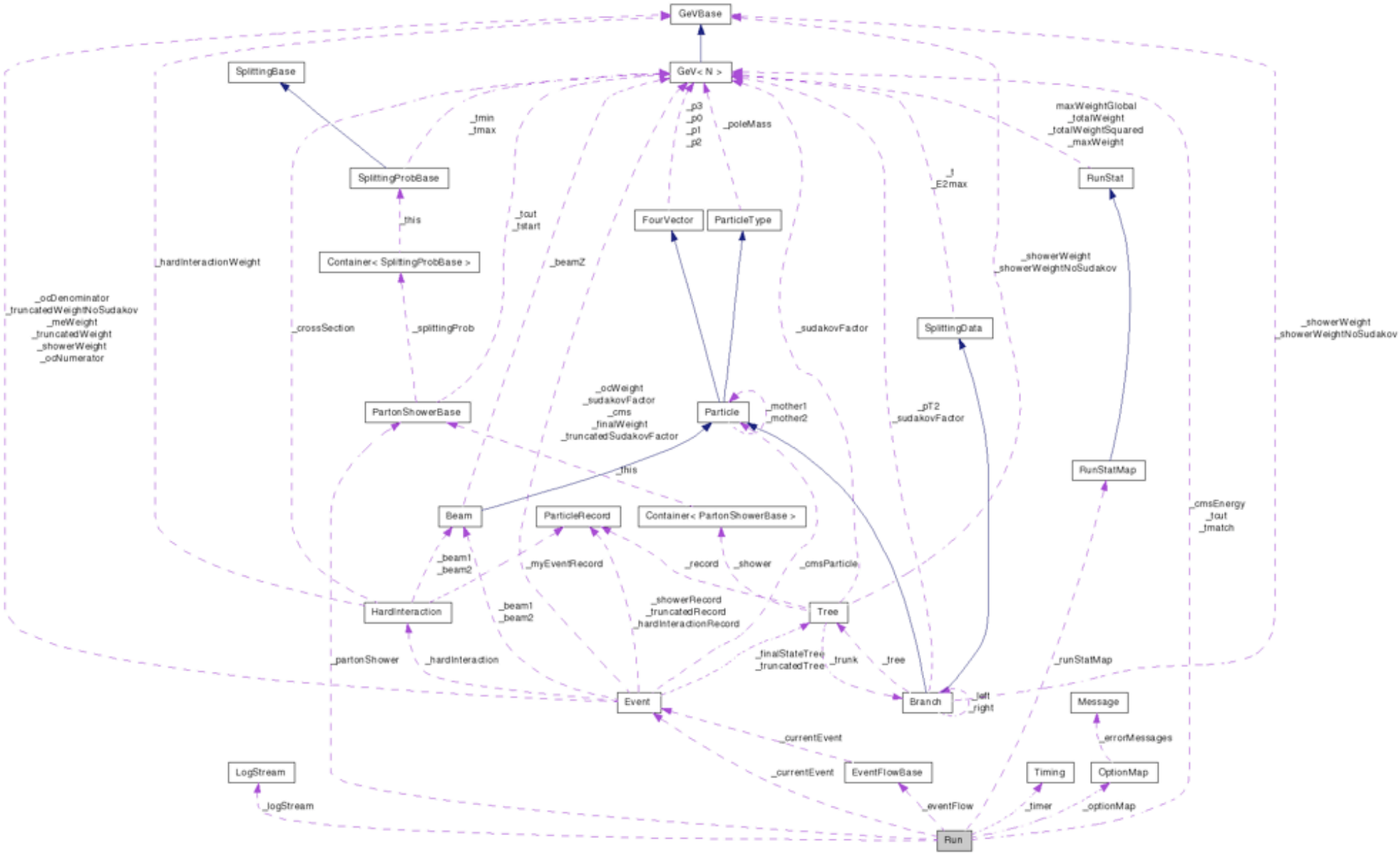
GenEvA

GENerate EVents Analytically: Preliminary Results

Christian Bauer, Frank Tackmann & JKT



Yes, there is real code....

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+-------------------------------------------------------------+
|  GenEvA --- GENerate EVents Analytically                    |
+-------------------------------------------------------------+
|  Version: 0.1.95 (November 6, 2007)                         |
|  Authors: Christian Bauer, Frank Tackmann & Jesse Thaler    |
|    arXiv: 0712.xxxx                                         |
+-------------------------------------------------------------+

     +-----  Command Line
     |  GenEvA --cms 1000 --cut 10 --numStat 10000 --best 6 50
     +----------

     +-----  Event Generation Information
     |                  Process: e- e+ -> j j
     |   Center-of-Mass Energy: 1000 GeV
     |          Matching Scale: 50 GeV with maximum multiplicity 6
     |           Shower Cutoff: 10 GeV
     |              Generation: Events are matched to NLO/LO matrix element.
     +----------

     +-----  Run Statistics
     |  Process:    NumGen  NumKept  NumStat StatEff   NumUnw  UnwEff      Sigma +/- dS (pb)   (error%)
     |   Global:     19771    18674  10000.3   0.536   6485.0   0.347   0.253007 +/- 0.001779  ( 0.70%)
     |       2j:      2303     2303   2303.0   1.000   2303.0   1.000   0.089849 +/- 0.001760  ( 1.96%)
     |       3j:      8480     7383   6406.3   0.868   3539.7   0.479   0.129731 +/- 0.001333  ( 1.03%)
     |       4j:      5629     5629   3351.1   0.595    905.4   0.161   0.029322 +/- 0.000462  ( 1.57%)
     |       5j:      2492     2492   1187.3   0.476    254.1   0.102   0.003693 +/- 0.000104  ( 2.81%)
     |       6j:       867      867    326.1   0.376     82.2   0.095   0.000412 +/- 0.000023  ( 5.49%)
     +----------

+-----  Thank you for running GenEvA
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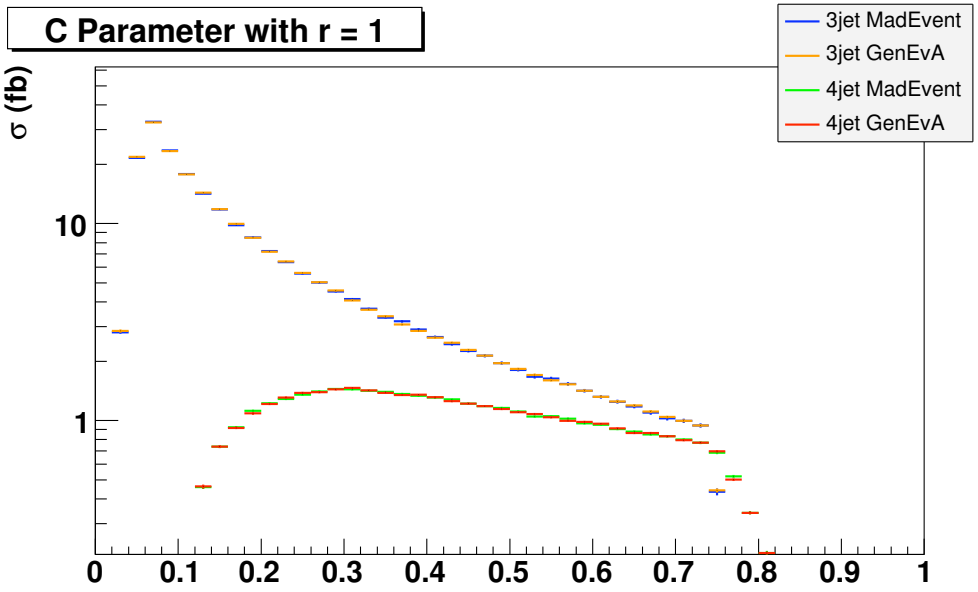
....and reasonably user-friendly.

