Tracking in p13.04.00

General Computing and Software Meeting
Dec. 5, 2002

Herbert Greenlee

Tracking Algorithm History

- P11 default: gtr.
- TARC (p11.11 & later): gtr, htf, gtrhtf, gtrela, htfela, aa.
- P13 default, based on TARC recommendation: gtrhtf.

History of Changes in p13

- p13.00.00
  - Default algorithm change (gtr to gtrhtf).
  - Pack GtrackChunk and McTrackChunk (reduce size).
  - Filter tracks based on percentage of shared hits instead of fixed number of shared hits.
- p13.01.00
  - Save cft axial tracks (chunk 113) in chunk 401.

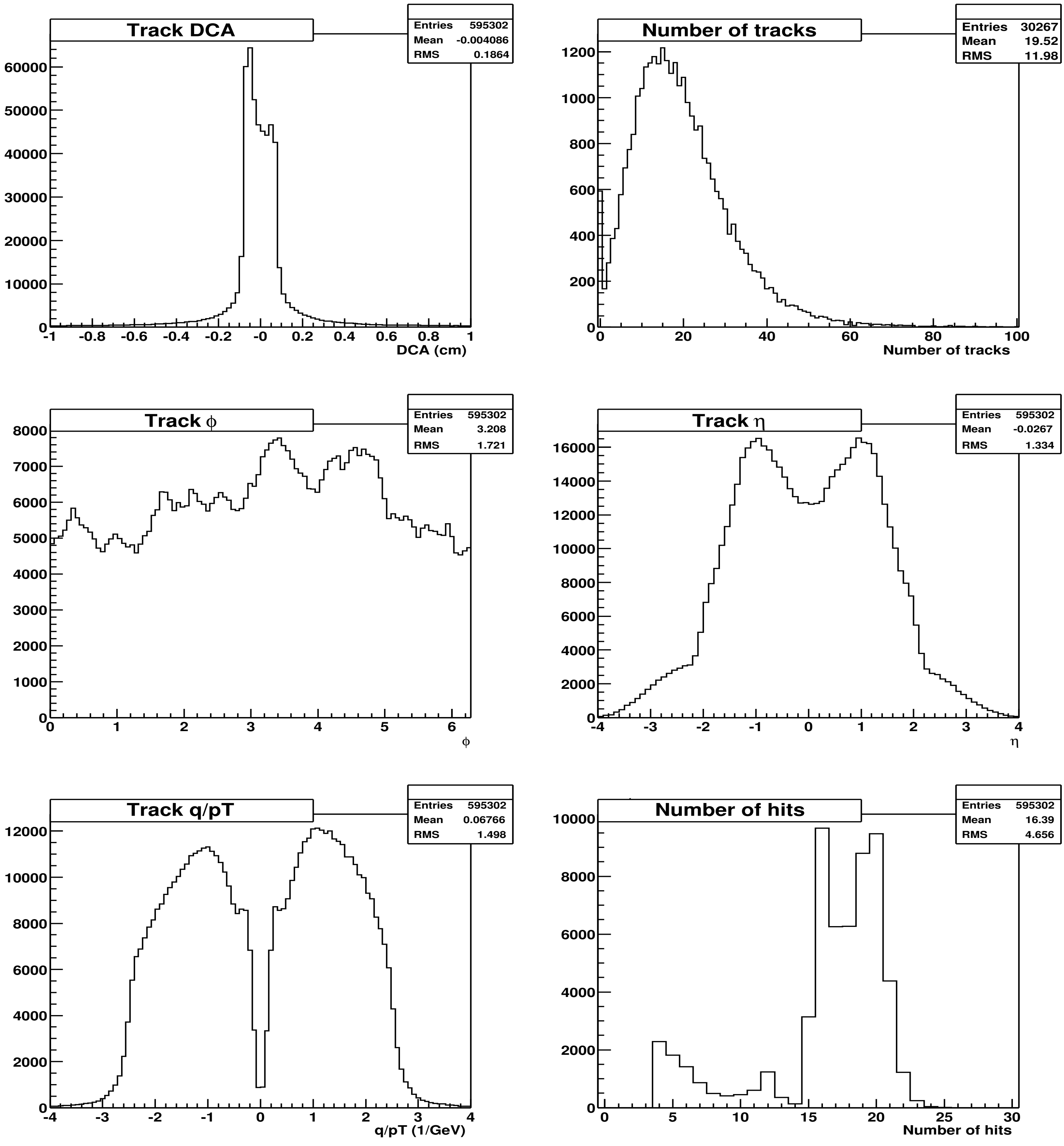
History of p13 (cont.)

- p13.02.00
  - Turn on CFT cluster splitting.
  - Add AA rcp support.
- p13.04.00
  - Turn off CFT cluster splitting.
  - Remove 1 cm offset of magnetic field ToscaField.
  - Turn on energy loss in D0Propagator.
  - Updated tracker geomerty.
- p13.05.00
  - AA bug fix.

