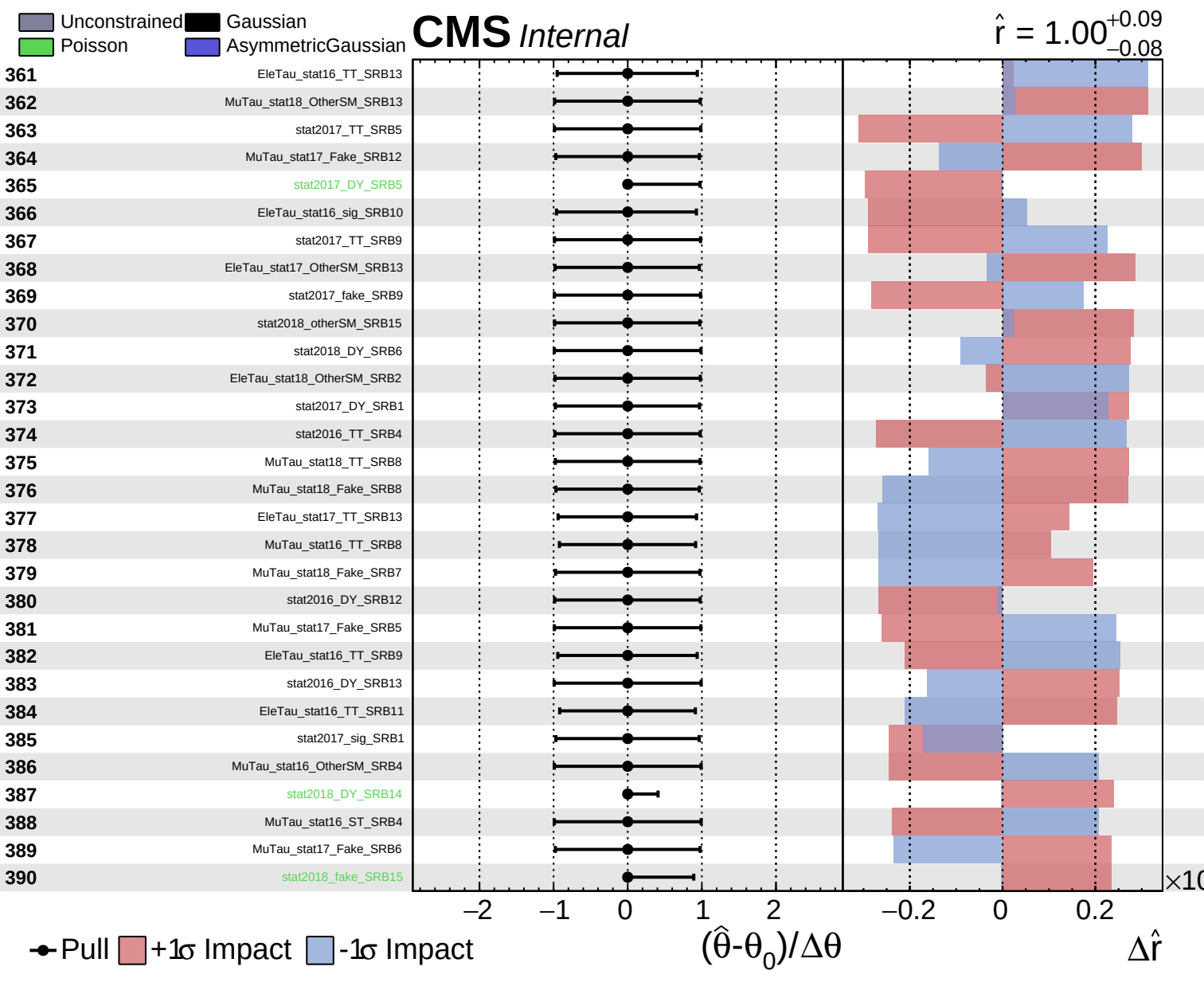

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
211 EleTau_stat18_OtherSM_SRB4
212 stat2016_sig_SRB12
213 stat2017_fake_SRB14
214 MuTau_stat16_sig_SRB7
215 EleTau_stat16_Fake_SRB6
216 stat2017_TT_SRB15
217 stat2016_fake_SRB3
218 stat2018_DY_SRB4
219 EleTau_stat17_TT_SRB1
220 MuTau_stat16_OtherSM_SRB1
221 stat2016_TT_SRB5
222 EleTau_stat16_TT_SRB8
223 stat2017_DY_SRB2
224 stat2017_DY_SRB10
225 EleTau_stat16_ST_SRB5
226 stat2017_DY_SRB9
227 stat2017_TT_SRB11
228 EleTau_stat17_TT_SRB11
229 stat2018_DY_SRB3
230 stat2018_fake_SRB1
231 stat2017_sig_SRB6
232 EleTau_stat18_sig_SRB7
233 MuTau_stat17_sig_SRB15
234 stat2017_DY_SRB14
235 stat2017_TT_SRB3
236 MuTau_stat16_TT_SRB7
237 EleTau_stat17_sig_SRB2
238 stat2017_sig_SRB14
239 EleTau_stat18_Fake_SRB4
240 EleTau_stat18_OtherSM_SRB6
−2 −1 0 1 2
−0.001 0 0.001
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr̂