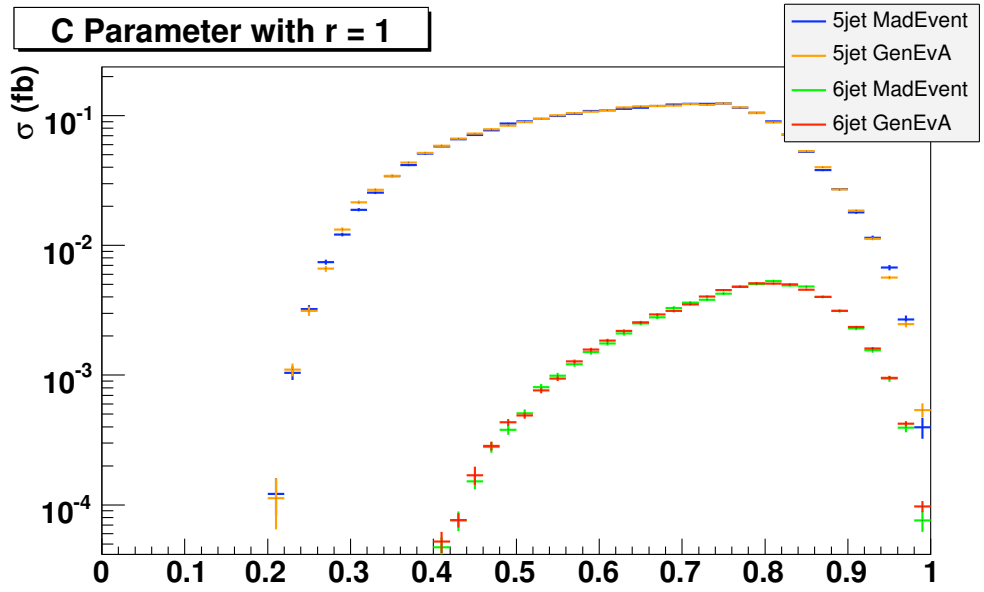
Distributing events according to tree-level MadGraph matrix elements.

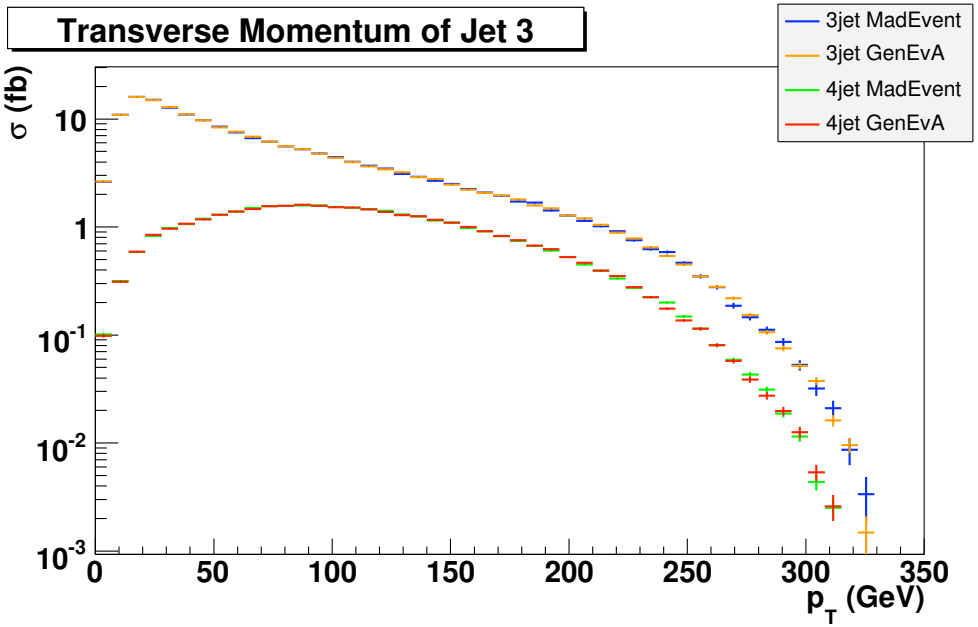
Cross sections (ab)
E_{CM} = 1000 GeV
Λ_{IR} = 100 GeV

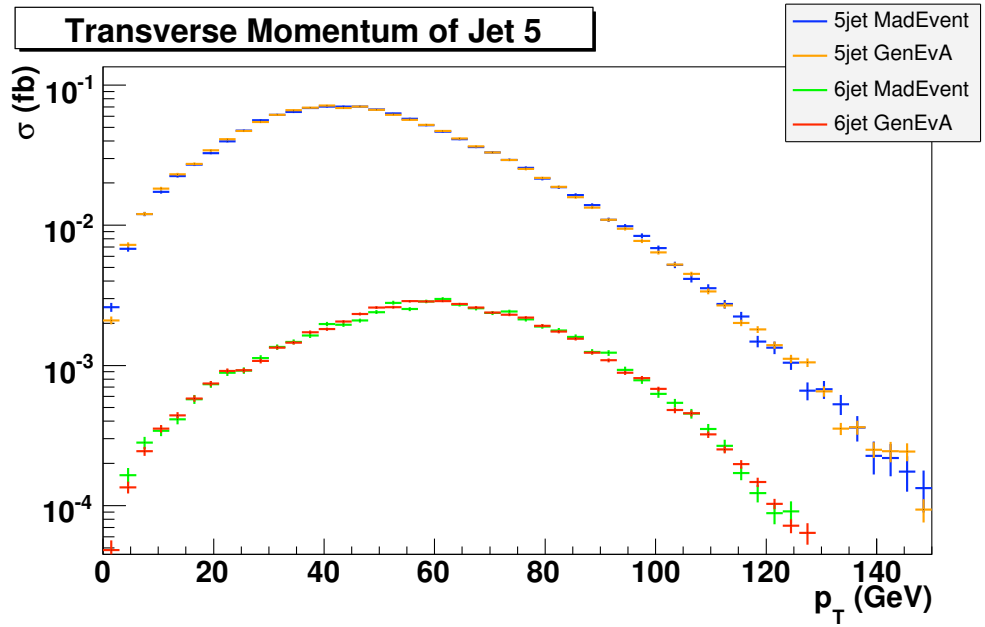
Reality check that we understand what our program is doing.

process	**MadEvent**	**GenEvA**
$4j$	36483 ± 49	36439 ± 69
$u\bar{u}gg$	14055 ± 32	14003 ± 44
$d\bar{d}gg$	3490 ± 9	3498 ± 22
$u\bar{u}c\bar{c}$	283.4 ± 1.3	273 ± 7
$u\bar{u}d\bar{d}$	175.9 ± 0.9	184 ± 6
$u\bar{u}u\bar{u}$	131.9 ± 0.9	135 ± 4
$5j$	2540.5 ± 3.3	2550 ± 6
$u\bar{u}ggg$	909.8 ± 2.1	916 ± 3
$d\bar{d}ggg$	227.4 ± 1.0	229 ± 2
$u\bar{u}c\bar{c}g$	54.44 ± 0.31	54 ± 1
$u\bar{u}d\bar{d}g$	33.96 ± 0.31	35 ± 1
$u\bar{u}u\bar{u}g$	25.41 ± 0.16	25 ± 1

