

Treating correlations in the
combined likelihood

Current 0-tag background estimate

- $N_{\text{bg}}^{0\text{-tag}} = N^{0\text{-tag}} - (N^{\text{tag}} - N_{\text{bg}}^{\text{tag}}) * (N_{\text{sig}}^{\text{tag}} / N_{\text{sig}}^{0\text{-tag}, 21\text{GeV}})$
- Trivial point: This is really a signal constraint, not a background constraint.
- Non-trivial points:
 - This is taking advantage of a correlation between $N_{\text{sig}}^{0\text{-tag}}$ and $N_{\text{sig}}^{\text{tag}}$. The likelihood should respect this correlation, not treat the two as independent quantities (after this initial calculation).
 - The last factor depends on M_{top} !

- Jet cut efficiency:

- ttop5l 0.547
- ttopjk 0.473
- ttopli 0.576
- ttop6l 0.622
- ttopkk 0.473
- ttop7l 0.632
- ttoplk 0.507
- ttopmk 0.516
- ttopnk 0.559
- ttopok 0.558
- ttoppk 0.583
- ttopqk 0.588
- ttoprk 0.590
- ttopsk 0.582
- ttopTk 0.600
- ttopgk 0.429
- ttopuk 0.620
- ttophk 0.431
- ttopvk 0.617
- ttopik 0.458

- Tag ratio:

- ttop5l 0.711
- ttopjk 0.748
- ttopli 0.700
- ttop6l 0.674
- ttopkk 0.748
- ttop7l 0.728
- ttoplk 0.707
- ttopmk 0.734
- ttopnk 0.722
- ttopok 0.712
- ttoppk 0.716
- ttopqk 0.708
- ttoprk 0.671
- ttopsk 0.677
- ttopTk 0.693
- ttopgk 0.780
- ttopuk 0.700
- ttophk 0.749
- ttopvk 0.708
- ttopik 0.735

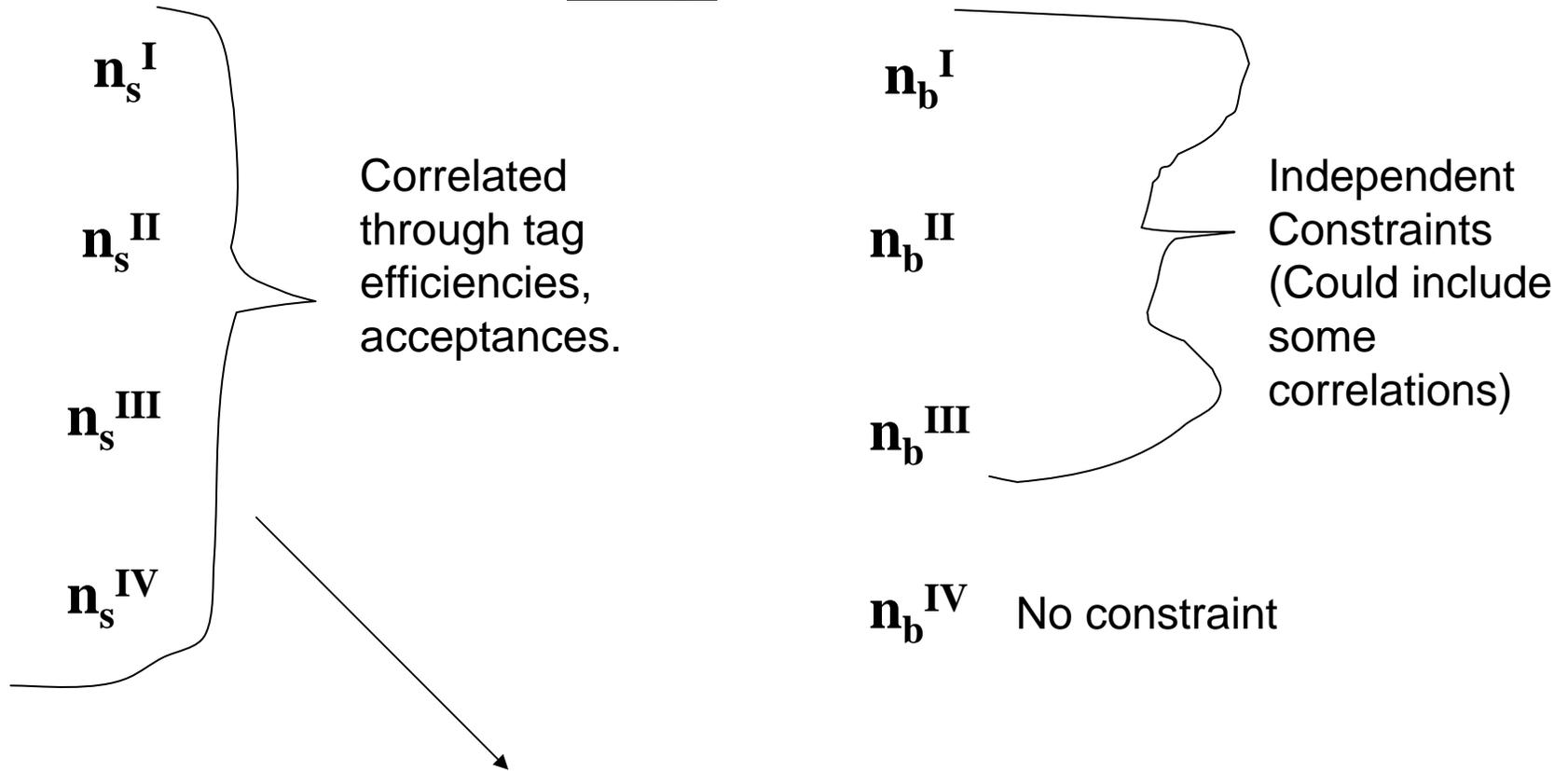
M=175

M=192.5

M=130

Likelihood parameters

M_{top}



Can be 1 parameter, N_{sig} ,
with four efficiencies.
Efficiencies depend on M_{top} !!!

Advantages of changing likelihood

- Correctness: what we do now with 0-tag “background” is wrong—can give wrong answer.
- More powerful: after removing incorrect assumptions, reintroducing what we know about correlations can only improve the measurement.
- Of course, these are probably not large effects. But hard to know without trying. Plus might as well do it right.