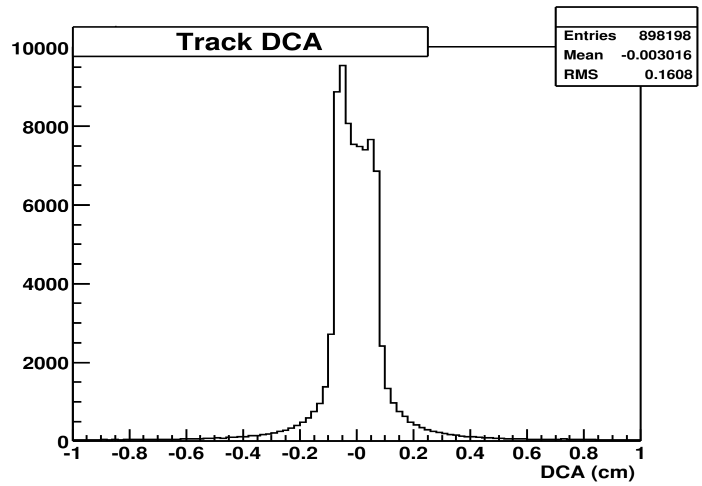
GTRHTF Algorithm Summary

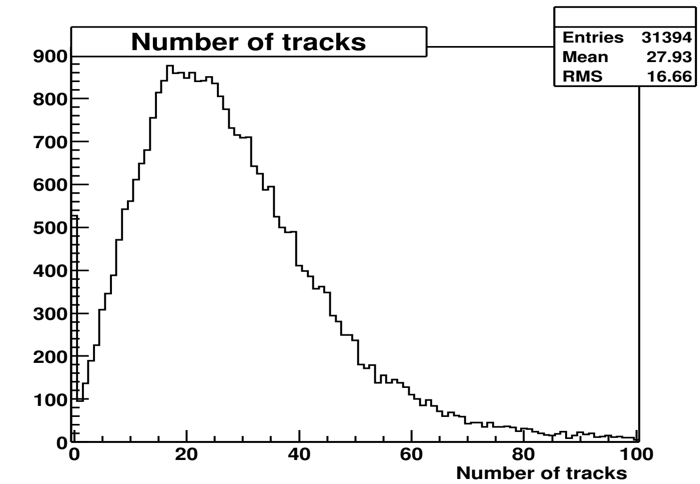
	Step	Input CIDs	CID	Refit?
1.	Htf		911	N
2.	Gtr			
2a.	Cft axial		113	U
2b.	Cft stereo	113	111	N
2c.	Full cft	111,121	101	N
2d.	Smt extenstion	101	201	N
2e.	Gap		311	N
2f.	Forward		301	N
2g.	Cft extension	301,311	2111	N
2h.	H disks	301,311	321*	N
2j.	Full eta	201,111,321	411	Y
3.	Combine			
3a.	Refit htf	911	601	Y
3b.	Filter	113,411,601	401	N