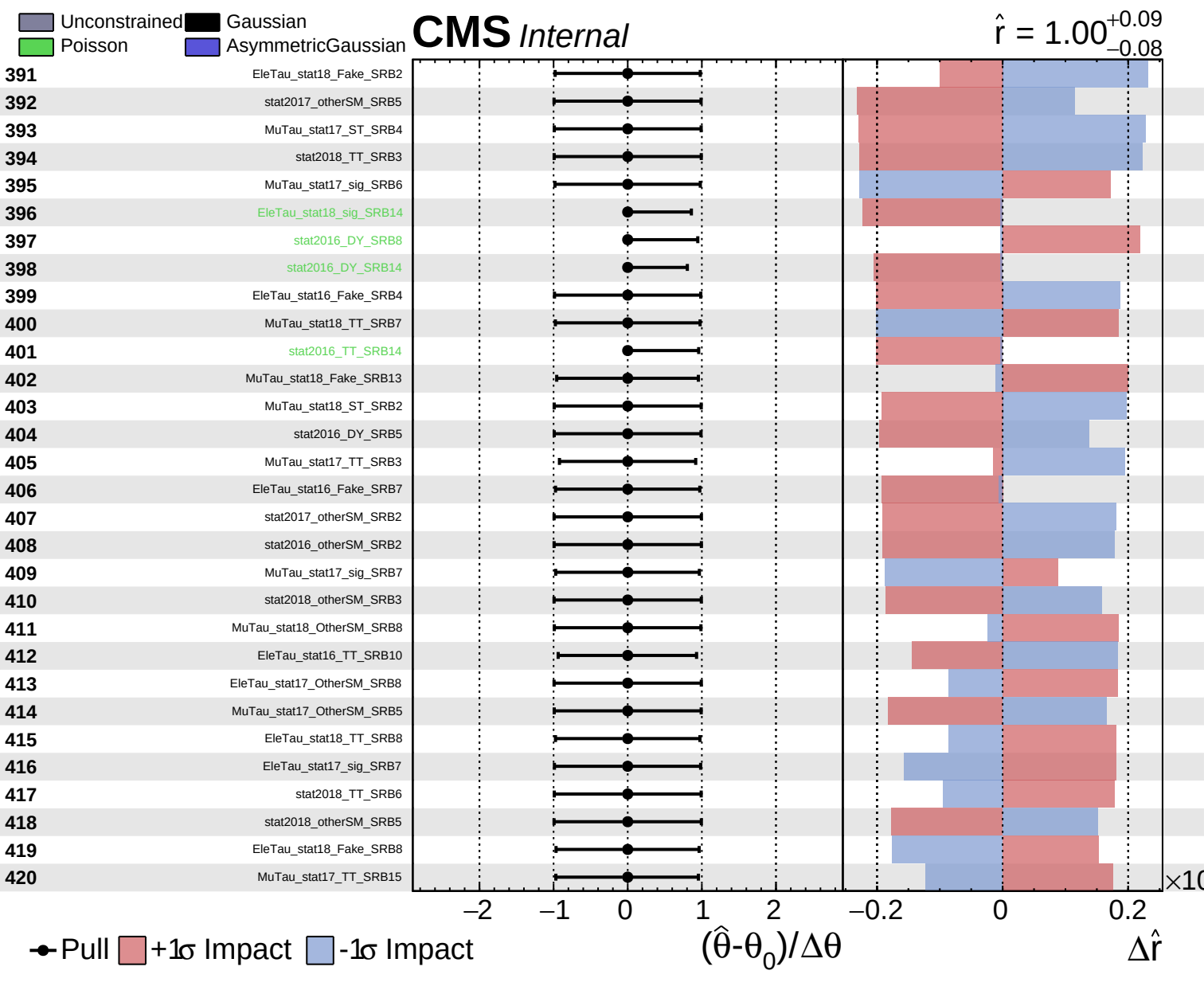

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
241 stat2017_sig_SRB12
242 MuTau_stat18_sig_SRB13
243 MuTau_stat18_TT_SRB14
244 stat2017_fake_SRB13
245 stat2017_sig_SRB7
246 MuTau_stat16_OtherSM_SRB5
247 stat2016_fake_SRB7
248 EleTau_stat18_ST_SRB4
249 EleTau_stat18_ST_SRB1
250 MuTau_stat17_OtherSM_SRB1
251 stat2017_fake_SRB4
252 stat2018_DY_SRB8
253 EleTau_stat18_Fake_SRB7
254 stat2017_fake_SRB1
255 EleTau_stat16_Fake_SRB2
256 EleTau_stat17_sig_SRB14
257 MuTau_stat18_ST_SRB6
258 MuTau_stat17_sig_SRB3
259 EleTau_stat18_TT_SRB7
260 stat2016_fake_SRB9
261 MuTau_stat16_ST_SRB5
262 MuTau_stat18_Fake_SRB15
263 stat2017_fake_SRB7
264 stat2018_DY_SRB2
265 stat2017_fake_SRB5
266 EleTau_stat17_TT_SRB12
267 stat2016_TT_SRB1
268 MuTau_stat18_TT_SRB1
269 syst2018_eleFastSim
270 stat2018_fake_SRB7
−2 −1 0 1 2
−0.001 −0.0005 0 0.0005 0.001
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr̂

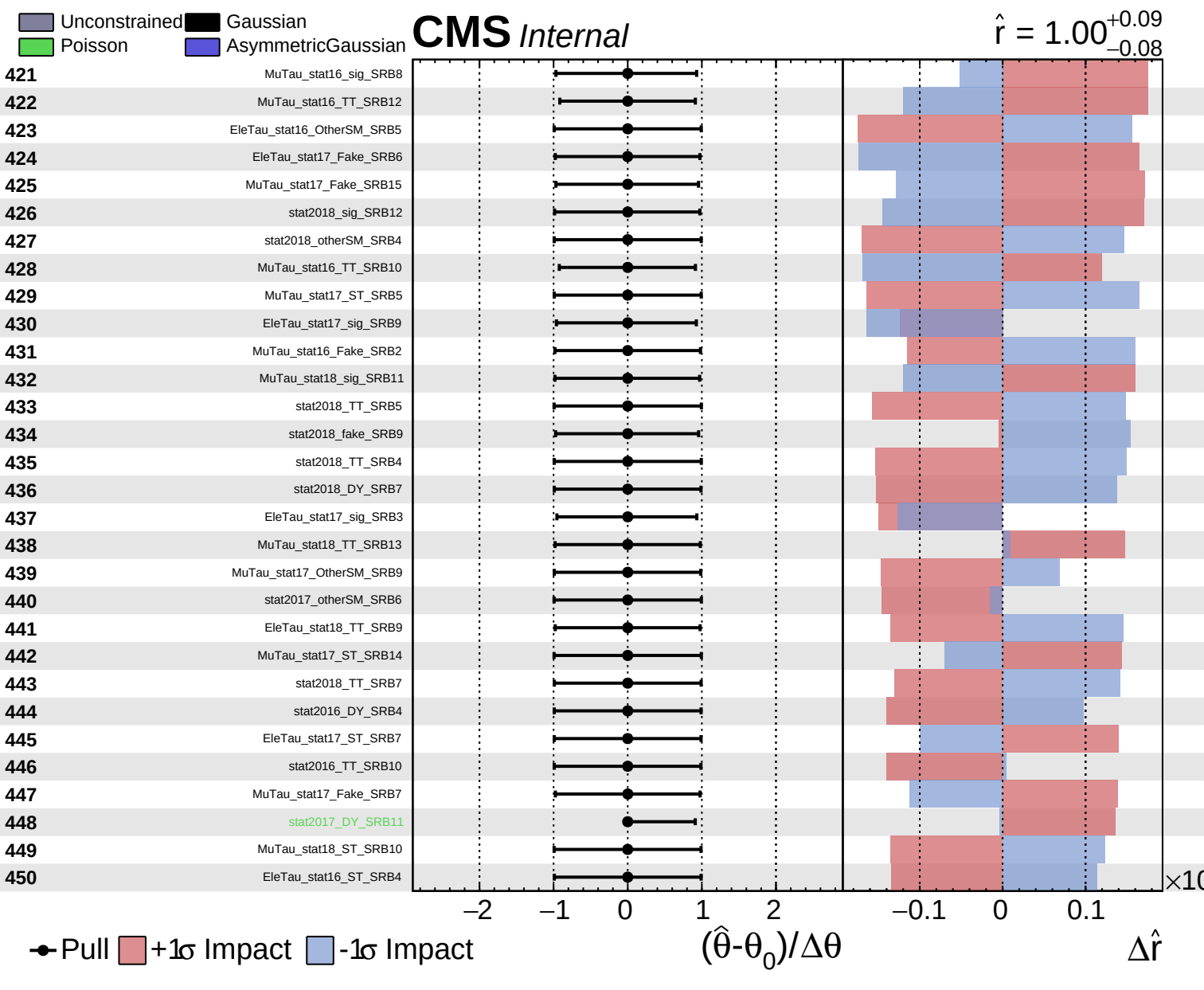

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
271 EleTau_stat17_TT_SRB2
272 stat2016_DY_SRB1
273 EleTau_stat16_sig_SRB1
274 stat2018_fake_SRB10
275 MuTau_stat17_TT_SRB12
276 EleTau_stat17_sig_SRB1
277 EleTau_stat18_sig_SRB2
278 stat2016_TT_SRB6
279 MuTau_stat18_Fake_SRB1
280 EleTau_stat18_TT_SRB11
281 EleTau_stat18_TT_SRB2
282 EleTau_stat17_OtherSM_SRB1
283 MuTau_stat18_TT_SRB11
284 EleTau_stat16_sig_SRB6
285 MuTau_stat16_Fake_SRB3
286 MuTau_stat17_Fake_SRB9
287 EleTau_stat18_Fake_SRB12
288 stat2016_fake_SRB8
289 MuTau_stat16_sig_SRB2
290 stat2018_sig_SRB6
291 syst2016_bTaggingSF
292 stat2017_TT_SRB8
293 stat2016_DY_SRB15
294 EleTau_stat17_Fake_SRB5
295 EleTau_stat18_Fake_SRB11
296 EleTau_stat17_TT_SRB10
297 stat2017_TT_SRB6
298 stat2017_TT_SRB12
299 MuTau_stat18_Fake_SRB11
300 MuTau_stat18_OtherSM_SRB6
−2 −1 0 1 2
−0.5 0 0.5
×10
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr̂