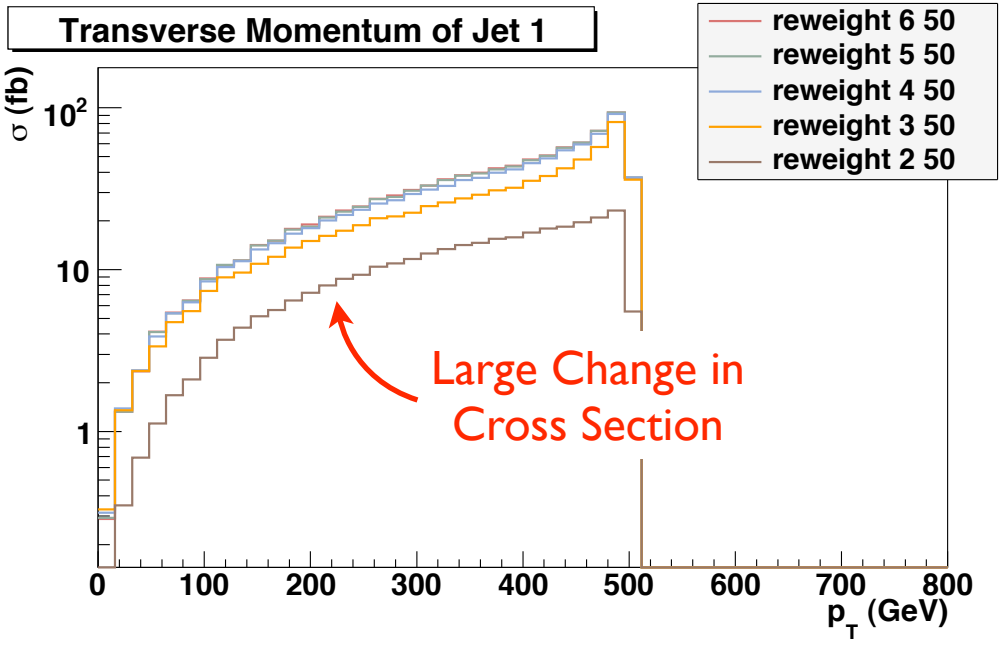


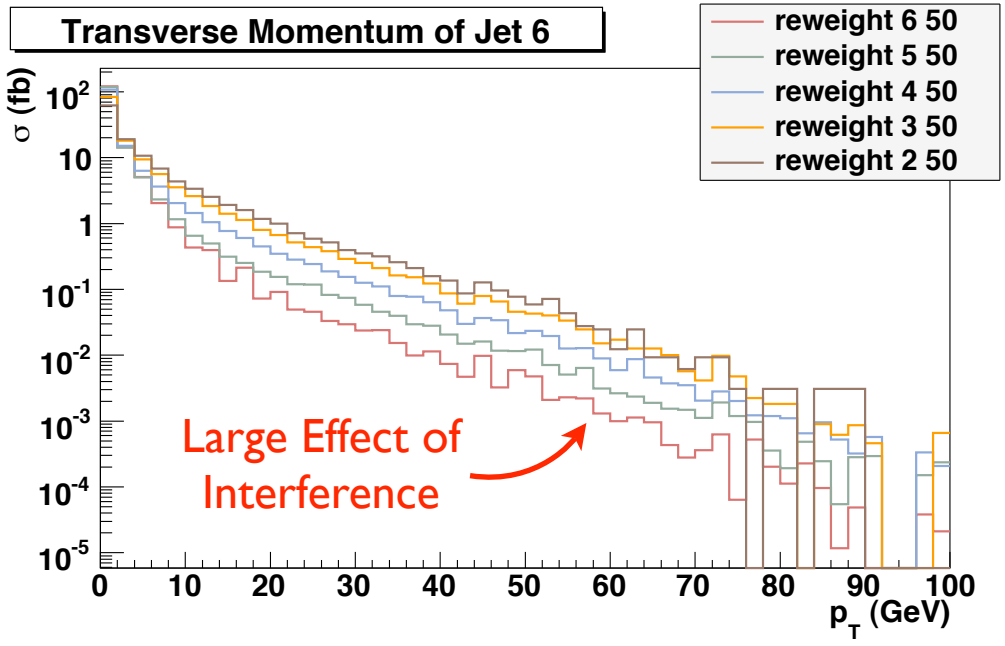


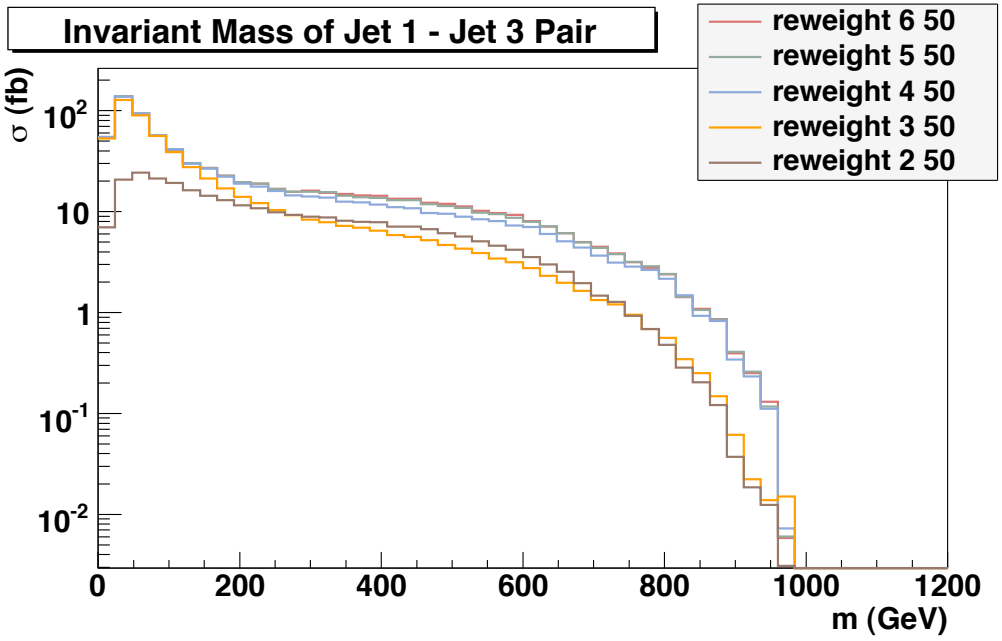


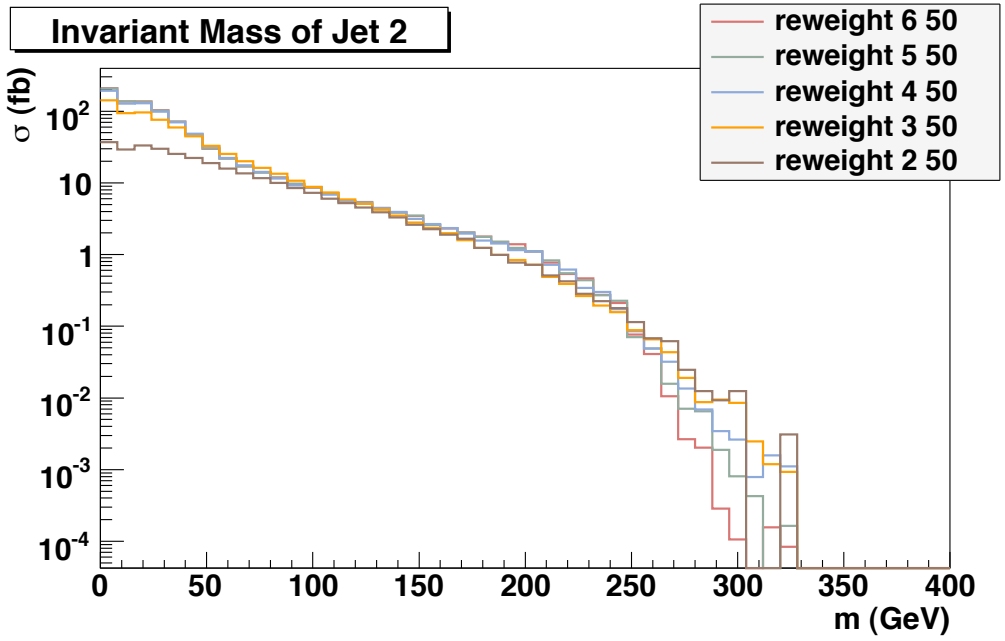


Differential distributions look good.