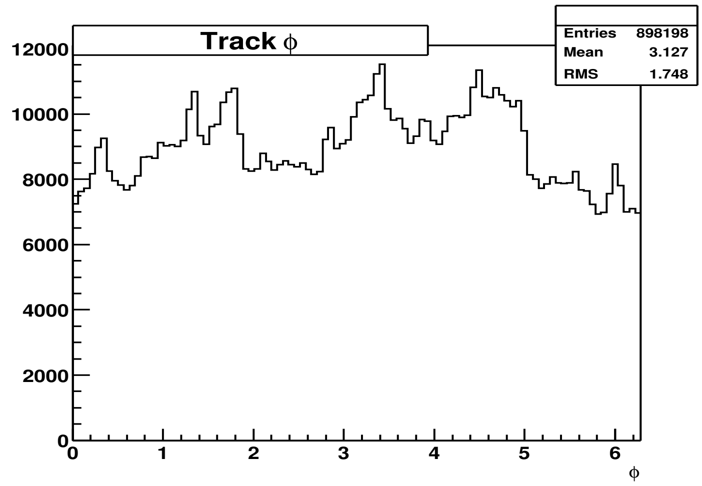
Tracks in Data in p11/gtr

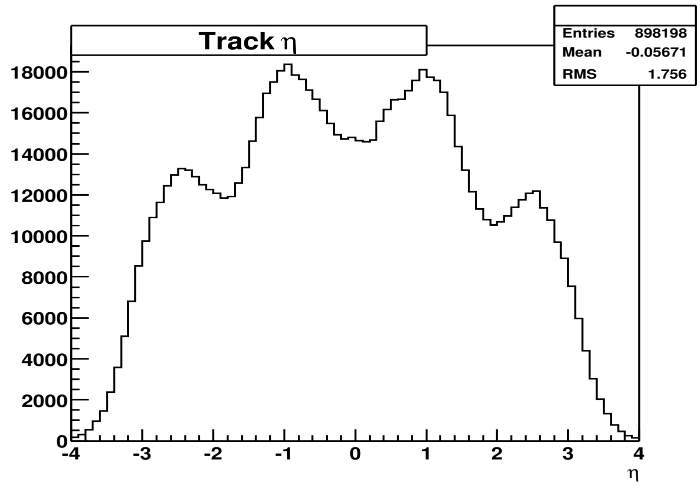


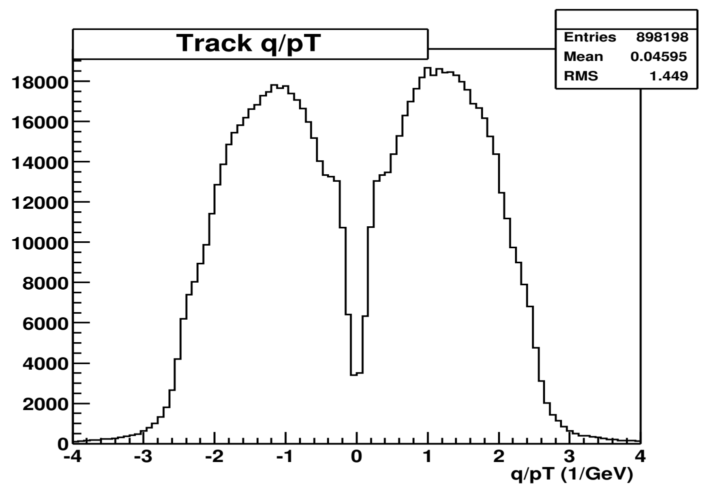
Tracks in Data in p11/gtrhtf

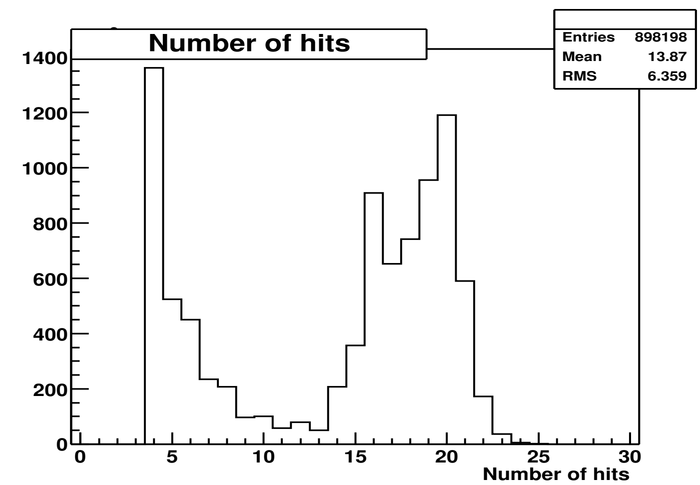




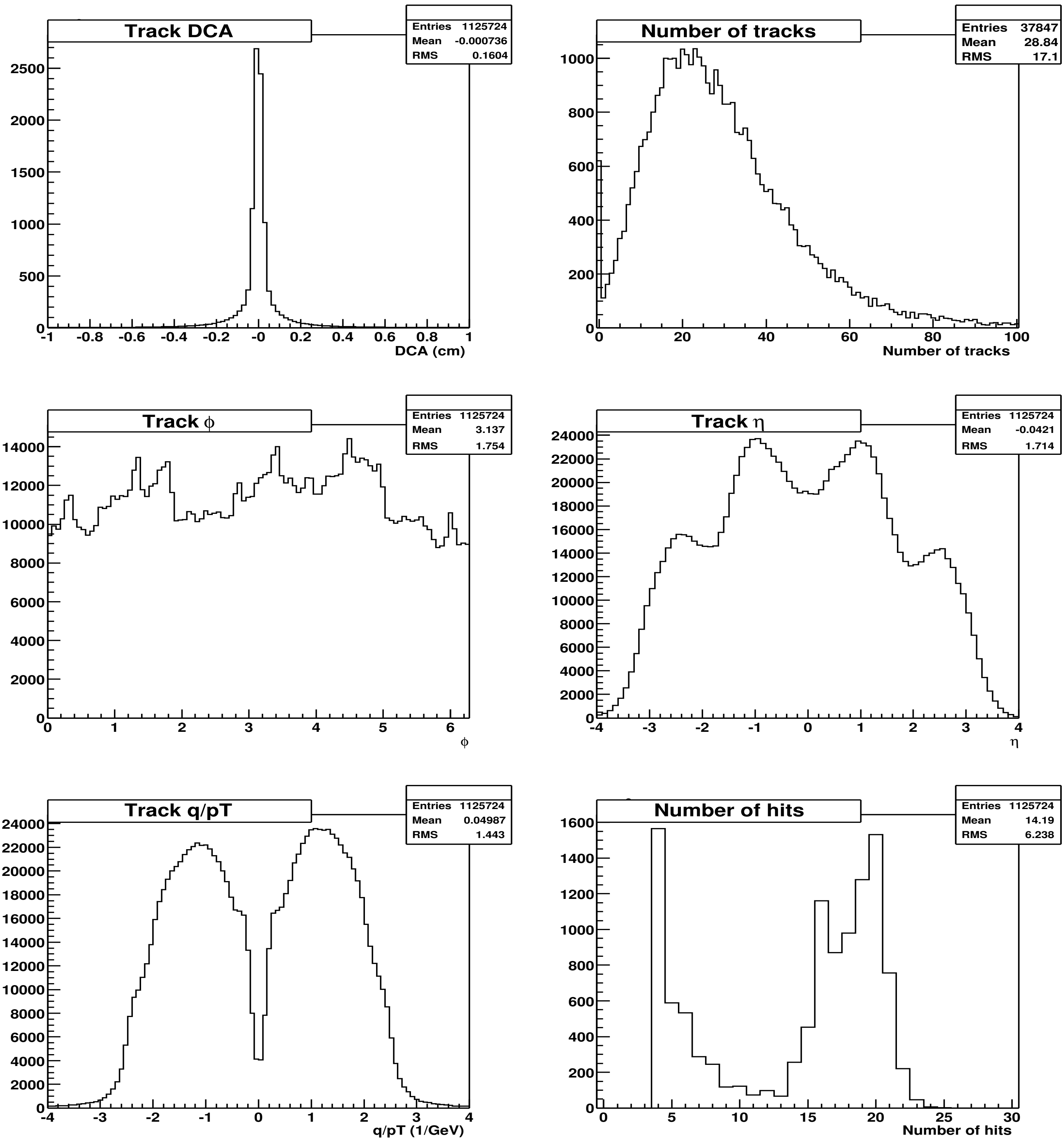






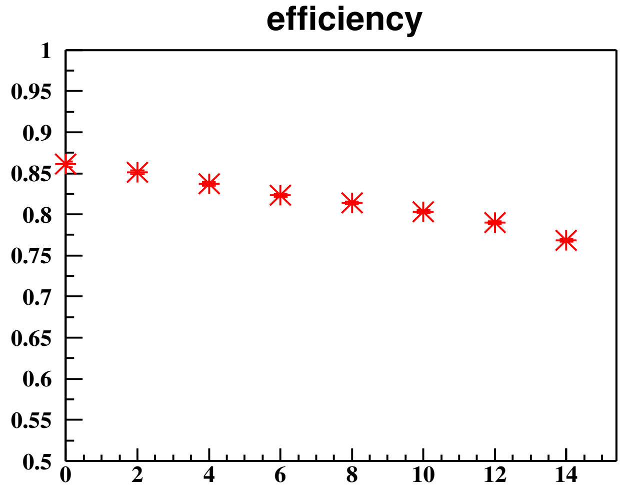