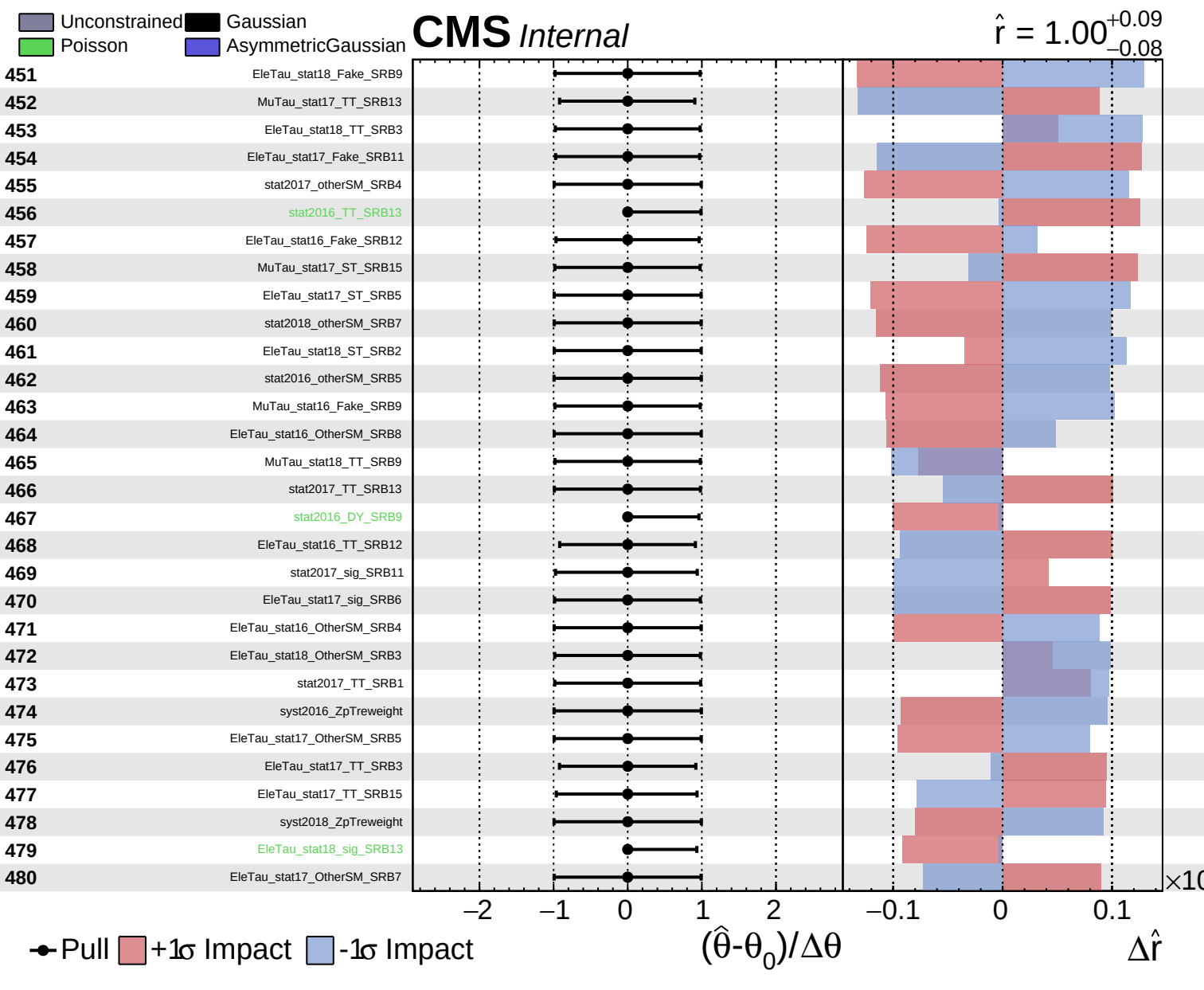

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
301 MuTau_stat17_TT_SRB11
302 stat2016_TT_SRB15
303 EleTau_stat16_TT_SRB7
304 stat2018_DY_SRB15
305 MuTau_stat17_Fake_SRB1
306 EleTau_stat18_TT_SRB12
307 stat2018_sig_SRB13
308 stat2016_TT_SRB7
309 stat2017_DY_SRB12
310 EleTau_stat17_Fake_SRB1
311 stat2016_DY_SRB10
312 stat2017_TT_SRB14
313 stat2017_TT_SRB7
314 stat2018_sig_SRB7
315 EleTau_stat17_sig_SRB12
316 EleTau_stat16_Fake_SRB3
317 stat2018_sig_SRB15
318 stat2016_TT_SRB8
319 EleTau_stat16_sig_SRB8
320 stat2016_TT_SRB3
321 stat2018_TT_SRB2
322 MuTau_stat17_sig_SRB8
323 EleTau_stat16_OtherSM_SRB2
324 EleTau_stat18_sig_SRB11
325 EleTau_stat18_sig_SRB3
326 stat2018_DY_SRB1
327 stat2018_sig_SRB11
328 EleTau_stat18_Fake_SRB10
329 EleTau_stat16_Fake_SRB15
330 MuTau_stat18_ST_SRB1
−2 −1 0 1 2
−0.5 0 0.5
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr̂

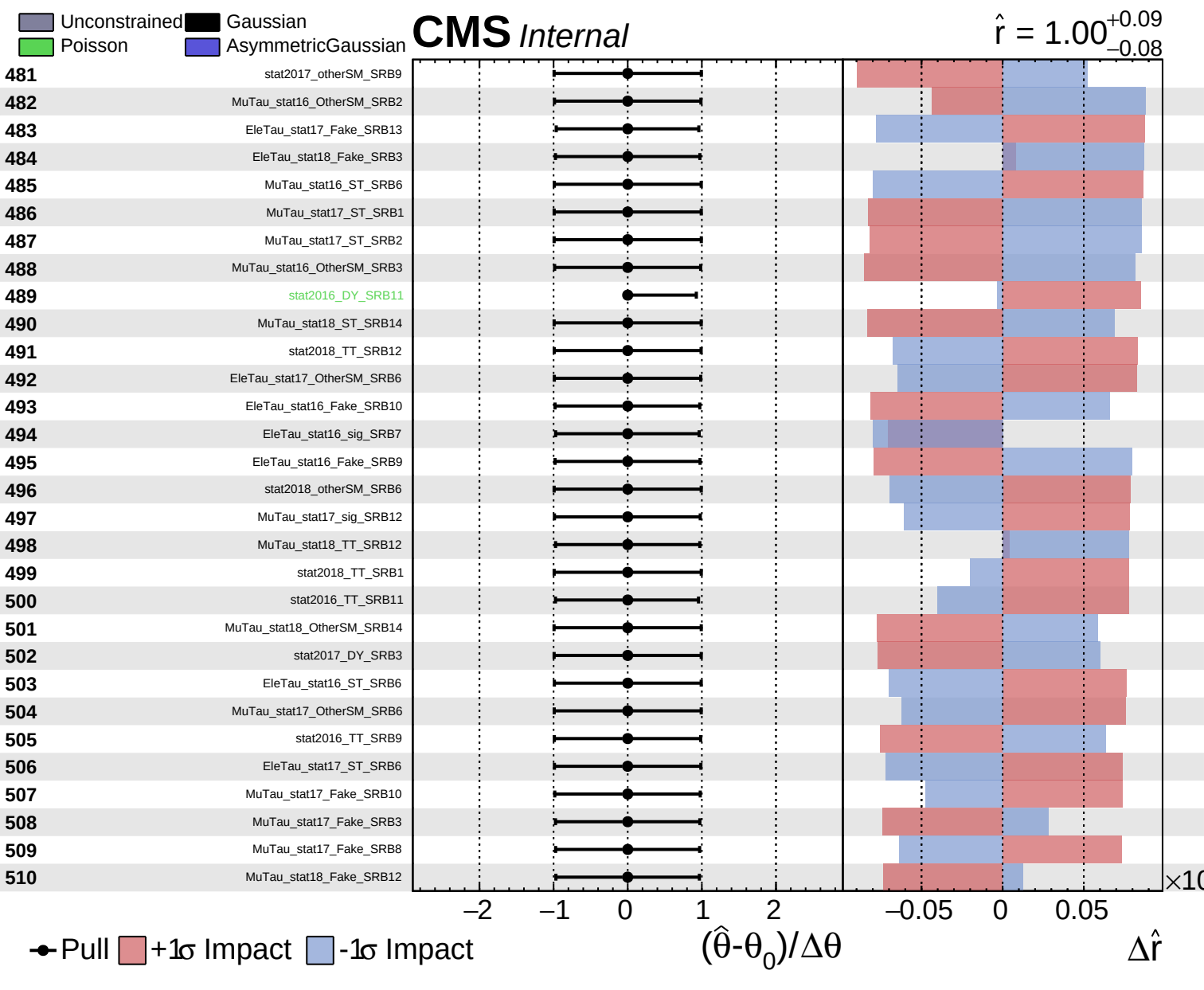

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
331 EleTau_stat17_Fake_SRB15
332 stat2017_TT_SRB4
333 EleTau_stat18_ST_SRB11
334 stat2018_sig_SRB1
335 stat2017_otherSM_SRB10
336 syst2018_extraMt2Unc
337 MuTau_stat18_ST_SRB11
338 stat2018_otherSM_SRB2
339 EleTau_stat17_ST_SRB1
340 stat2017_fake_SRB15
341 MuTau_stat18_Fake_SRB9
342 MuTau_stat18_sig_SRB8
343 EleTau_stat17_Fake_SRB12
344 stat2017_DY_SRB6
345 MuTau_stat17_OtherSM_SRB2
346 MuTau_stat17_Fake_SRB2
347 EleTau_stat17_ST_SRB8
348 MuTau_stat18_sig_SRB12
349 MuTau_stat18_sig_SRB7
350 MuTau_stat18_Fake_SRB3
351 MuTau_stat16_TT_SRB11
352 EleTau_stat16_OtherSM_SRB1
353 MuTau_stat18_OtherSM_SRB3
354 MuTau_stat16_TT_SRB2
355 MuTau_stat17_TT_SRB7
356 MuTau_stat18_TT_SRB3
357 EleTau_stat16_Fake_SRB8
358 EleTau_stat16_Fake_SRB13
359 MuTau_stat17_TT_SRB8
360 stat2018_DY_SRB5
−2 −1 0 1 2
−0.4 −0.2 0 0.2 0.4
×10
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr̂