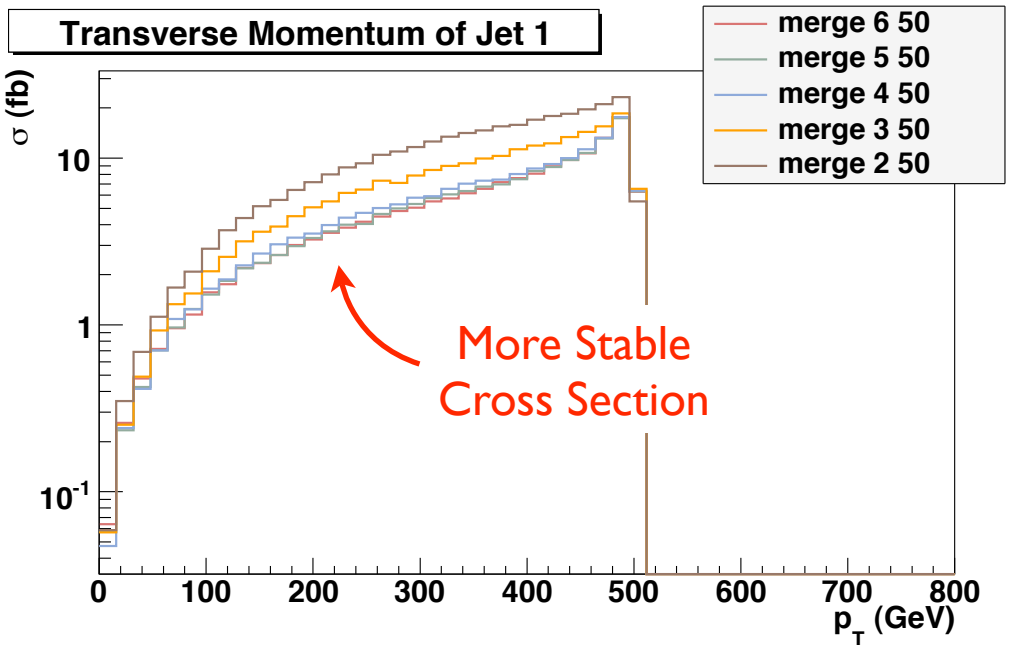


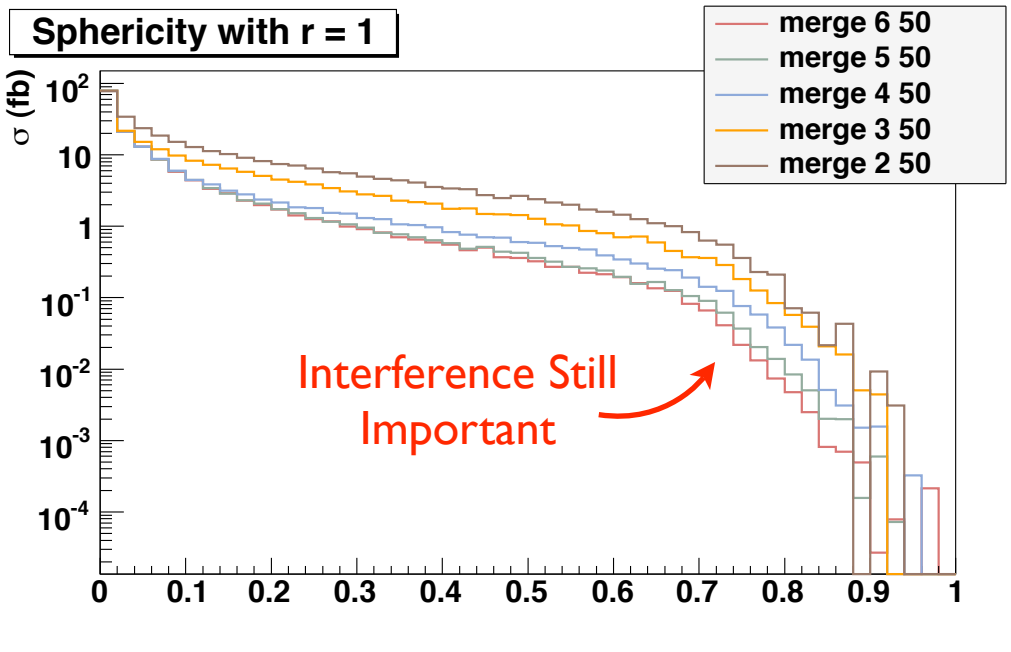


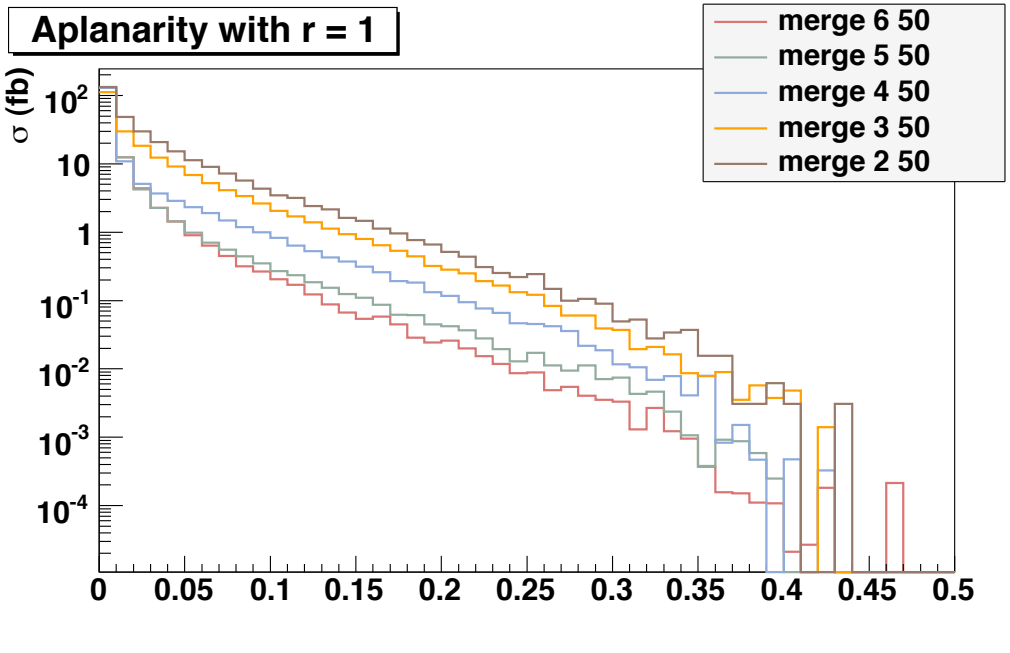


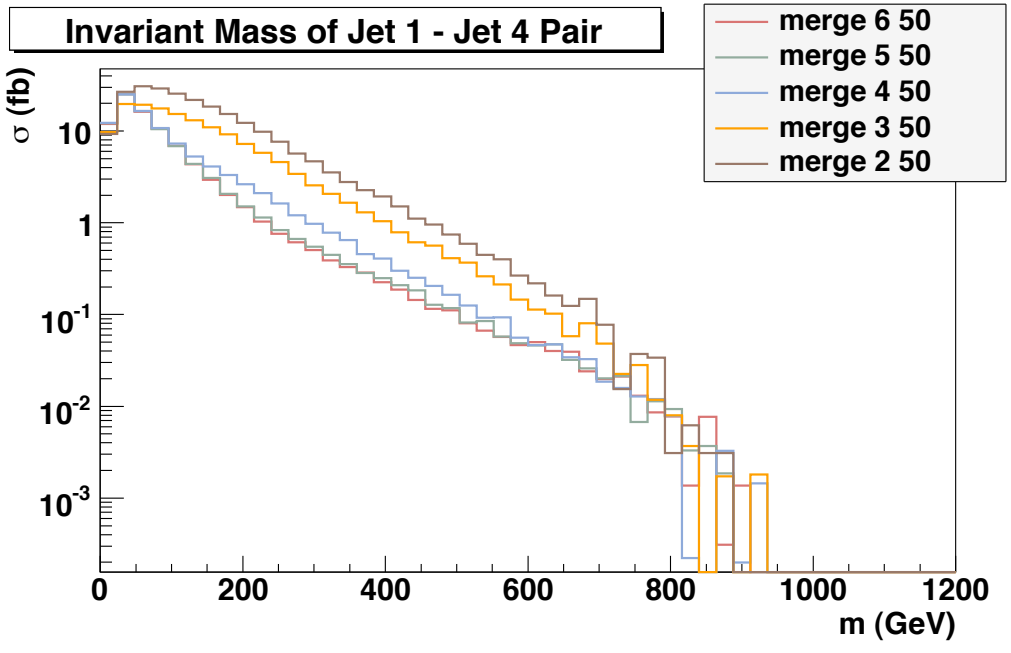