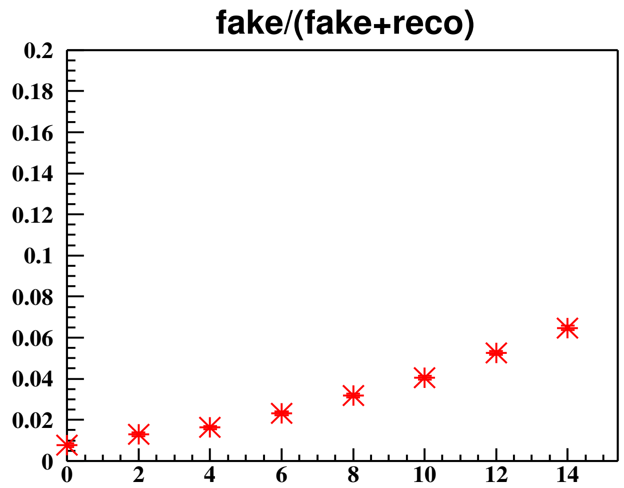
Tracks in Data in p13/gtrhtf

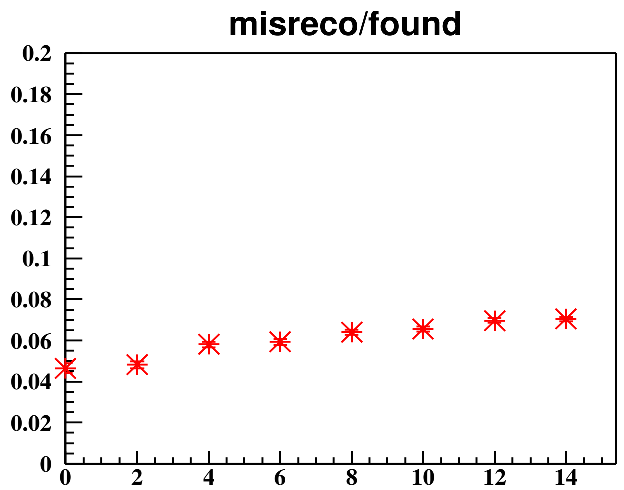


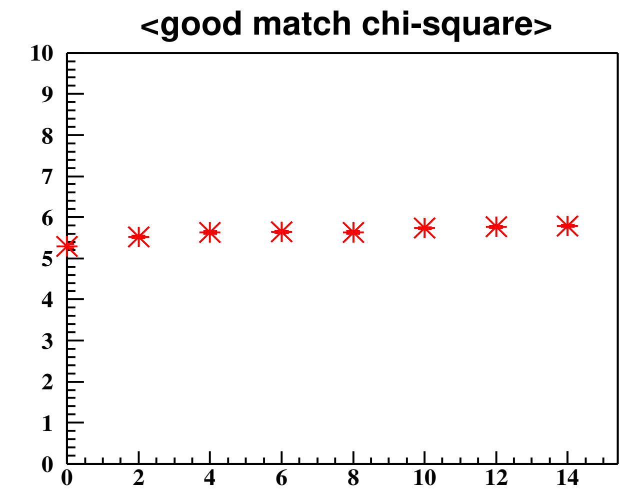
MC Performance in p11

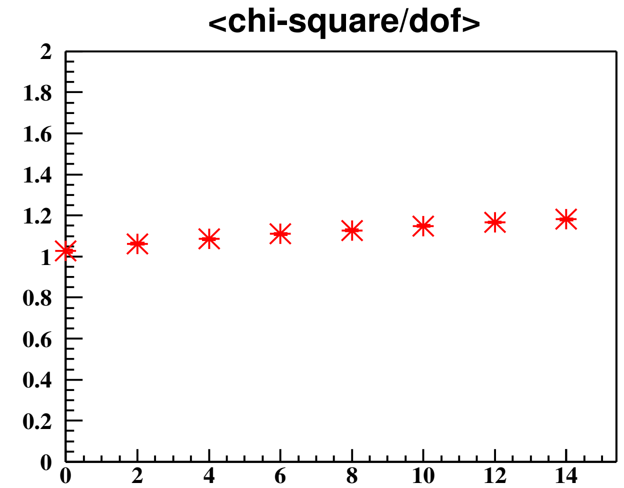
GTR perf vs nbg for p11.09.00_fast with cut_p0.5_full.dat for p09.0