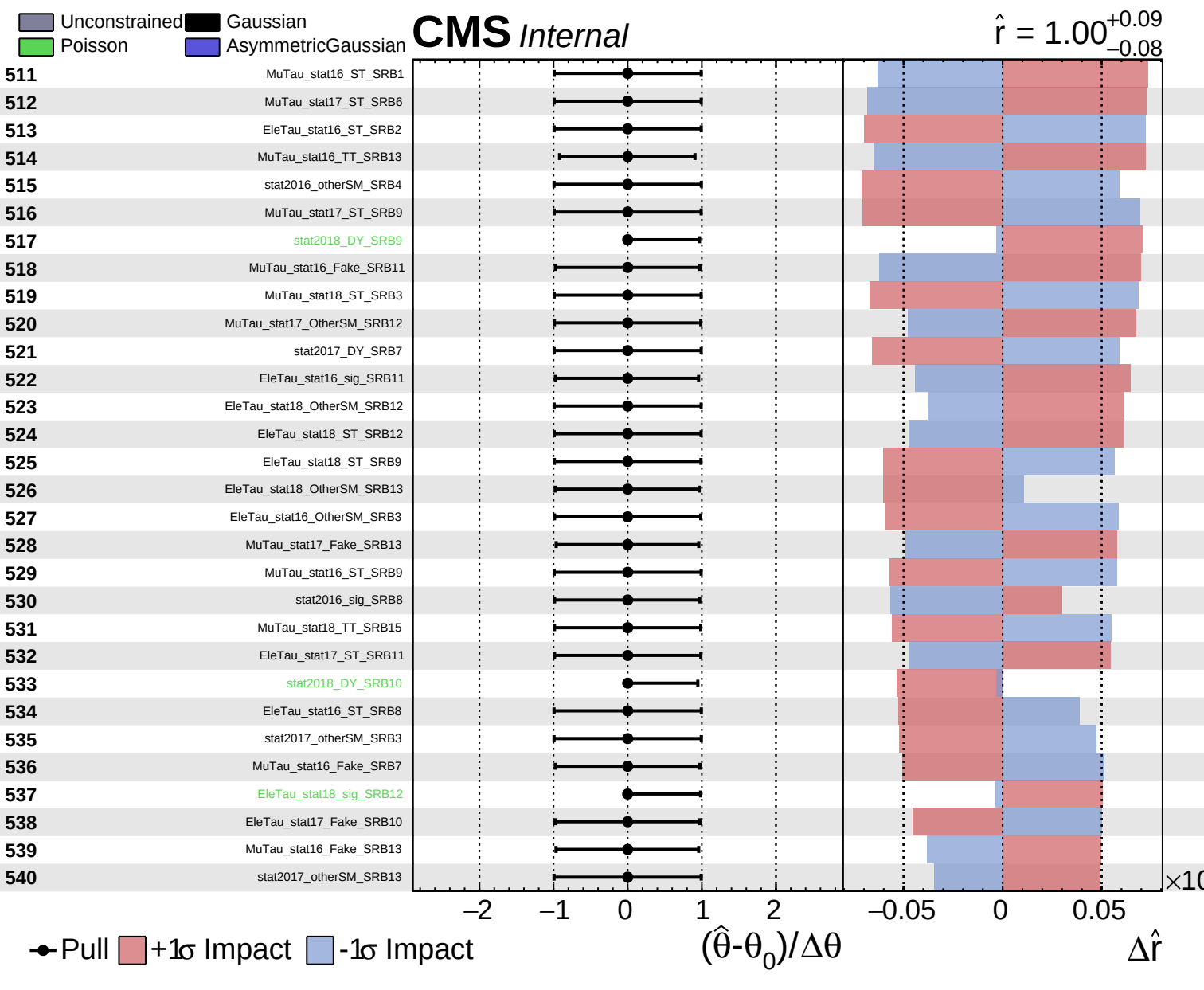

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
361 EleTau_stat16_TT_SRB13
362 MuTau_stat18_OtherSM_SRB13
363 stat2017_TT_SRB5
364 MuTau_stat17_Fake_SRB12
365 stat2017_DY_SRB5
366 EleTau_stat16_sig_SRB10
367 stat2017_TT_SRB9
368 EleTau_stat17_OtherSM_SRB13
369 stat2017_fake_SRB9
370 stat2018_otherSM_SRB15
371 stat2018_DY_SRB6
372 EleTau_stat18_OtherSM_SRB2
373 stat2017_DY_SRB1
374 stat2016_TT_SRB4
375 MuTau_stat18_TT_SRB8
376 MuTau_stat18_Fake_SRB8
377 EleTau_stat17_TT_SRB13
378 MuTau_stat16_TT_SRB8
379 MuTau_stat18_Fake_SRB7
380 stat2016_DY_SRB12
381 MuTau_stat17_Fake_SRB5
382 EleTau_stat16_TT_SRB9
383 stat2016_DY_SRB13
384 EleTau_stat16_TT_SRB11
385 stat2017_sig_SRB1
386 MuTau_stat16_OtherSM_SRB4
387 stat2018_DY_SRB14
388 MuTau_stat16_ST_SRB4
389 MuTau_stat17_Fake_SRB6
390 stat2018_fake_SRB15
−2 −1 0 1 2
−0.2 0 0.2
×10
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr̂

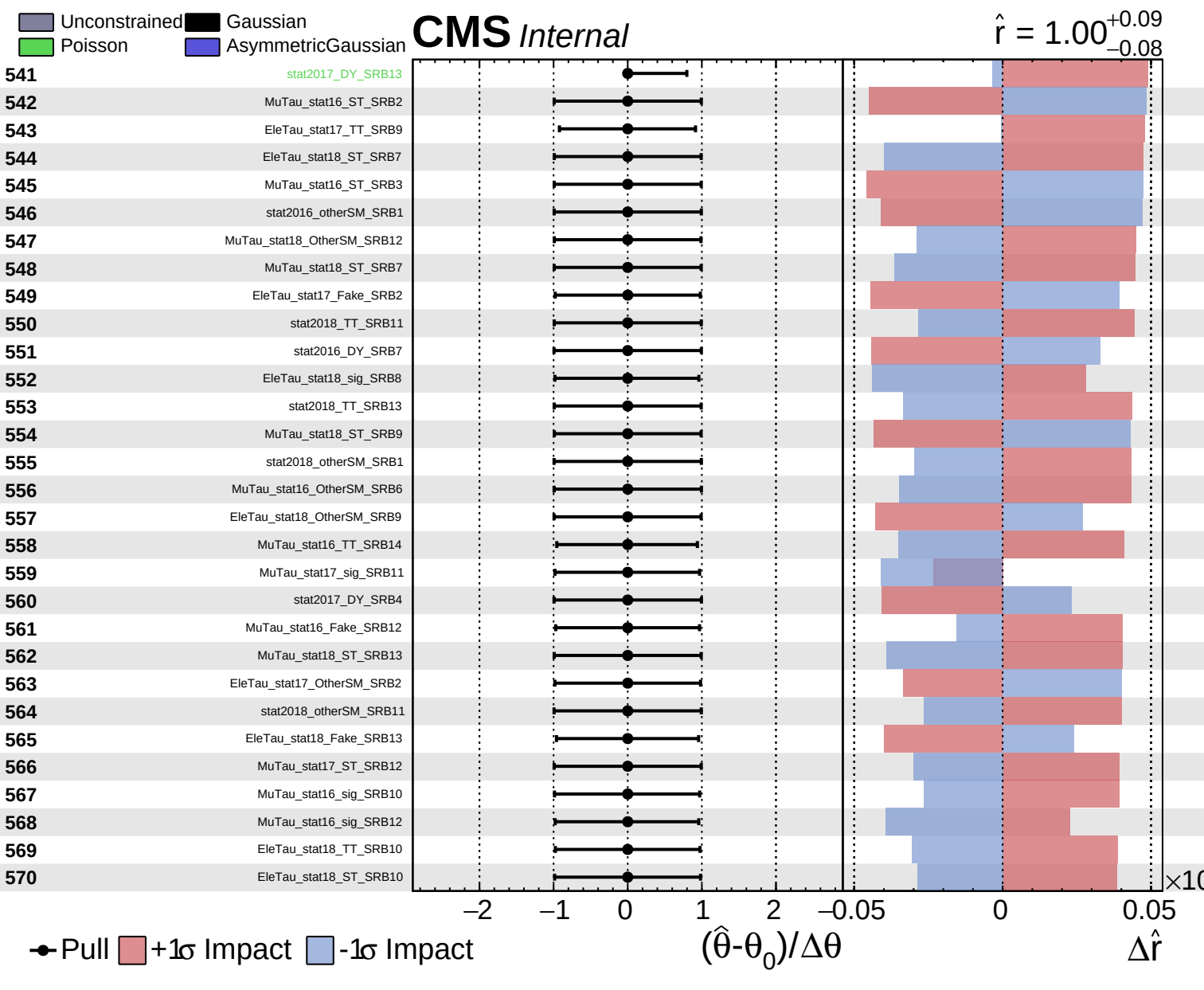

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
391 EleTau_stat18_Fake_SRB2
392 stat2017_otherSM_SRB5
393 MuTau_stat17_ST_SRB4
394 stat2018_TT_SRB3
395 MuTau_stat17_sig_SRB6
396 EleTau_stat18_sig_SRB14
397 stat2016_DY_SRB8
398 stat2016_DY_SRB14
399 EleTau_stat16_Fake_SRB4
400 MuTau_stat18_TT_SRB7
401 stat2016_TT_SRB14
402 MuTau_stat18_Fake_SRB13
403 MuTau_stat18_ST_SRB2
404 stat2016_DY_SRB5
405 MuTau_stat17_TT_SRB3
406 EleTau_stat16_Fake_SRB7
407 stat2017_otherSM_SRB2
408 stat2016_otherSM_SRB2
409 MuTau_stat17_sig_SRB7
410 stat2018_otherSM_SRB3
411 MuTau_stat18_OtherSM_SRB8
412 EleTau_stat16_TT_SRB10
413 EleTau_stat17_OtherSM_SRB8
414 MuTau_stat17_OtherSM_SRB5
415 EleTau_stat18_TT_SRB8
416 EleTau_stat17_sig_SRB7
417 stat2018_TT_SRB6
418 stat2018_otherSM_SRB5
419 EleTau_stat18_Fake_SRB8
420 MuTau_stat17_TT_SRB15
×10
−2 −1 0 1 2
−0.2 0 0.2
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr̂