Tree-Level Matrix Elements Alone

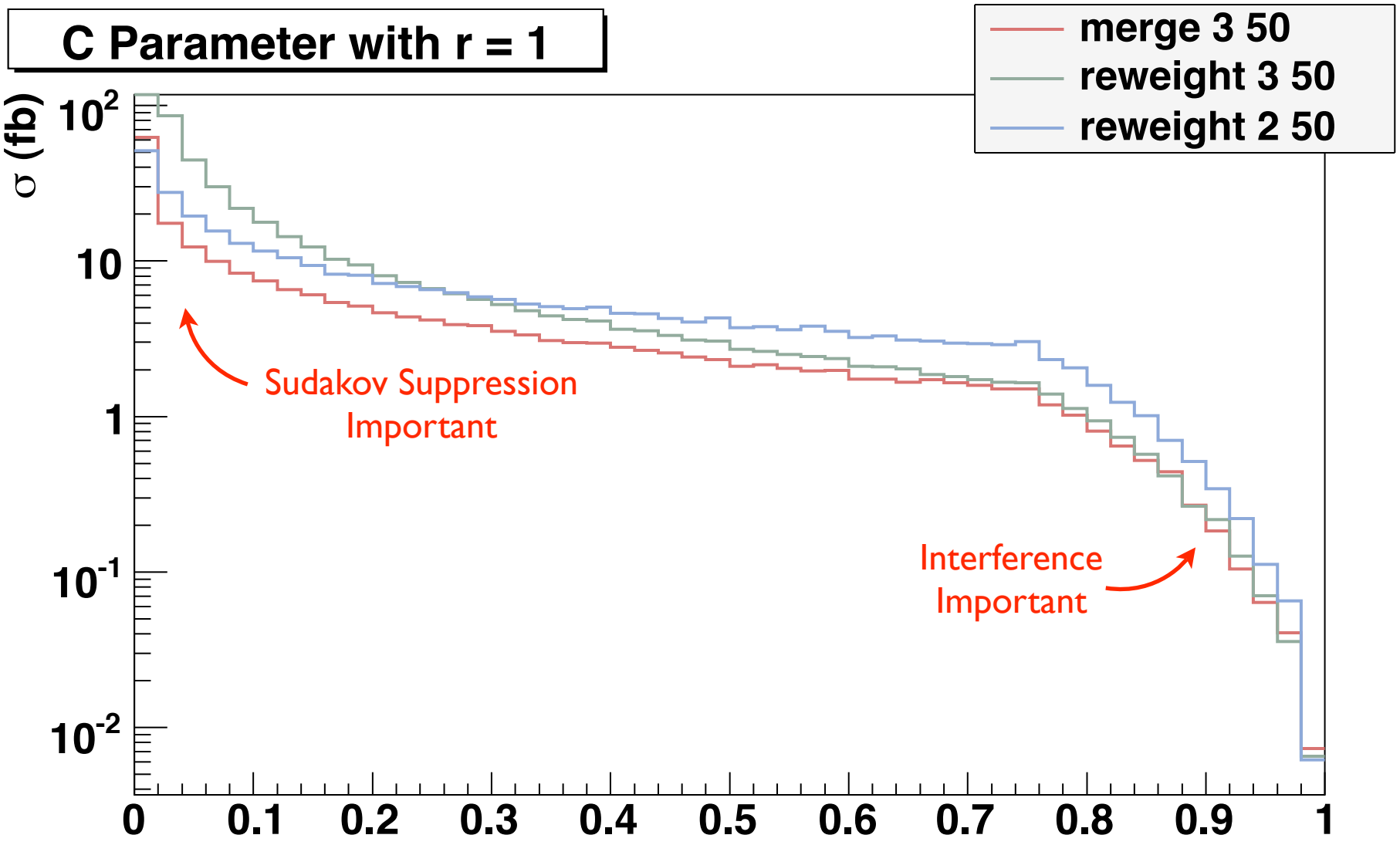




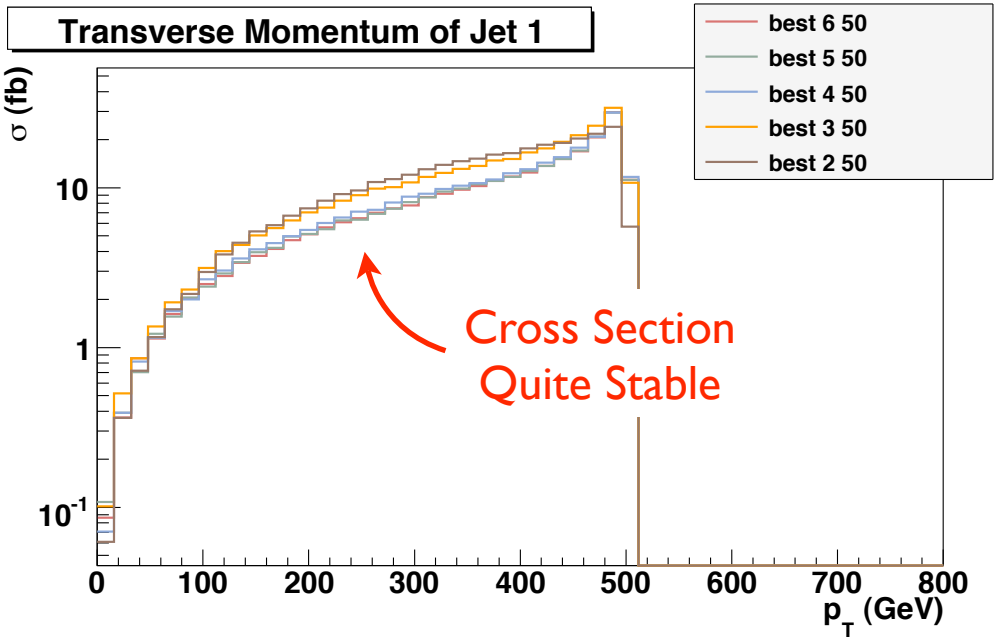


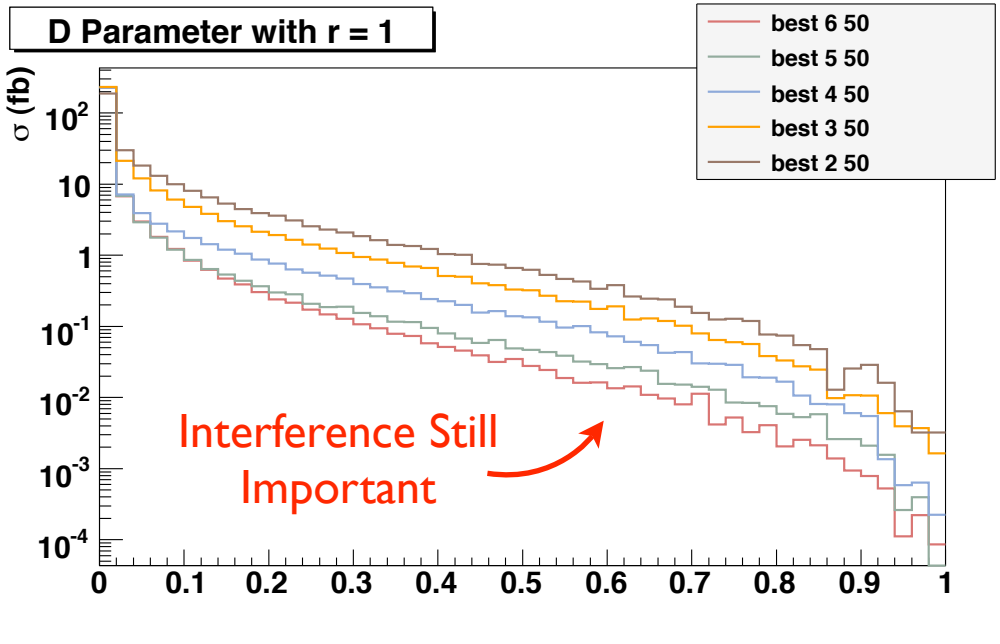


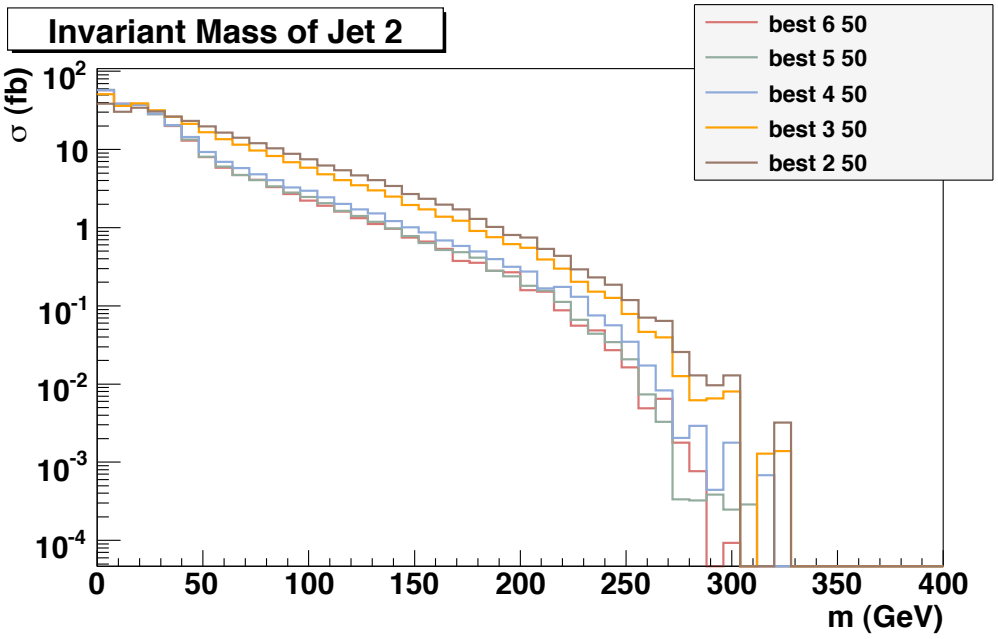