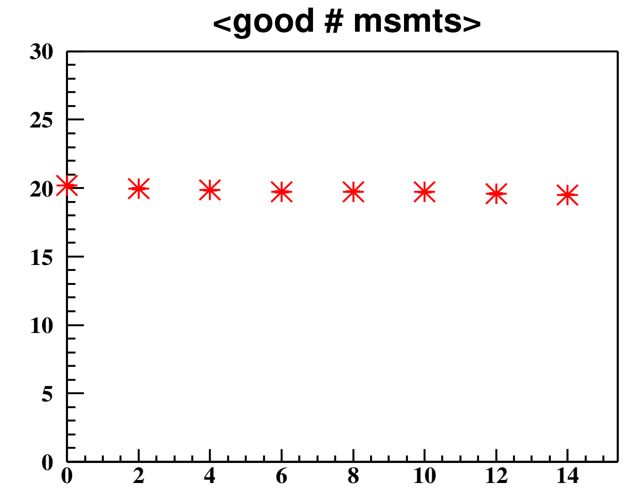






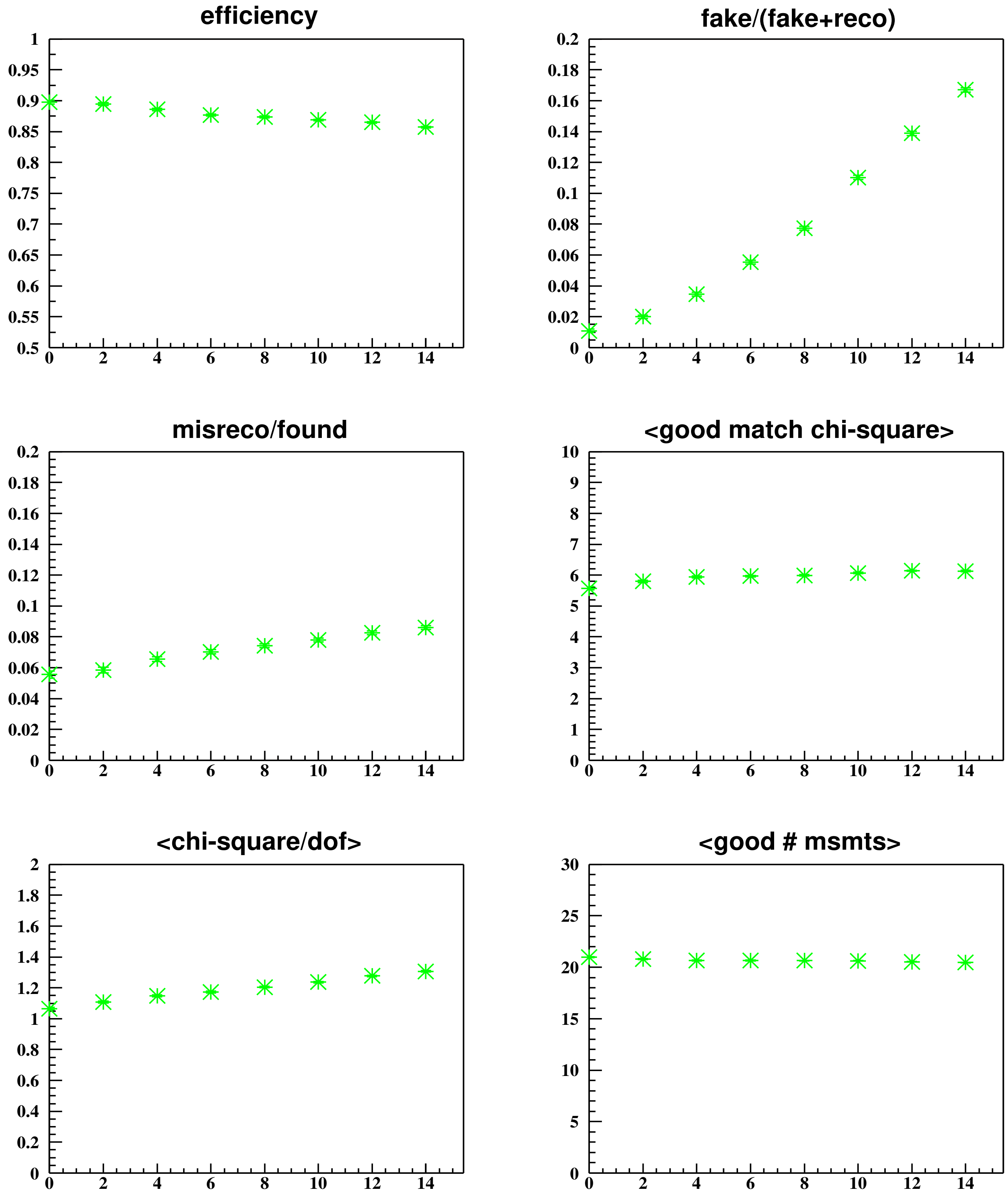






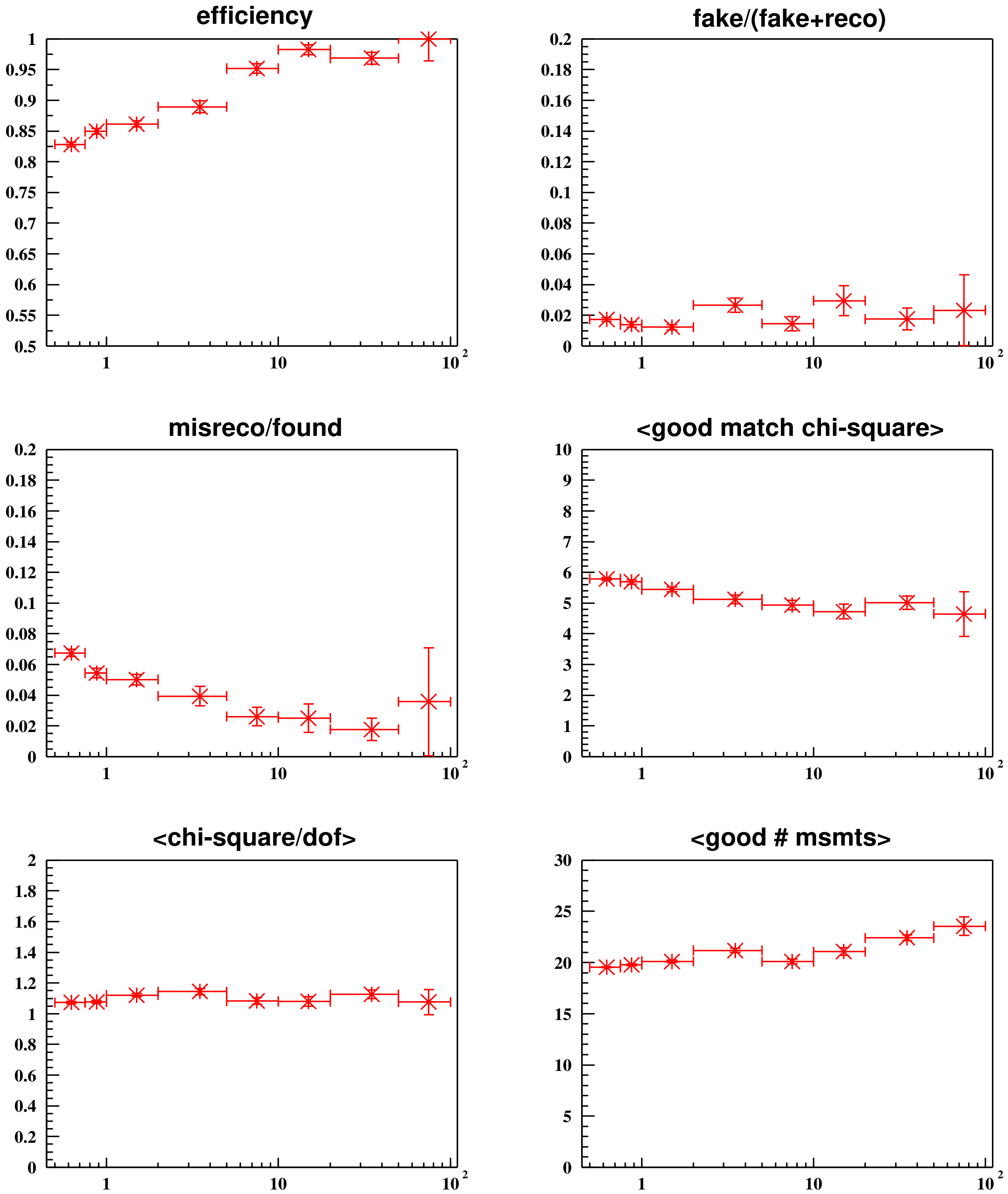
MC Performance in p13.04.00

GTR perf vs nbg for p13.04.00 with cut_p0.5_full.dat for p09.08_zm



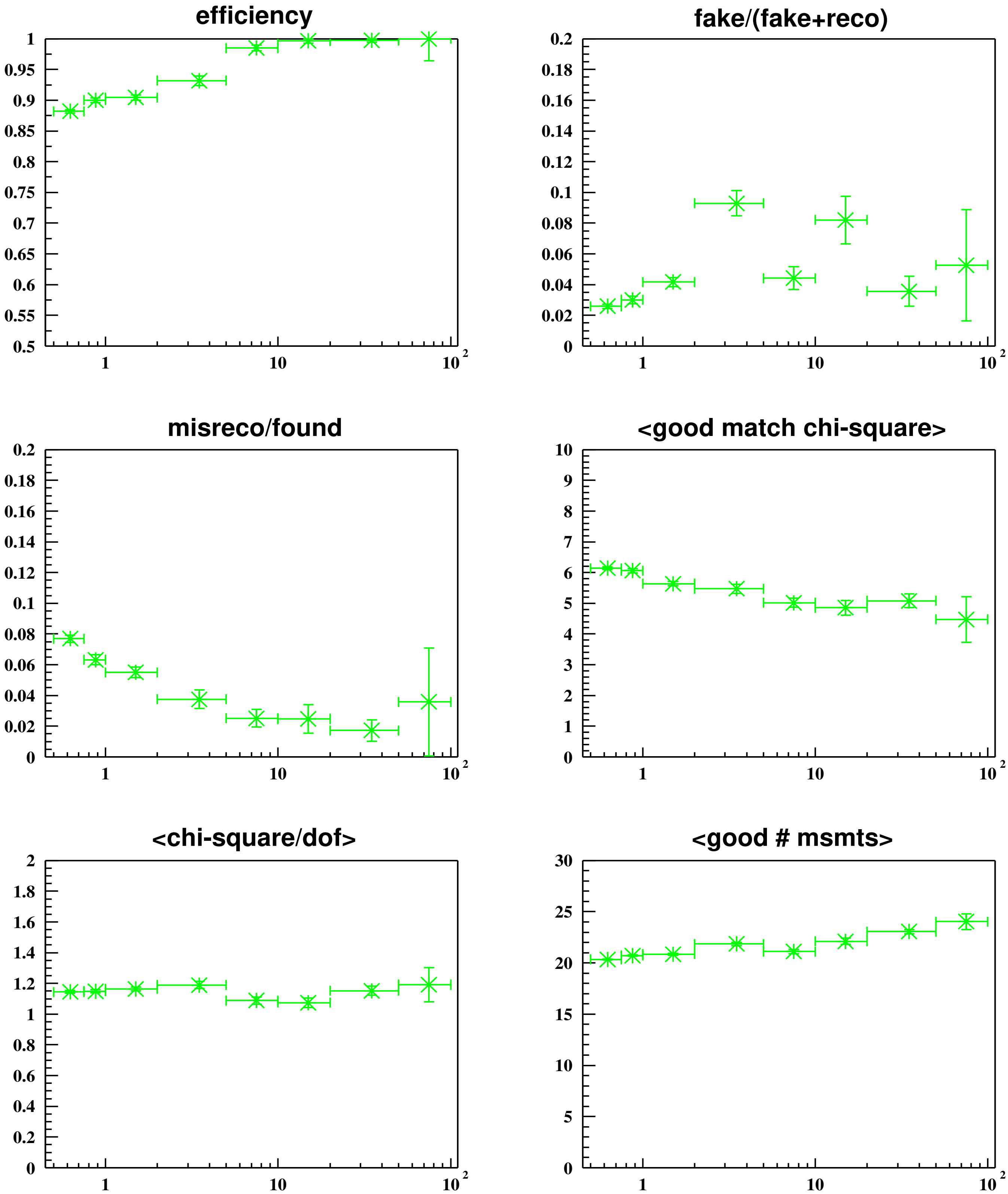
MC Performance in p11

GTR perf vs pt for p11.09.00_fast with cut_p0.5_full.dat for p09.08_