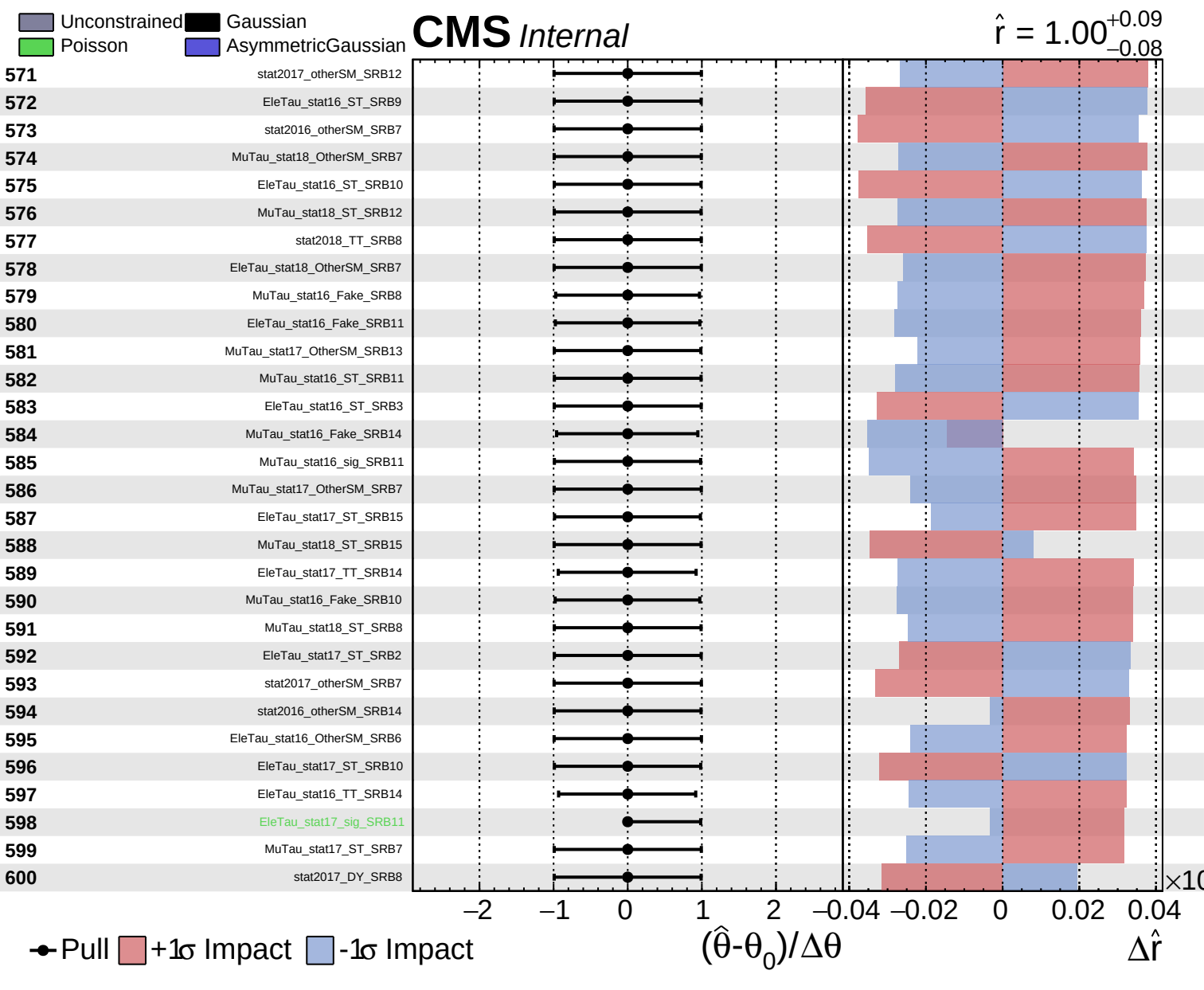

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
421 MuTau_stat16_sig_SRB8
422 MuTau_stat16_TT_SRB12
423 EleTau_stat16_OtherSM_SRB5
424 EleTau_stat17_Fake_SRB6
425 MuTau_stat17_Fake_SRB15
426 stat2018_sig_SRB12
427 stat2018_otherSM_SRB4
428 MuTau_stat16_TT_SRB10
429 MuTau_stat17_ST_SRB5
430 EleTau_stat17_sig_SRB9
431 MuTau_stat16_Fake_SRB2
432 MuTau_stat18_sig_SRB11
433 stat2018_TT_SRB5
434 stat2018_fake_SRB9
435 stat2018_TT_SRB4
436 stat2018_DY_SRB7
437 EleTau_stat17_sig_SRB3
438 MuTau_stat18_TT_SRB13
439 MuTau_stat17_OtherSM_SRB9
440 stat2017_otherSM_SRB6
441 EleTau_stat18_TT_SRB9
442 MuTau_stat17_ST_SRB14
443 stat2018_TT_SRB7
444 stat2016_DY_SRB4
445 EleTau_stat17_ST_SRB7
446 stat2016_TT_SRB10
447 MuTau_stat17_Fake_SRB7
448 stat2017_DY_SRB11
449 MuTau_stat18_ST_SRB10
450 EleTau_stat16_ST_SRB4
−2 −1 0 1 2
−0.1 0 0.1
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr̂