Sudakov-Improved Matrix Elements

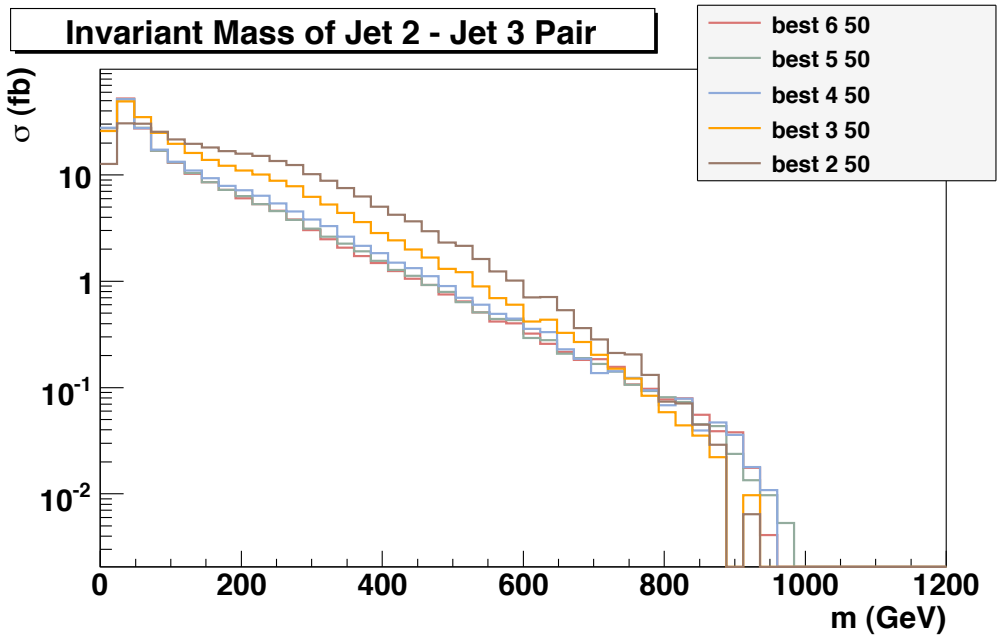


Smooth Matching of Matrix Element and Parton Shower

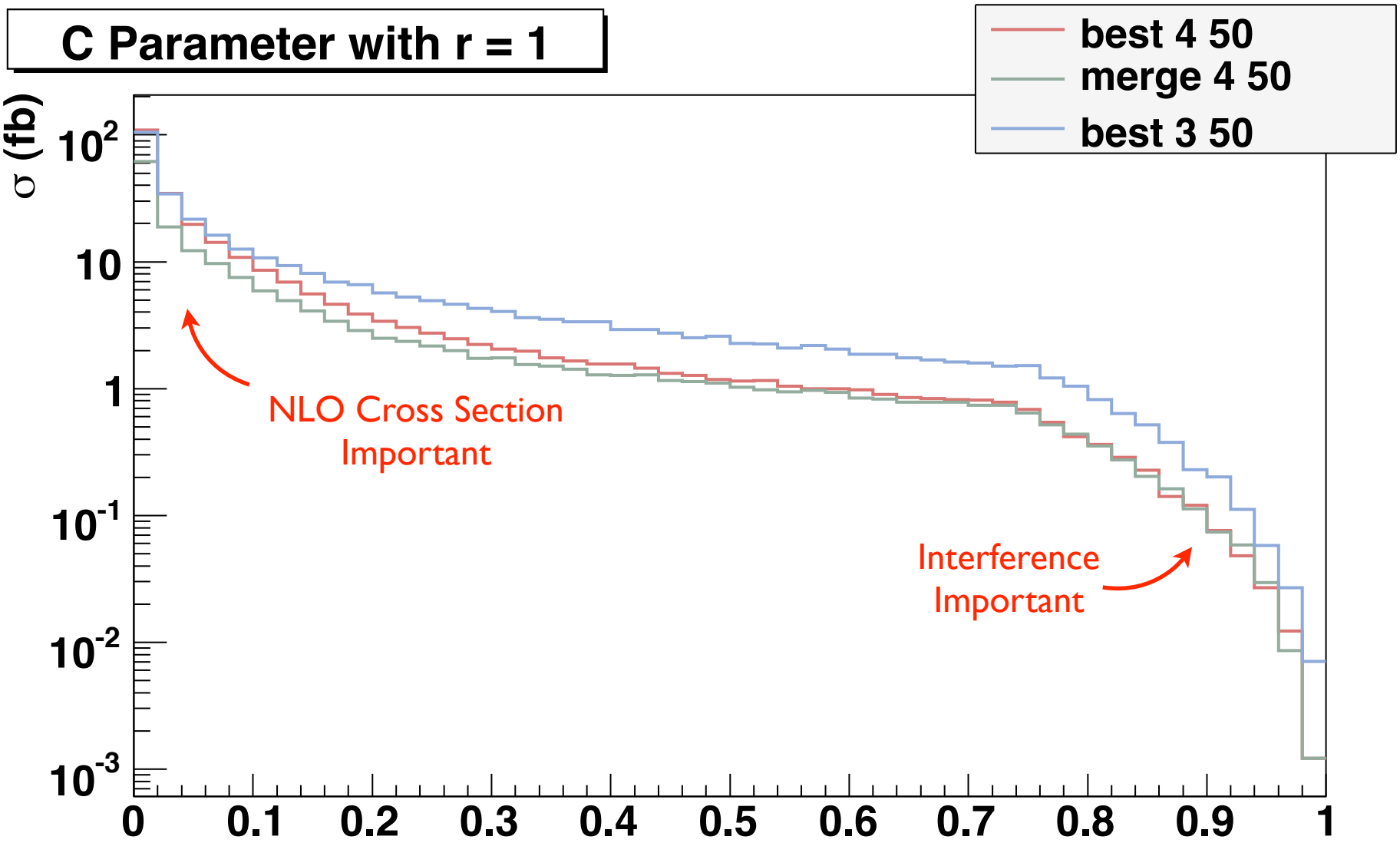