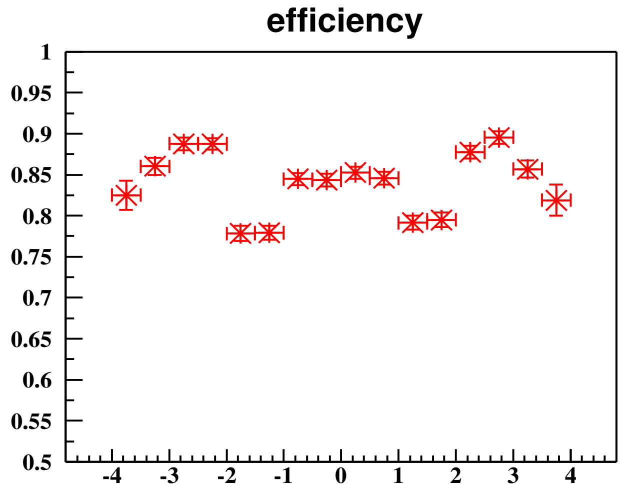
MC Performance in p13.04.00

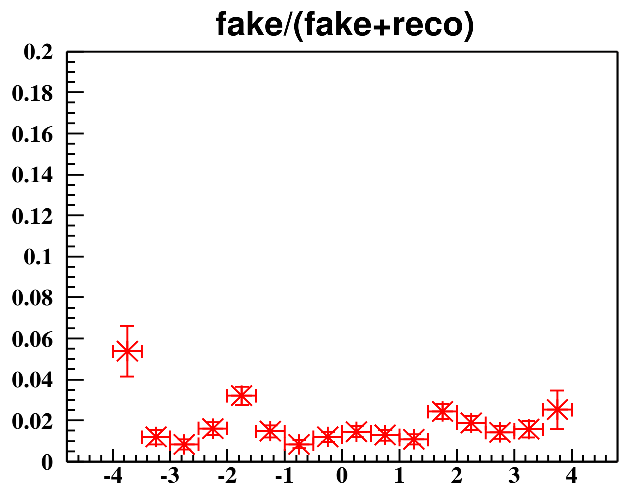
GTR perf vs pt for p13.04.00 with cut_p0.5_full.dat for p09.08_zmm

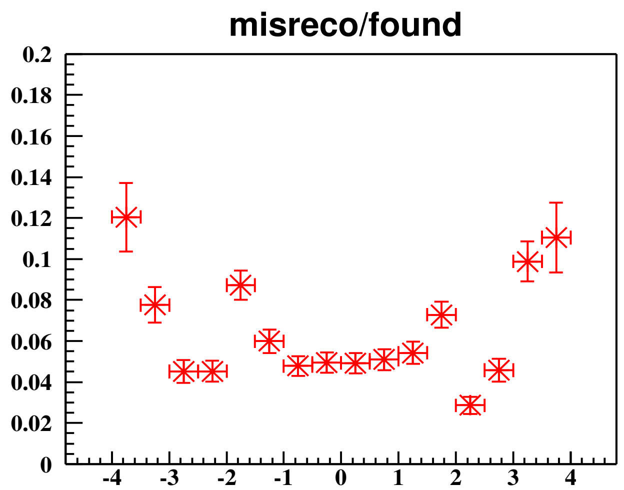


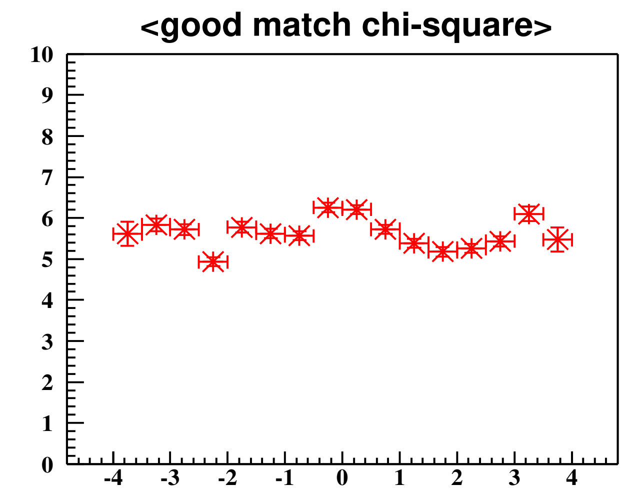
MC Performance in p11

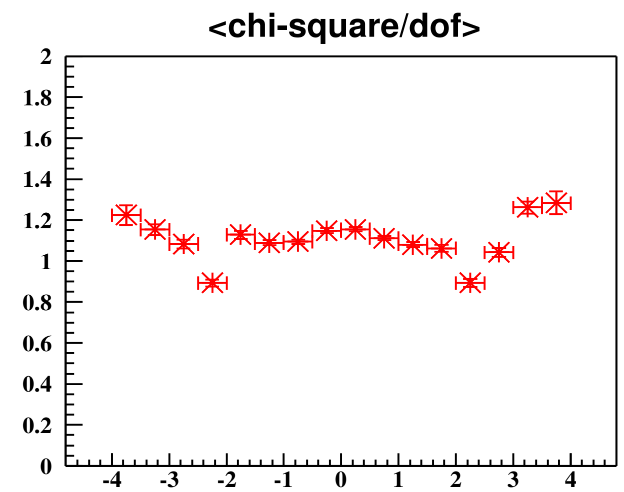
GTR perf vs eta for p11.09.00_fast with cut_p0.5_full.dat for p09.08