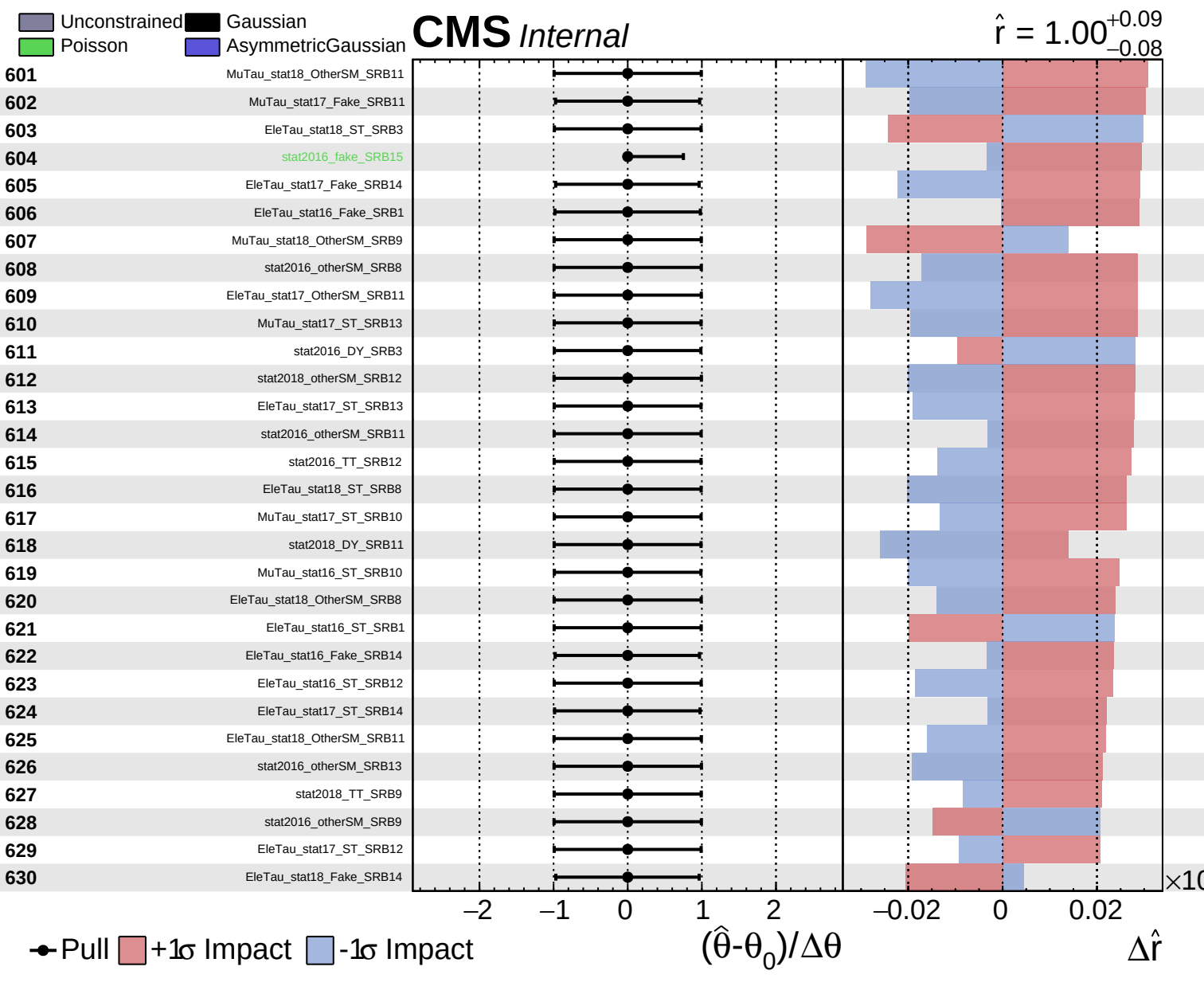

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
451 EleTau_stat18_Fake_SRB9
452 MuTau_stat17_TT_SRB13
453 EleTau_stat18_TT_SRB3
454 EleTau_stat17_Fake_SRB11
455 stat2017_otherSM_SRB4
456 stat2016_TT_SRB13
457 EleTau_stat16_Fake_SRB12
458 MuTau_stat17_ST_SRB15
459 EleTau_stat17_ST_SRB5
460 stat2018_otherSM_SRB7
461 EleTau_stat18_ST_SRB2
462 stat2016_otherSM_SRB5
463 MuTau_stat16_Fake_SRB9
464 EleTau_stat16_OtherSM_SRB8
465 MuTau_stat18_TT_SRB9
466 stat2017_TT_SRB13
467 stat2016_DY_SRB9
468 EleTau_stat16_TT_SRB12
469 stat2017_sig_SRB11
470 EleTau_stat17_sig_SRB6
471 EleTau_stat16_OtherSM_SRB4
472 EleTau_stat18_OtherSM_SRB3
473 stat2017_TT_SRB1
474 syst2016_ZpTreweight
475 EleTau_stat17_OtherSM_SRB5
476 EleTau_stat17_TT_SRB3
477 EleTau_stat17_TT_SRB15
478 syst2018_ZpTreweight
479 EleTau_stat18_sig_SRB13
480 EleTau_stat17_OtherSM_SRB7
−2 −1 0 1 2
−0.1 0 0.1
×10
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr̂

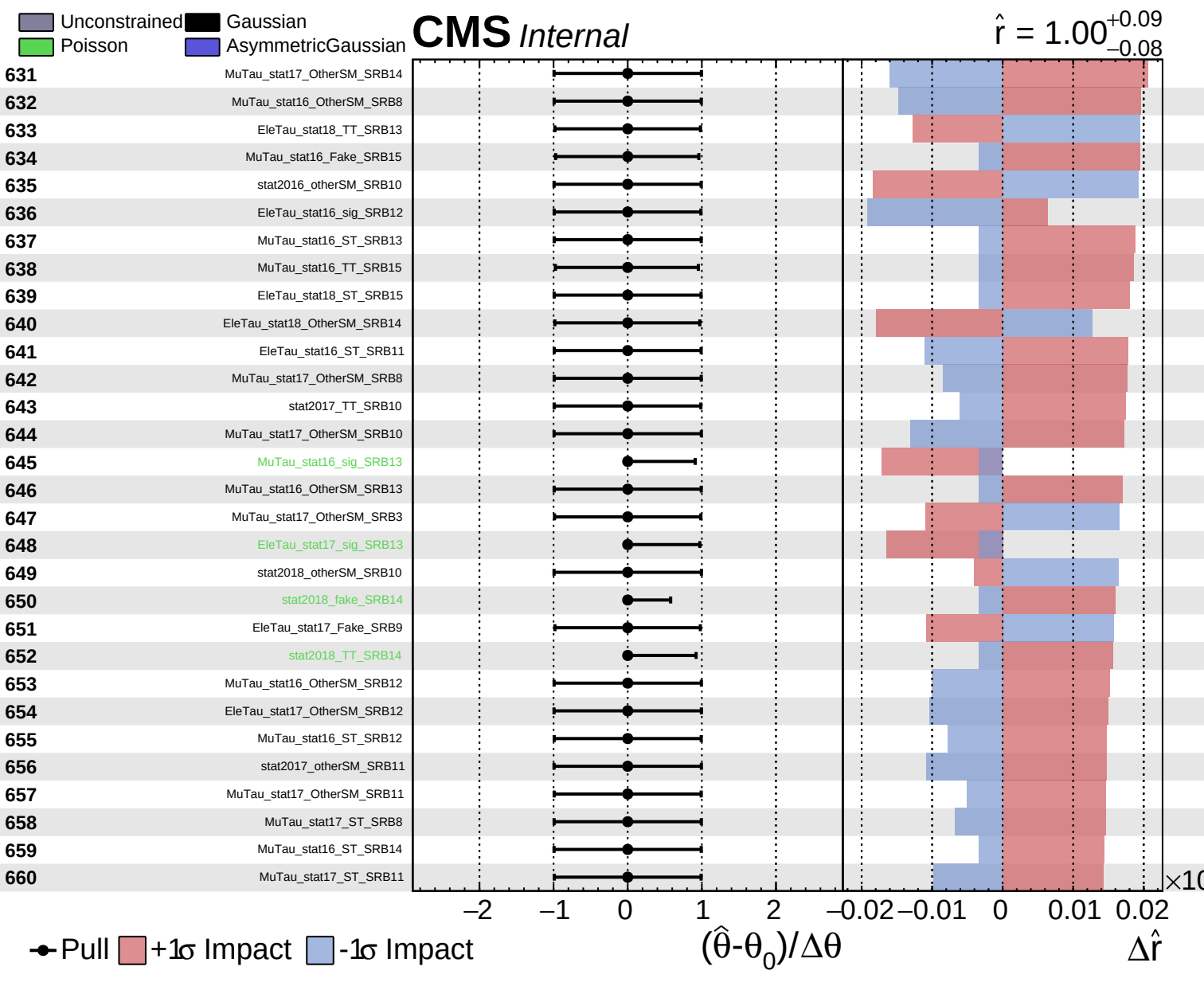

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
481 stat2017_otherSM_SRB9
482 MuTau_stat16_OtherSM_SRB2
483 EleTau_stat17_Fake_SRB13
484 EleTau_stat18_Fake_SRB3
485 MuTau_stat16_ST_SRB6
486 MuTau_stat17_ST_SRB1
487 MuTau_stat17_ST_SRB2
488 MuTau_stat16_OtherSM_SRB3
489 stat2016_DY_SRB11
490 MuTau_stat18_ST_SRB14
491 stat2018_TT_SRB12
492 EleTau_stat17_OtherSM_SRB6
493 EleTau_stat16_Fake_SRB10
494 EleTau_stat16_sig_SRB7
495 EleTau_stat16_Fake_SRB9
496 stat2018_otherSM_SRB6
497 MuTau_stat17_sig_SRB12
498 MuTau_stat18_TT_SRB12
499 stat2018_TT_SRB1
500 stat2016_TT_SRB11
501 MuTau_stat18_OtherSM_SRB14
502 stat2017_DY_SRB3
503 EleTau_stat16_ST_SRB6
504 MuTau_stat17_OtherSM_SRB6
505 stat2016_TT_SRB9
506 EleTau_stat17_ST_SRB6
507 MuTau_stat17_Fake_SRB10
508 MuTau_stat17_Fake_SRB3
509 MuTau_stat17_Fake_SRB8
510 MuTau_stat18_Fake_SRB12
×10
−2 −1 0 1 2
−0.05 0 0.05
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr̂