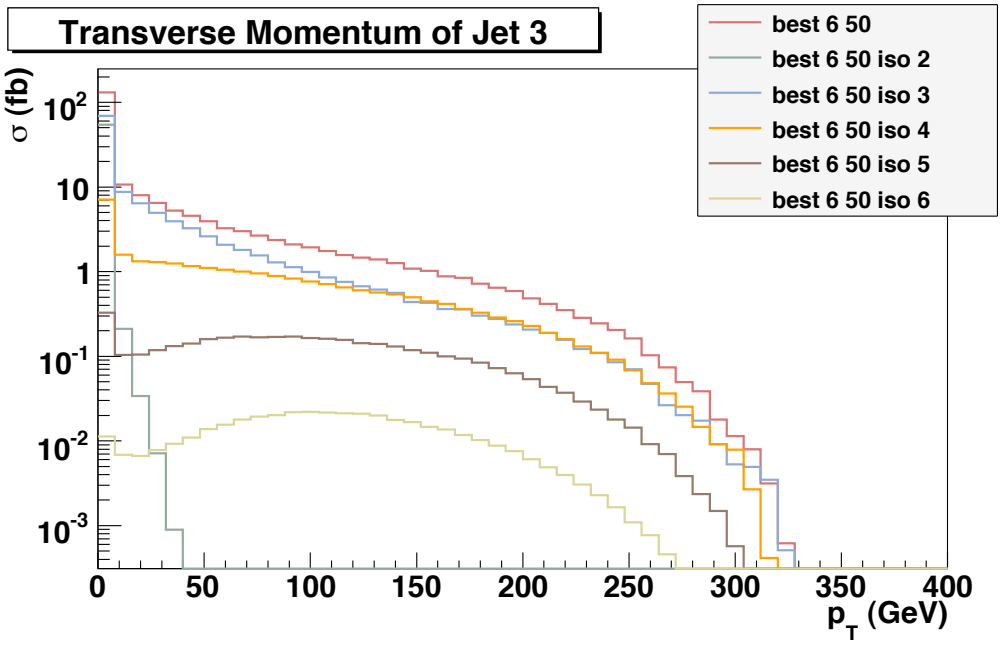


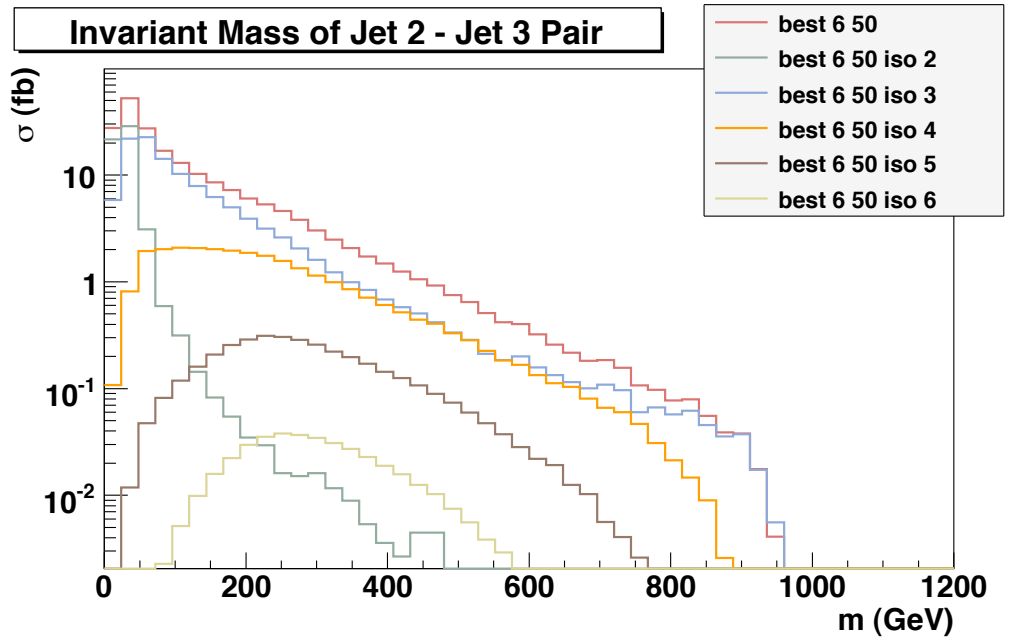


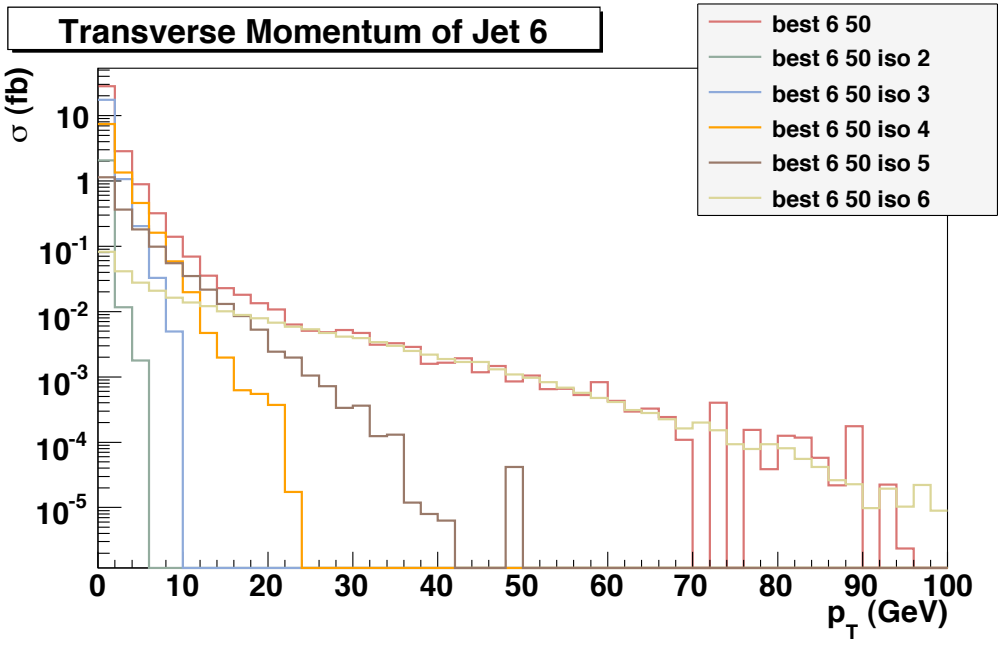
NLO and Sudakov Improved Matrix Elements

