# Weekly meeting

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# Outline

- $CL_s$ method

- bbtautau

- Tool and the validation

- Madgraph-a example

# $CL_S$ method

- $CL_{s+b}$ method

$$p_{s+b} = P(q \geq q_{obs}|s + b)$$

$$= \int_{q_{obs}}^{\infty} f(q|s + b)\, dq$$

$$p_b = P(q \leq q_{obs}|b)$$

$$= \int_{-\infty}^{q_{obs}} f(q|b)\, dq$$

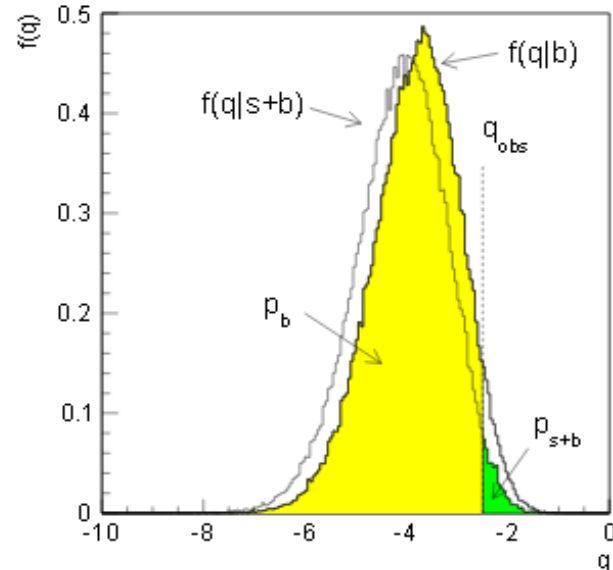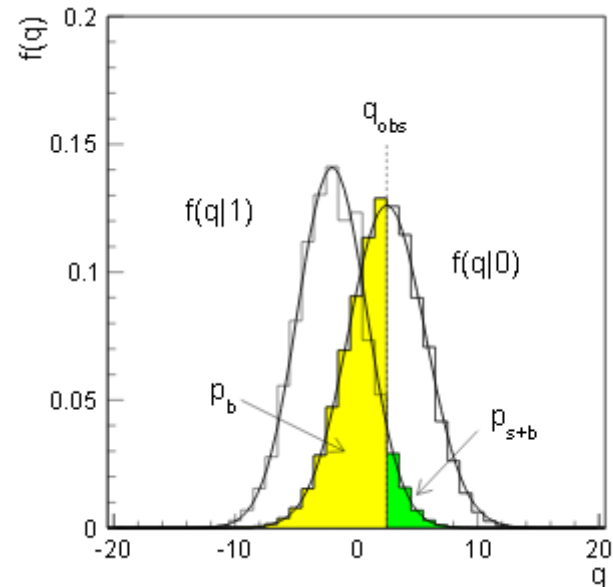$$p_{s+b} < \alpha \dots \dots \dots (1)$$

-> signal model is excluded

- $CL_S$ method

$$CL_S = \frac{p_{s+b}}{1-p_b} < \alpha \dots \dots \dots (2)$$

-> signal model is excluded

# Compare mH260, mH300 and mH800 of both toys and asymptotic

**Toys-260(10,50k,0.5-6)**

- expected limit (+2 sig) 5.38889
- expected limit (+1 sig) 3.38754
- expected limit (median) 2.27161
- expected limit (-1 sig) 1.63792
- expected limit (-2 sig) 1.32123

**Asymptotic-260**

- +2sigma: 5.1206
- +1sigma: 3.24203
- -1sigma: 1.52754
- -2sigma: 1.13783
- Median: 2.11994
- Observed: 2.12013