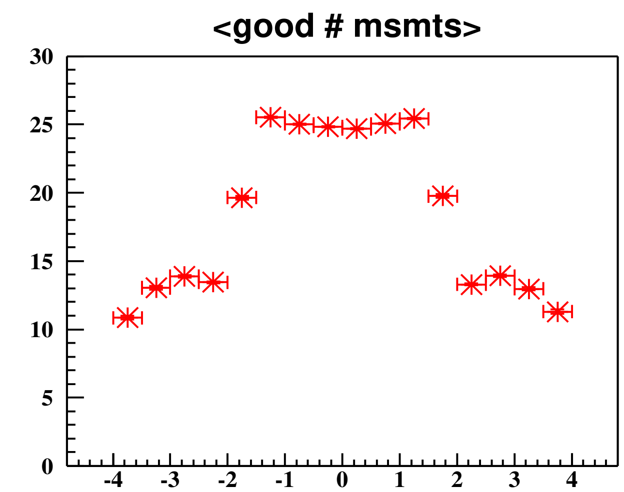






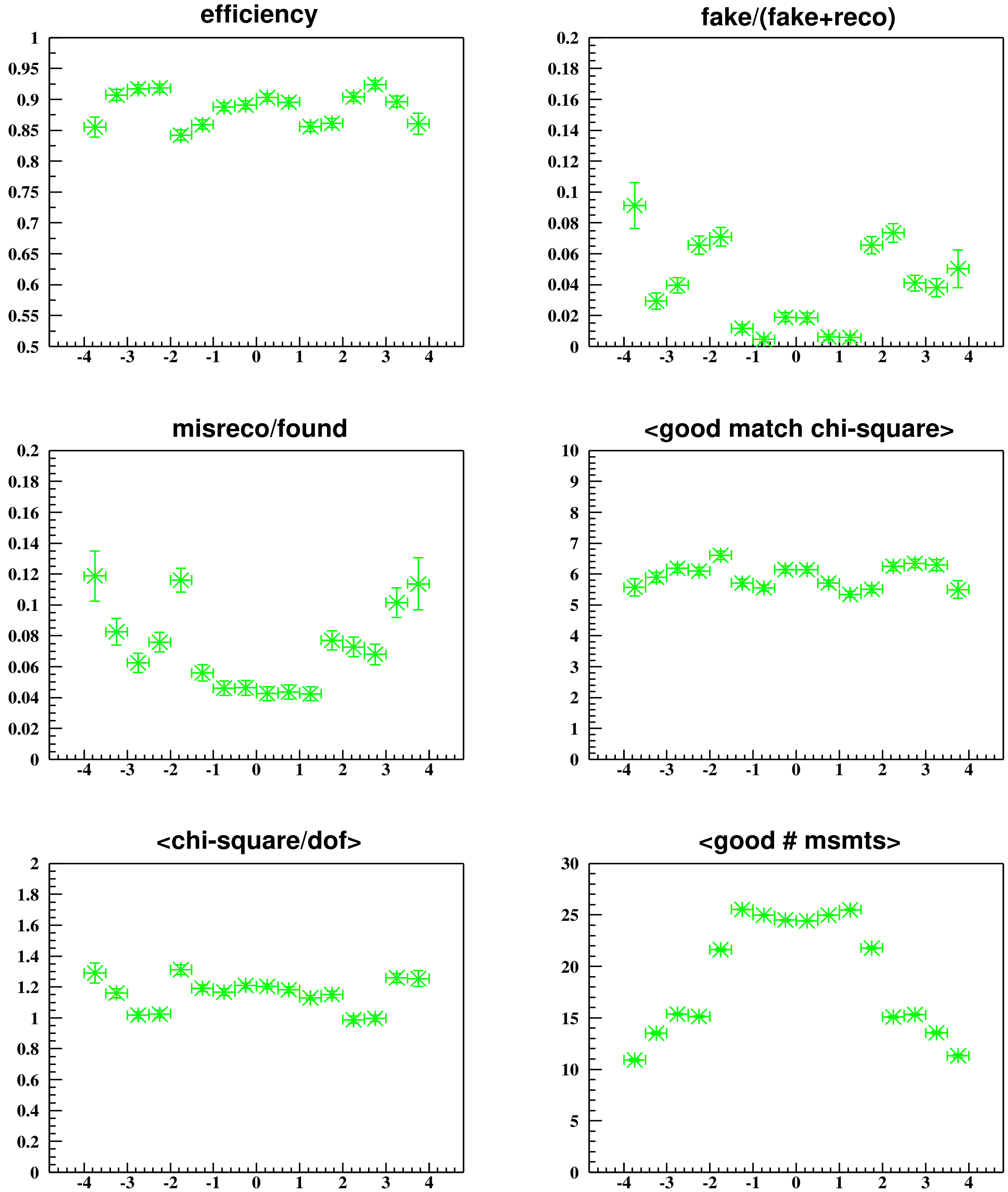




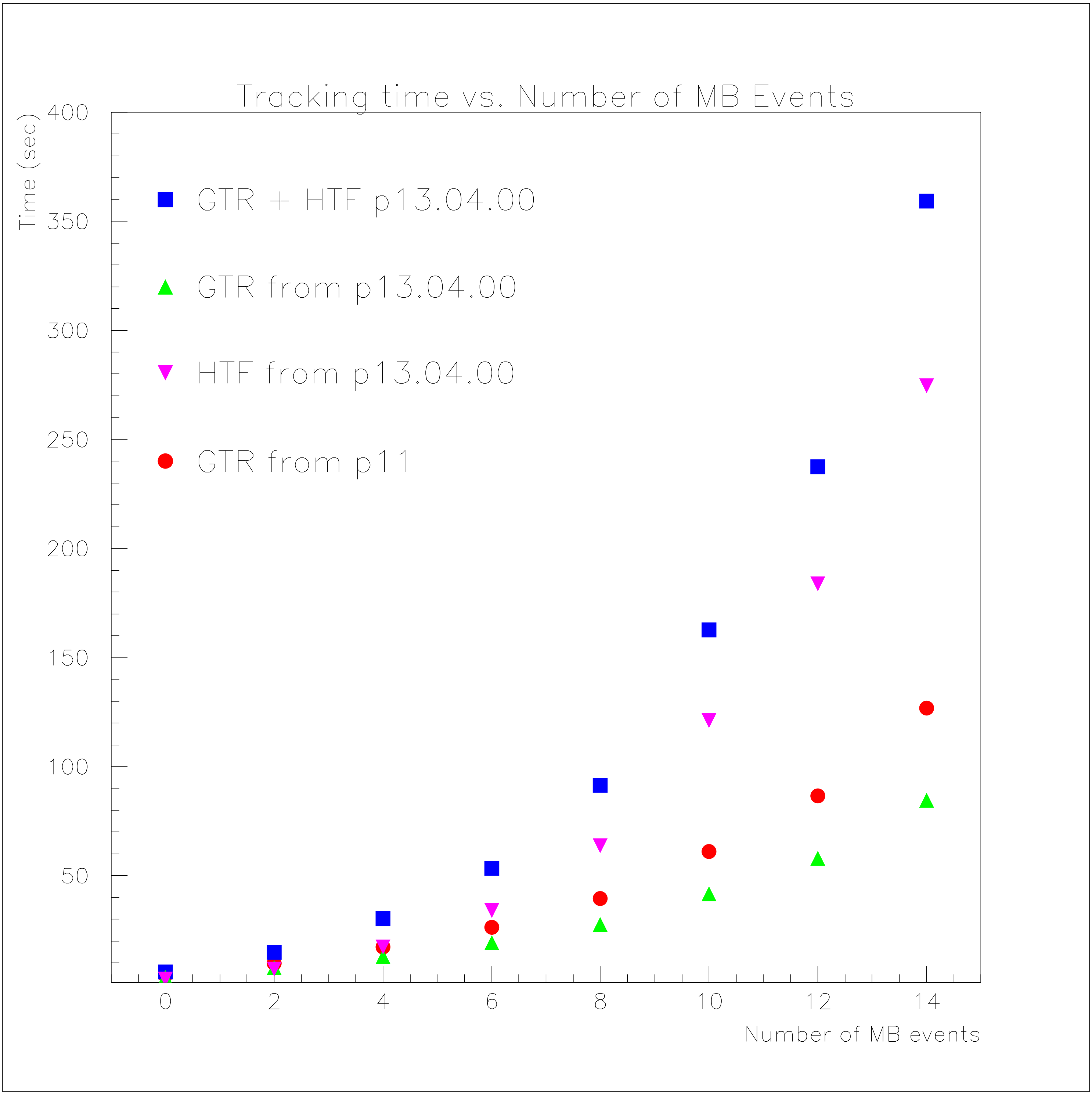