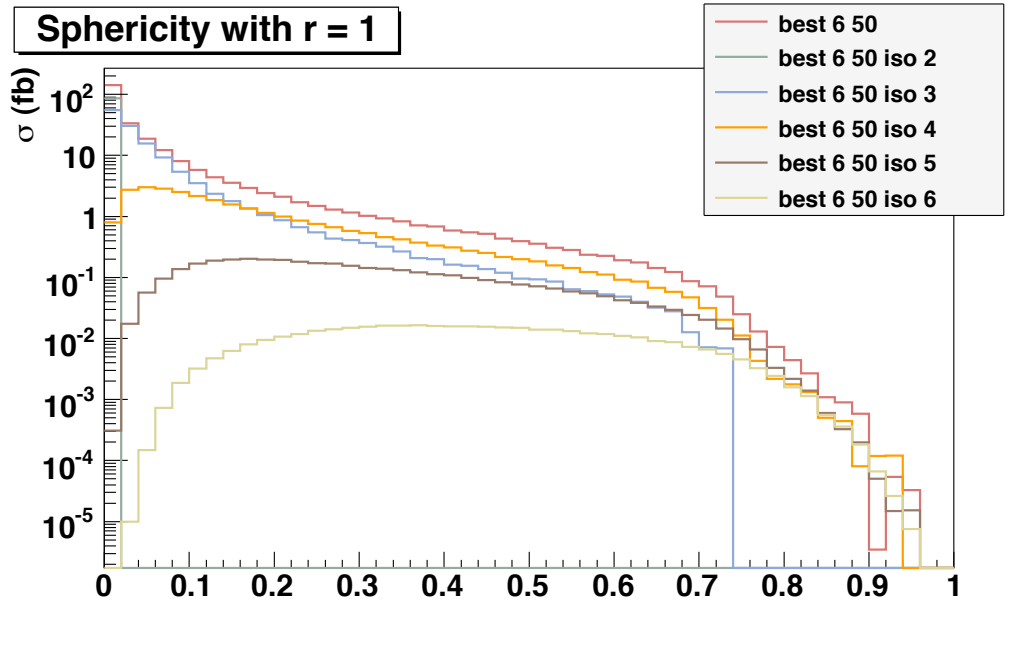


Smooth Matching of NLO and LO Matrix Elements

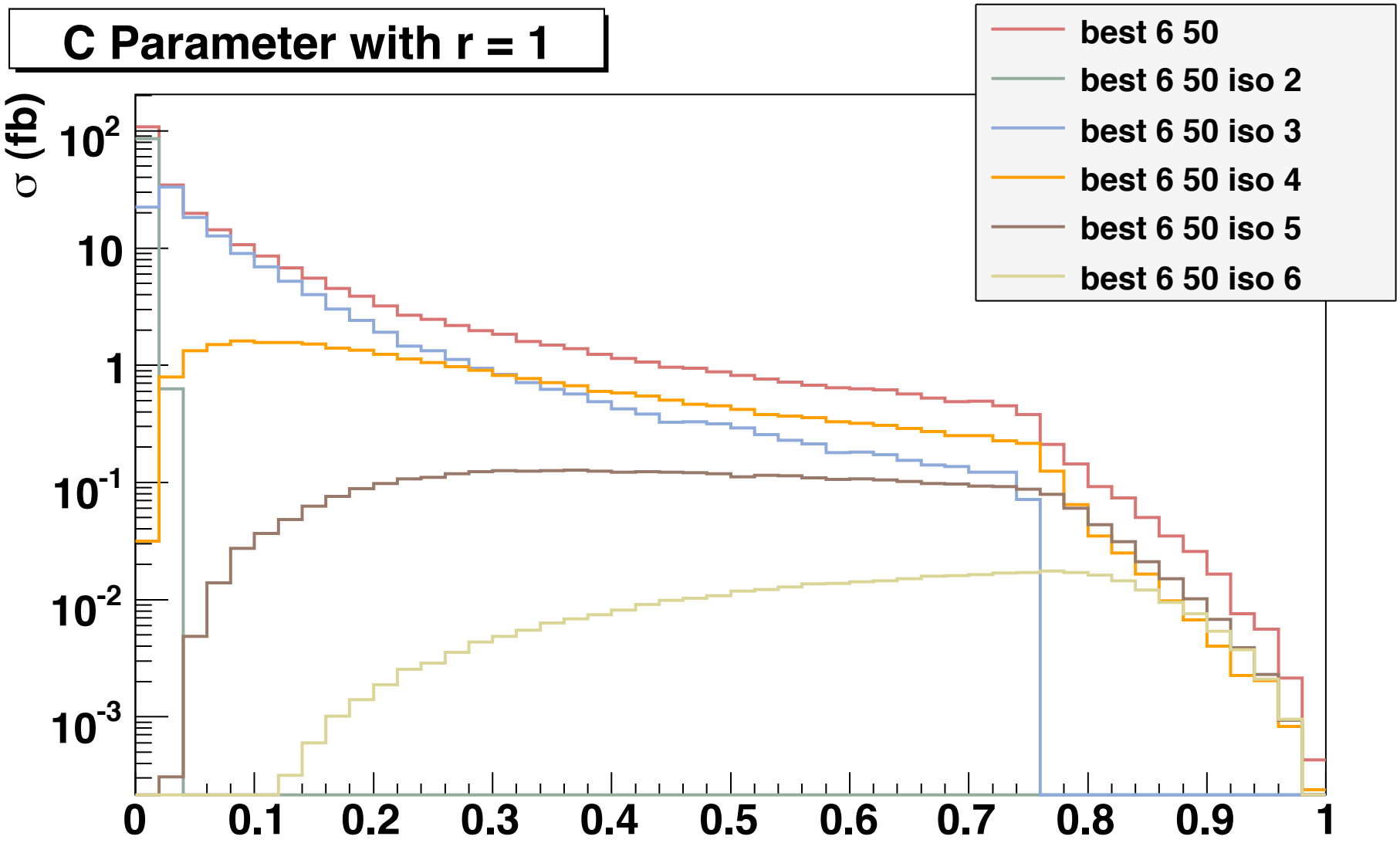






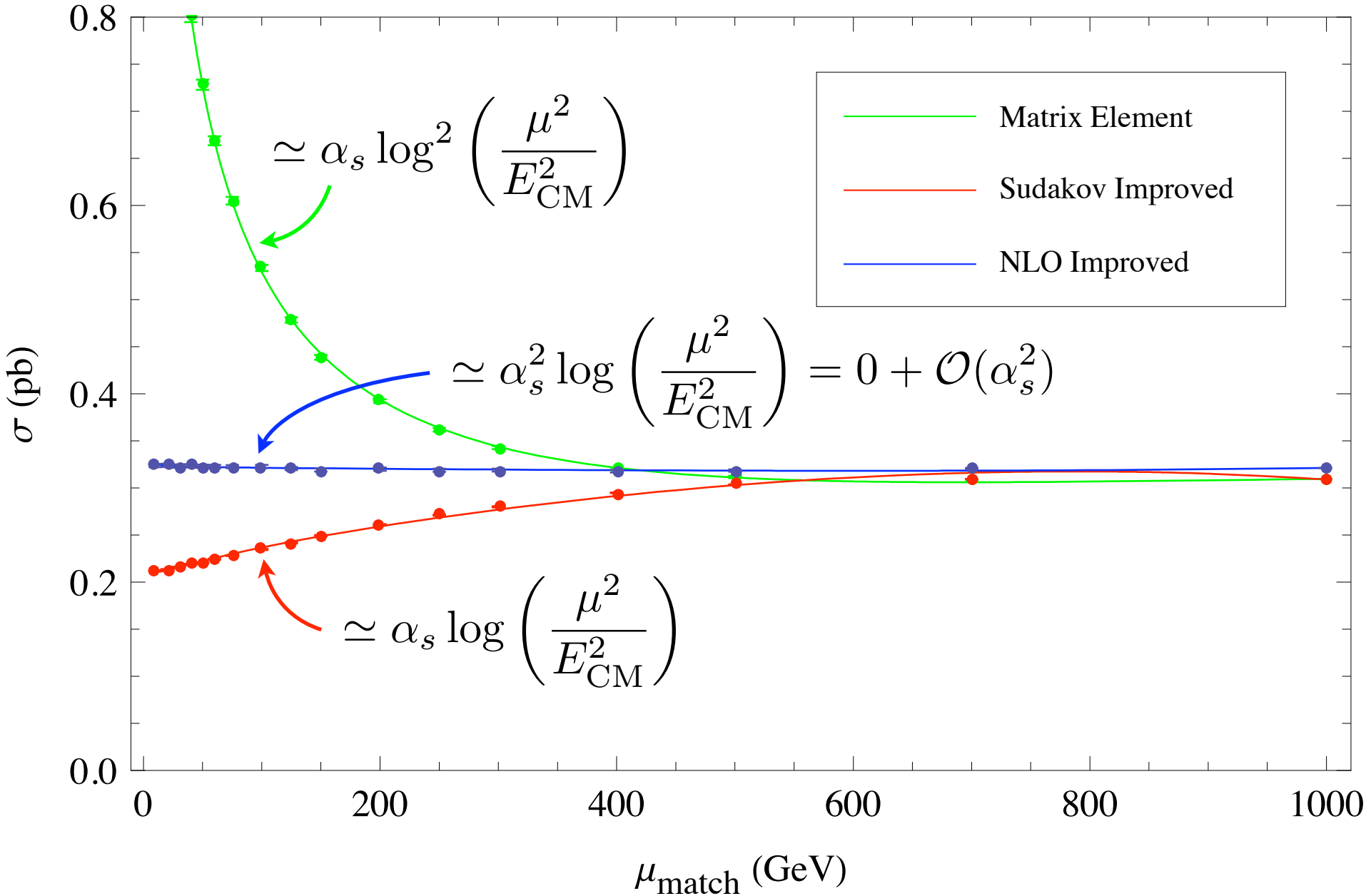


Contribution of Matrix Elements to NLO/LO/PS



Contribution of Matrix Elements to NLO/LO/PS

Up to 3-body Matrix Elements Comparison



Up to 6-body Matrix Elements Comparison