Intro

The **mistag asymmetry** (α) is the ratio of *light* positive tags to *all* negative tags

- Scales the negative tag matrix prediction to determine mistags
- Not unity
  - Heavy flavor
  - Material interactions
  - Displaced light flavor vertices

Weiming's 4.11.2 measurement: 1.2 ± 0.1

- Used pseudo-$c\tau$ fits in jet data
- Close-but-not-quite-the-same-measurement: 1.18 ± 0.11 *(not repeatable)*

Since the loose tagger analysis in Gen4, this number has been guessed, not measured

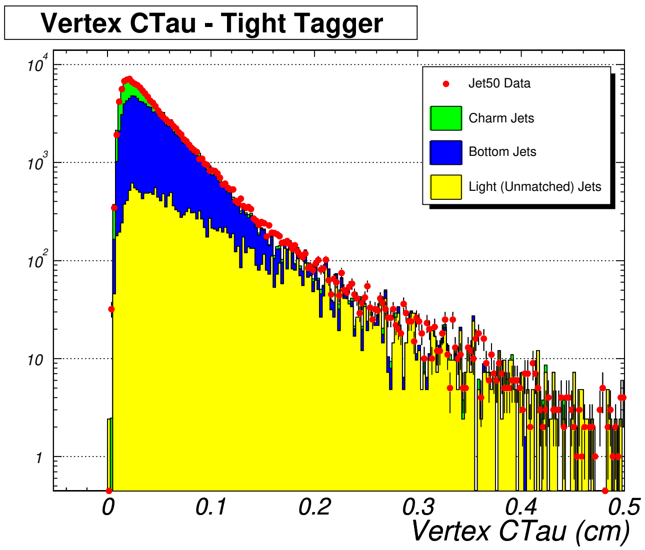
- Current estimate: 1.1 ± 0.1 (both taggers)

Approach

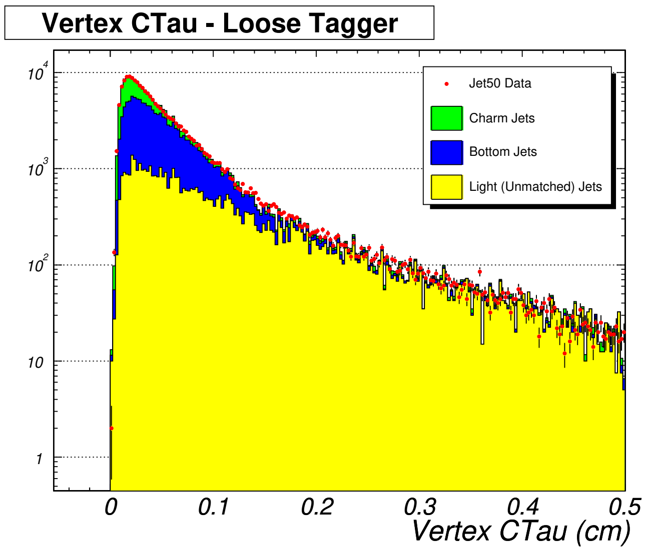
Strategy is essentially the same as Weiming's (Note 6739... good luck)

- In Jet50 MC, get negative-subtracted pseudo-$c\tau$ templates for b, c, and light jets
  - The MC is known to underestimate the number of resolution tags, which should be symmetric
- Fit data distribution to linear combination of the three templates
- Assume universal multiplicative correction for MC negative tails (*negative SF*)
- Solve simultaneously for this scale factor and the pos/neg tag composition

Excess Fits



Vertex CTau - Tight Tagger
Jet50 Data
Charm Jets
Bottom Jets
Light (Unmatched) Jets
Vertex CTau (cm)



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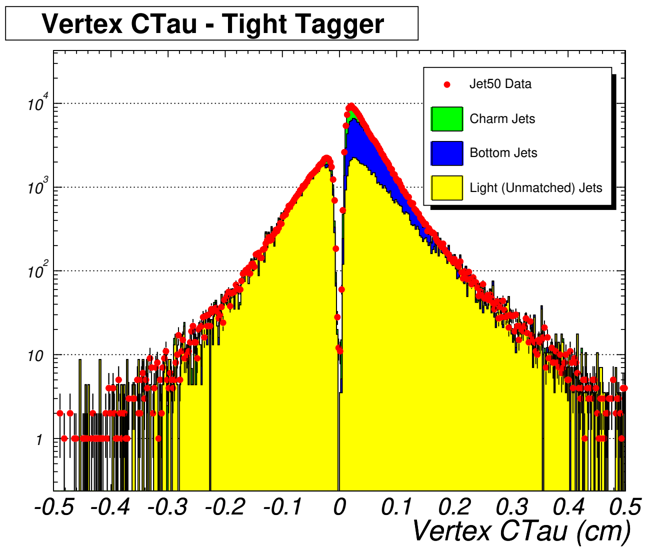
Vertex CTau (cm)

Fit Values

	Positive	Negative	Excess
True Data	192,908	53,203	139,705
True MC B	56,762	1053	55,709
True MC C	23,855	1289	22,566
True MC Light	19,235	10732	8503
Neg SF	1.815		
MC B Fit	91,674.6	3040.1	88,634.5
MC C Fit	33,717.7	3166.7	30,551
MC Light Fit	67,515.6	46,996.1	20,519.5
α	1.269		

	Positive	Negative	Excess
True Data	326,564	133,327	193237
True MC B	65,343	2318	63,025
True MC C	32,209	3137	29,072
True MC Light	49,981	30,389	19,592
Neg SF	1.576		
MC B Fit	102,043	5592.2	96,451.2
MC C Fit	56,021.9	8144.2	47,877.7
MC Light Fit	168,498	119,590	48,908.1
α	1.264		

Total Fits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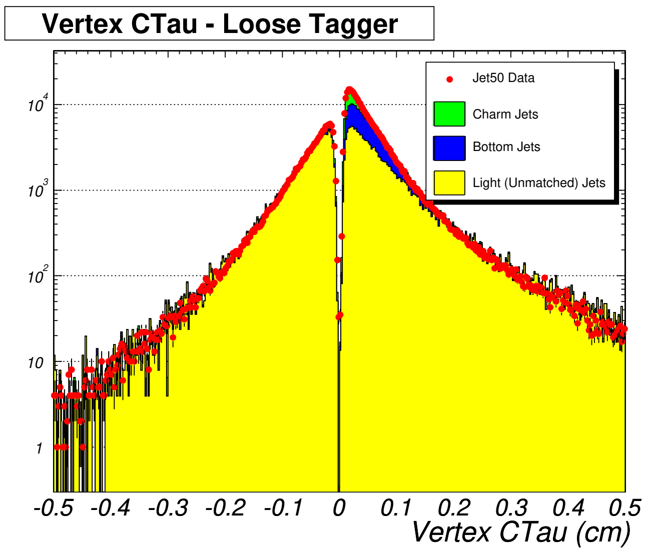
Vertex CTau (cm)


Vertex CTau - Loose Tagger
Jet50 Data
Charm Jets
Bottom Jets
Light (Unmatched) Jets
Vertex CTau (cm)

Systematic

The error was previously estimated by “calculating” the E_T dependence of α

Since we bothered to determine the positive and negative sides exactly, we can be more direct

- Find shift in α by doubling/halving the heavy fractions in the sample
- Statistical (fit) errors negligible
- At zeroth (maybe negative first) order, this covers the E_T systematic

Final values: 1.27 ± 0.13 for the tight tagger, 1.26 ± 0.11 for the loose tagger

Draft of note posted here, too