# Compare mH260, mH300 and mH800 of both toys and asymptotic

**Toys-300(20,50k,0.5-6.5)**

- expected limit (+2 sig) 6.30489

- expected limit (+1 sig) 4.25443

- expected limit (median) 2.86993

- expected limit (-1 sig) 2.02269

- expected limit (-2 sig) 1.55432

**Asymptotic-300**

- +2sigma: 5.98482

- +1sigma: 4.01098

- Median: 2.691

- -1sigma: 1.93902

- -2sigma: 1.44433

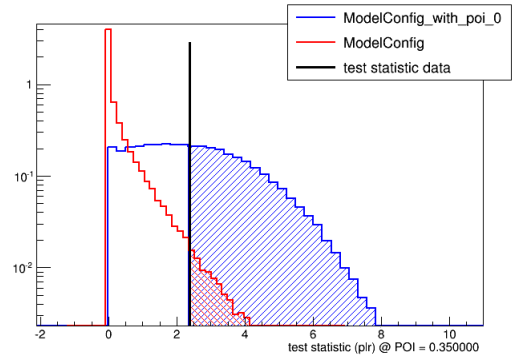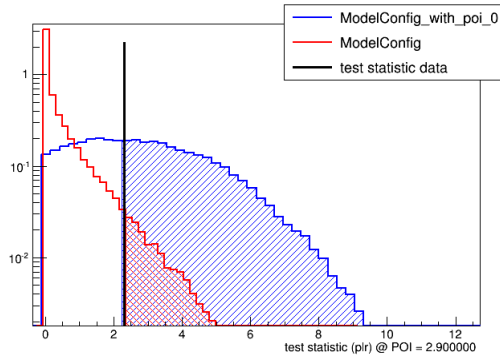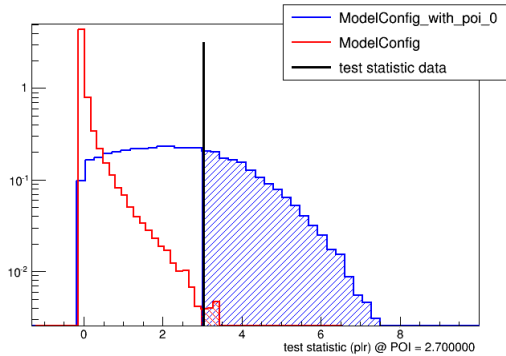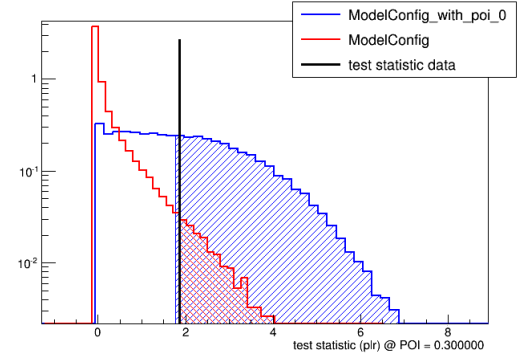# Compare mH260, mH300 and mH800 of both toys and asymptotic
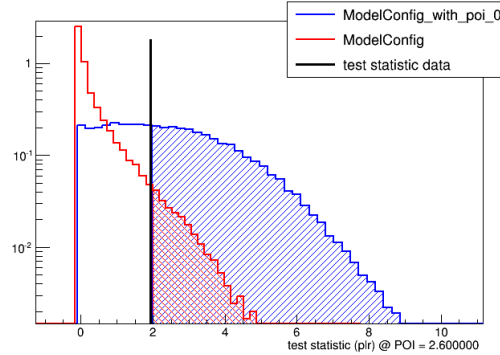
**Toys-800(20,50k,0-1)**

- expected limit (+2 sig) 0.687061
- expected limit (+1 sig) 0.475116
- expected limit (median) 0.325241
- expected limit (-1 sig) 0.23734
- expected limit (-2 sig) 0.190195

**Asymptotic-800**

- +2sigma: 0.713114
- +1sigma: 0.477251
- Median: 0.321297
- -1sigma: 0.231512
- -2sigma: 0.172448

# bbtautau-toys-asymptotic



mH260

mH300

mH800

# Summary-status

- Develop the tool-The other examples in the previous package are deleted.
- Validation-Waiting for the samples
- bbtautau-They are finished

# Backup

weekly meeting

# bbtautau-bands-asymptotic

**125**

- +2sigma:  3.3243
- +1sigma:  2.26686
- -1sigma:  1.10689
- -2sigma:  0.824501
- Median:   1.53617
- Observed: 1.53762

**260**

- +2sigma:  5.1206
- +1sigma:  3.24203
- -1sigma:  1.52754
- -2sigma:  1.13783
- Median:   2.11994
- Observed: 2.12013

# bbtautau-bands-asymptotic

**280**

- +2sigma: 6.82165
- +1sigma: 4.51662
- -1sigma: 2.16372
- -2sigma: 1.61171
- Median:  3.00285
- Observed: 2.99997

**300**

- +2sigma: 5.98482
- +1sigma: 4.01098
- -1sigma: 1.93902
- -2sigma: 1.44433
- Median:  2.691
- Observed: 2.69454

# bbtautau-bands-asymptotic

**350**

- +2sigma: 4.45574
- +1sigma: 2.93833
- -1sigma: 1.40349
- -2sigma: 1.04543
- Median: 1.94778
- Observed: 1.94918

**400**

- +2sigma: 2.11494
- +1sigma: 1.40578
- -1sigma: 0.679748
- -2sigma: 0.506329
- Median: 0.943366
- Observed: 0.943979

# bbtautau-bands-asymptotic

**500**

- +2sigma:  1.21178
- +1sigma:  0.805131
- -1sigma:  0.388639
- -2sigma:  0.289488
- Median:   0.53936
- Observed: 0.539536

**600**

- +2sigma:  0.97585
- +1sigma:  0.653037
- -1sigma:  0.316476
- -2sigma:  0.235736
- Median:   0.439211
- Observed: 0.438973

# bbtautau-bands-asymptotic

**700**

- +2sigma:  0.817782
- +1sigma:  0.547861
- -1sigma:  0.265604
- -2sigma:  0.197842
- Median:   0.36861
- Observed: 0.370097

**800**

- +2sigma:  0.713114
- +1sigma:  0.477251
- -1sigma:  0.231512
- -2sigma:  0.172448
- Median:   0.321297
- Observed: 0.321766

# bbtautau-bands-asymptotic

**900**

- +2sigma:  0.680548
- +1sigma:  0.455951
- -1sigma:  0.22148
- -2sigma:  0.164975
- Median:   0.307374
- Observed: 0.307965

**1000**

- +2sigma:  0.627831
- +1sigma:  0.423752
- -1sigma:  0.207307
- -2sigma:  0.154419
- Median:   0.287705
- Observed: 0.287836

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