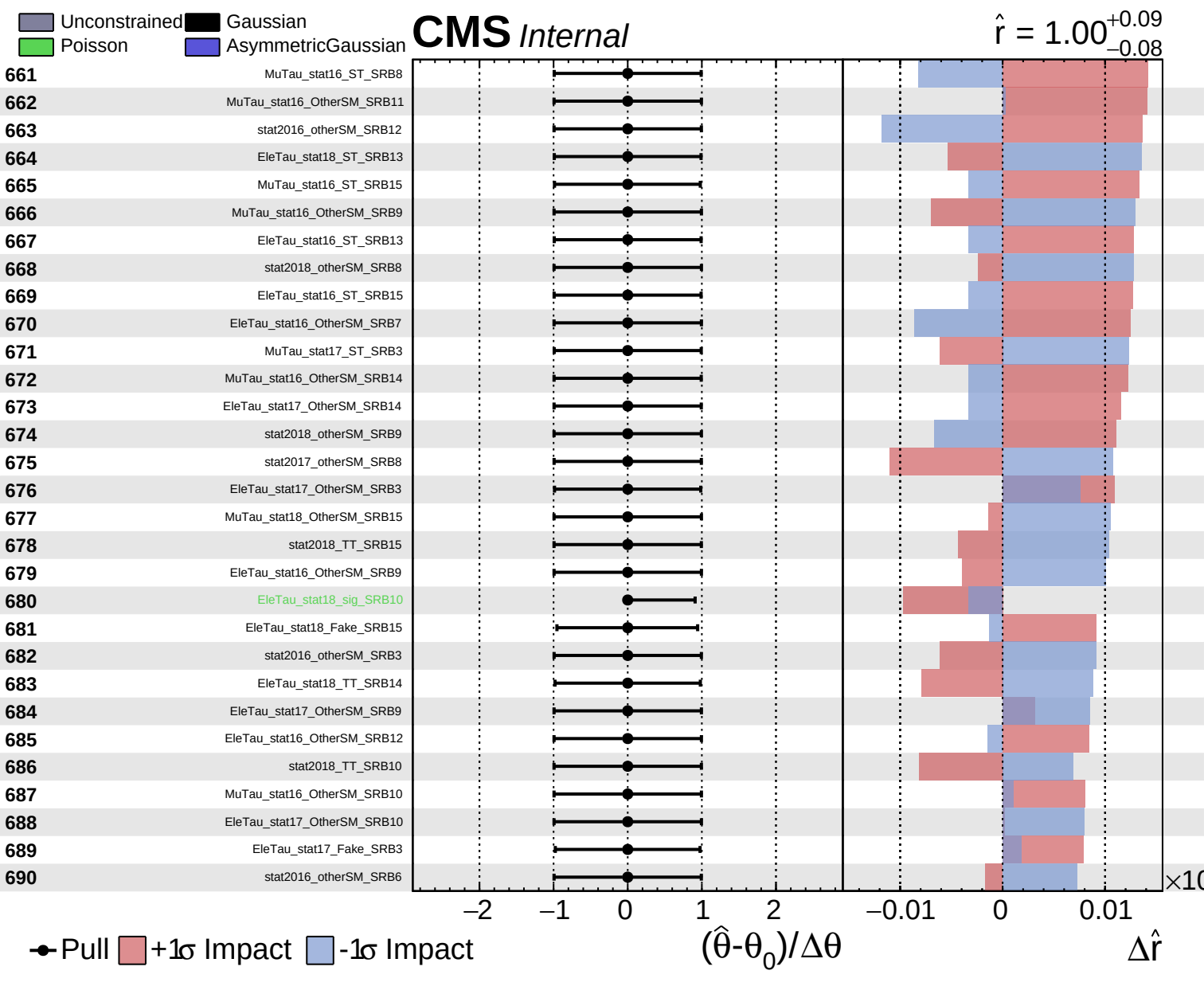

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
511 MuTau_stat16_ST_SRB1
512 MuTau_stat17_ST_SRB6
513 EleTau_stat16_ST_SRB2
514 MuTau_stat16_TT_SRB13
515 stat2016_otherSM_SRB4
516 MuTau_stat17_ST_SRB9
517 stat2018_DY_SRB9
518 MuTau_stat16_Fake_SRB11
519 MuTau_stat18_ST_SRB3
520 MuTau_stat17_OtherSM_SRB12
521 stat2017_DY_SRB7
522 EleTau_stat16_sig_SRB11
523 EleTau_stat18_OtherSM_SRB12
524 EleTau_stat18_ST_SRB12
525 EleTau_stat18_ST_SRB9
526 EleTau_stat18_OtherSM_SRB13
527 EleTau_stat16_OtherSM_SRB3
528 MuTau_stat17_Fake_SRB13
529 MuTau_stat16_ST_SRB9
530 stat2016_sig_SRB8
531 MuTau_stat18_TT_SRB15
532 EleTau_stat17_ST_SRB11
533 stat2018_DY_SRB10
534 EleTau_stat16_ST_SRB8
535 stat2017_otherSM_SRB3
536 MuTau_stat16_Fake_SRB7
537 EleTau_stat18_sig_SRB12
538 EleTau_stat17_Fake_SRB10
539 MuTau_stat16_Fake_SRB13
540 stat2017_otherSM_SRB13
×10
−2 −1 0 1 2
−0.05 0 0.05
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr̂

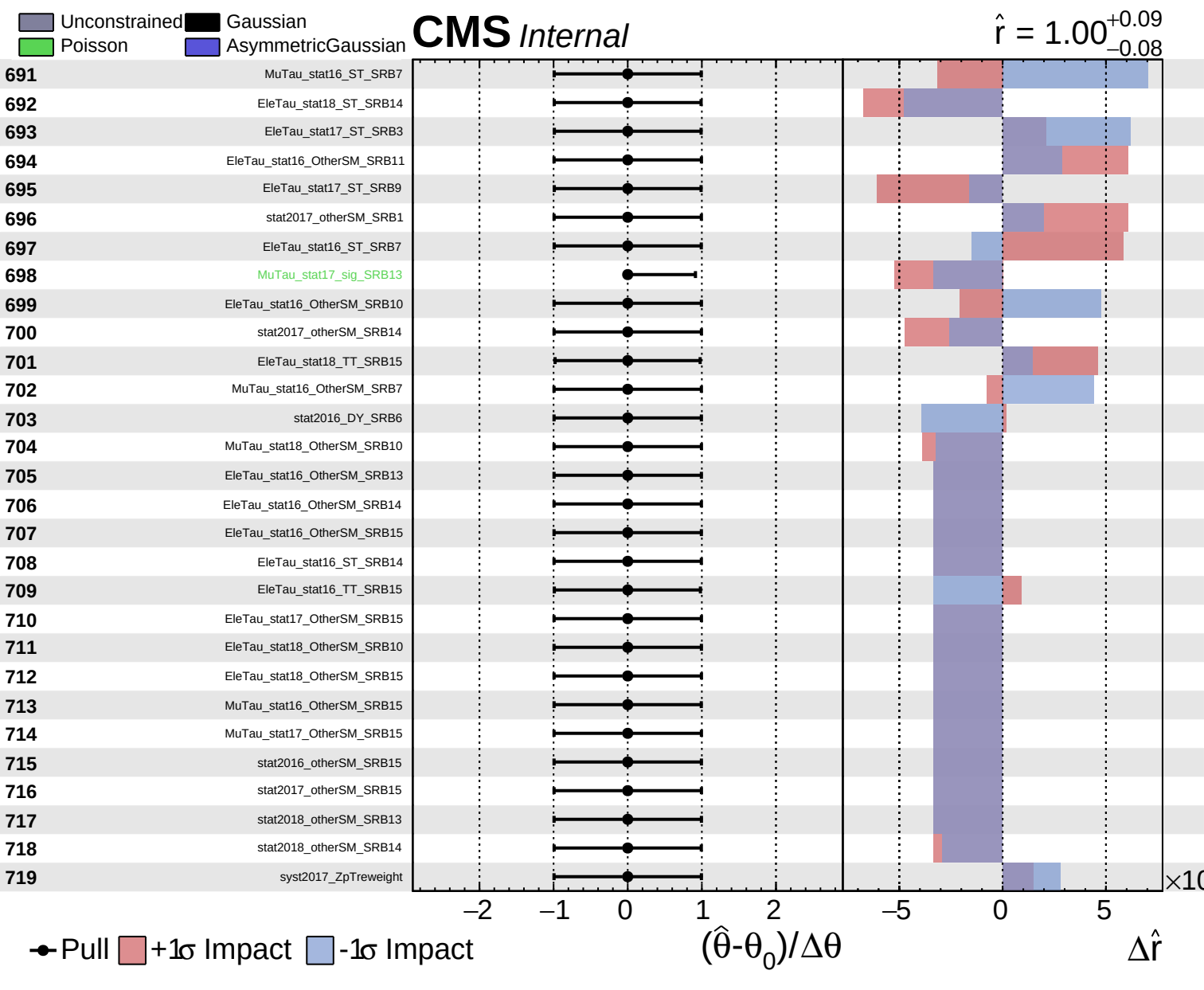

Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
541 stat2017_DY_SRB13
542 MuTau_stat16_ST_SRB2
543 EleTau_stat17_TT_SRB9
544 EleTau_stat18_ST_SRB7
545 MuTau_stat16_ST_SRB3
546 stat2016_otherSM_SRB1
547 MuTau_stat18_OtherSM_SRB12
548 MuTau_stat18_ST_SRB7
549 EleTau_stat17_Fake_SRB2
550 stat2018_TT_SRB11
551 stat2016_DY_SRB7
552 EleTau_stat18_sig_SRB8
553 stat2018_TT_SRB13
554 MuTau_stat18_ST_SRB9
555 stat2018_otherSM_SRB1
556 MuTau_stat16_OtherSM_SRB6
557 EleTau_stat18_OtherSM_SRB9
558 MuTau_stat16_TT_SRB14
559 MuTau_stat17_sig_SRB11
560 stat2017_DY_SRB4
561 MuTau_stat16_Fake_SRB12
562 MuTau_stat18_ST_SRB13
563 EleTau_stat17_OtherSM_SRB2
564 stat2018_otherSM_SRB11
565 EleTau_stat18_Fake_SRB13
566 MuTau_stat17_ST_SRB12
567 MuTau_stat16_sig_SRB10
568 MuTau_stat16_sig_SRB12
569 EleTau_stat18_TT_SRB10
570 EleTau_stat18_ST_SRB10
×10
−2 −1 0 1 2
−0.05 0 0.05
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr̂


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
571 stat2017_otherSM_SRB12
572 EleTau_stat16_ST_SRB9
573 stat2016_otherSM_SRB7
574 MuTau_stat18_OtherSM_SRB7
575 EleTau_stat16_ST_SRB10
576 MuTau_stat18_ST_SRB12
577 stat2018_TT_SRB8
578 EleTau_stat18_OtherSM_SRB7
579 MuTau_stat16_Fake_SRB8
580 EleTau_stat16_Fake_SRB11
581 MuTau_stat17_OtherSM_SRB13
582 MuTau_stat16_ST_SRB11
583 EleTau_stat16_ST_SRB3
584 MuTau_stat16_Fake_SRB14
585 MuTau_stat16_sig_SRB11
586 MuTau_stat17_OtherSM_SRB7
587 EleTau_stat17_ST_SRB15
588 MuTau_stat18_ST_SRB15
589 EleTau_stat17_TT_SRB14
590 MuTau_stat16_Fake_SRB10
591 MuTau_stat18_ST_SRB8
592 EleTau_stat17_ST_SRB2
593 stat2017_otherSM_SRB7
594 stat2016_otherSM_SRB14
595 EleTau_stat16_OtherSM_SRB6
596 EleTau_stat17_ST_SRB10
597 EleTau_stat16_TT_SRB14
598 EleTau_stat17_sig_SRB11
599 MuTau_stat17_ST_SRB7
600 stat2017_DY_SRB8
−2 −1 0 1 2
−0.04 −0.02 0 0.02 0.04
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr̂


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
601 MuTau_stat18_OtherSM_SRB11
602 MuTau_stat17_Fake_SRB11
603 EleTau_stat18_ST_SRB3
604 stat2016_fake_SRB15
605 EleTau_stat17_Fake_SRB14
606 EleTau_stat16_Fake_SRB1
607 MuTau_stat18_OtherSM_SRB9
608 stat2016_otherSM_SRB8
609 EleTau_stat17_OtherSM_SRB11
610 MuTau_stat17_ST_SRB13
611 stat2016_DY_SRB3
612 stat2018_otherSM_SRB12
613 EleTau_stat17_ST_SRB13
614 stat2016_otherSM_SRB11
615 stat2016_TT_SRB12
616 EleTau_stat18_ST_SRB8
617 MuTau_stat17_ST_SRB10
618 stat2018_DY_SRB11
619 MuTau_stat16_ST_SRB10
620 EleTau_stat18_OtherSM_SRB8
621 EleTau_stat16_ST_SRB1
622 EleTau_stat16_Fake_SRB14
623 EleTau_stat16_ST_SRB12
624 EleTau_stat17_ST_SRB14
625 EleTau_stat18_OtherSM_SRB11
626 stat2016_otherSM_SRB13
627 stat2018_TT_SRB9
628 stat2016_otherSM_SRB9
629 EleTau_stat17_ST_SRB12
630 EleTau_stat18_Fake_SRB14
−2
−1
0
1
2
−0.02
0
0.02
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr̂


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
631 MuTau_stat17_OtherSM_SRB14
632 MuTau_stat16_OtherSM_SRB8
633 EleTau_stat18_TT_SRB13
634 MuTau_stat16_Fake_SRB15
635 stat2016_otherSM_SRB10
636 EleTau_stat16_sig_SRB12
637 MuTau_stat16_ST_SRB13
638 MuTau_stat16_TT_SRB15
639 EleTau_stat18_ST_SRB15
640 EleTau_stat18_OtherSM_SRB14
641 EleTau_stat16_ST_SRB11
642 MuTau_stat17_OtherSM_SRB8
643 stat2017_TT_SRB10
644 MuTau_stat17_OtherSM_SRB10
645 MuTau_stat16_sig_SRB13
646 MuTau_stat16_OtherSM_SRB13
647 MuTau_stat17_OtherSM_SRB3
648 EleTau_stat17_sig_SRB13
649 stat2018_otherSM_SRB10
650 stat2018_fake_SRB14
651 EleTau_stat17_Fake_SRB9
652 stat2018_TT_SRB14
653 MuTau_stat16_OtherSM_SRB12
654 EleTau_stat17_OtherSM_SRB12
655 MuTau_stat16_ST_SRB12
656 stat2017_otherSM_SRB11
657 MuTau_stat17_OtherSM_SRB11
658 MuTau_stat17_ST_SRB8
659 MuTau_stat16_ST_SRB14
660 MuTau_stat17_ST_SRB11
×10
−2 −1 0 1 2
−0.02 −0.01 0 0.01 0.02
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr̂


Unconstrained
Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
661 MuTau_stat16_ST_SRB8
662 MuTau_stat16_OtherSM_SRB11
663 stat2016_otherSM_SRB12
664 EleTau_stat18_ST_SRB13
665 MuTau_stat16_ST_SRB15
666 MuTau_stat16_OtherSM_SRB9
667 EleTau_stat16_ST_SRB13
668 stat2018_otherSM_SRB8
669 EleTau_stat16_ST_SRB15
670 EleTau_stat16_OtherSM_SRB7
671 MuTau_stat17_ST_SRB3
672 MuTau_stat16_OtherSM_SRB14
673 EleTau_stat17_OtherSM_SRB14
674 stat2018_otherSM_SRB9
675 stat2017_otherSM_SRB8
676 EleTau_stat17_OtherSM_SRB3
677 MuTau_stat18_OtherSM_SRB15
678 stat2018_TT_SRB15
679 EleTau_stat16_OtherSM_SRB9
680 EleTau_stat18_sig_SRB10
681 EleTau_stat18_Fake_SRB15
682 stat2016_otherSM_SRB3
683 EleTau_stat18_TT_SRB14
684 EleTau_stat17_OtherSM_SRB9
685 EleTau_stat16_OtherSM_SRB12
686 stat2018_TT_SRB10
687 MuTau_stat16_OtherSM_SRB10
688 EleTau_stat17_OtherSM_SRB10
689 EleTau_stat17_Fake_SRB3
690 stat2016_otherSM_SRB6
−2
−1
0
1
2
−0.01
0
0.01
×10
Pull
+1σ Impact
-1σ Impact
(θ̂-θ0)/Δθ
Δr̂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Gaussian
Poisson
AsymmetricGaussian
CMS Internal
r̂ = 1.00 +0.09 −0.08
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692 EleTau_stat18_ST_SRB14
693 EleTau_stat17_ST_SRB3
694 EleTau_stat16_OtherSM_SRB11
695 EleTau_stat17_ST_SRB9
696 stat2017_otherSM_SRB1
697 EleTau_stat16_ST_SRB7
698 MuTau_stat17_sig_SRB13
699 EleTau_stat16_OtherSM_SRB10
700 stat2017_otherSM_SRB14
701 EleTau_stat18_TT_SRB15
702 MuTau_stat16_OtherSM_SRB7
703 stat2016_DY_SRB6
704 MuTau_stat18_OtherSM_SRB10
705 EleTau_stat16_OtherSM_SRB13
706 EleTau_stat16_OtherSM_SRB14
707 EleTau_stat16_OtherSM_SRB15
708 EleTau_stat16_ST_SRB14
709 EleTau_stat16_TT_SRB15
710 EleTau_stat17_OtherSM_SRB15
711 EleTau_stat18_OtherSM_SRB10
712 EleTau_stat18_OtherSM_SRB15
713 MuTau_stat16_OtherSM_SRB15
714 MuTau_stat17_OtherSM_SRB15
715 stat2016_otherSM_SRB15
716 stat2017_otherSM_SRB15
717 stat2018_otherSM_SRB13
718 stat2018_otherSM_SRB14
719 syst2017_ZpTreweight
−2 −1 0 1 2
−5 0 5
×10
Pull +1σ Impact -1σ Impact
(θ̂-θ0)/Δθ
Δr̂