MC Performance in p13.04.00

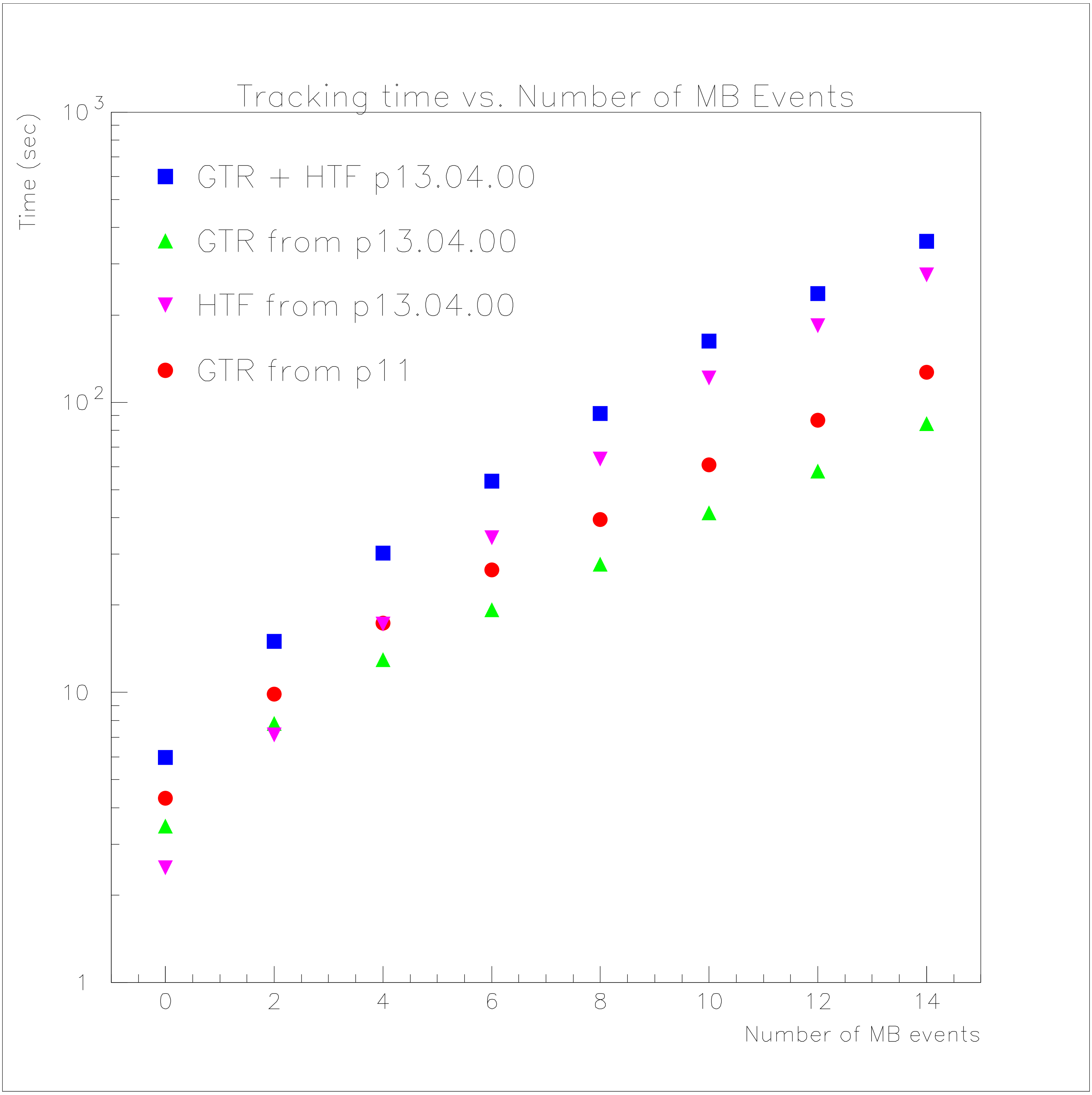
GTR perf vs eta for p13.04.00 with cut_p0.5_full.dat for p09.08_zmr



MC Timing

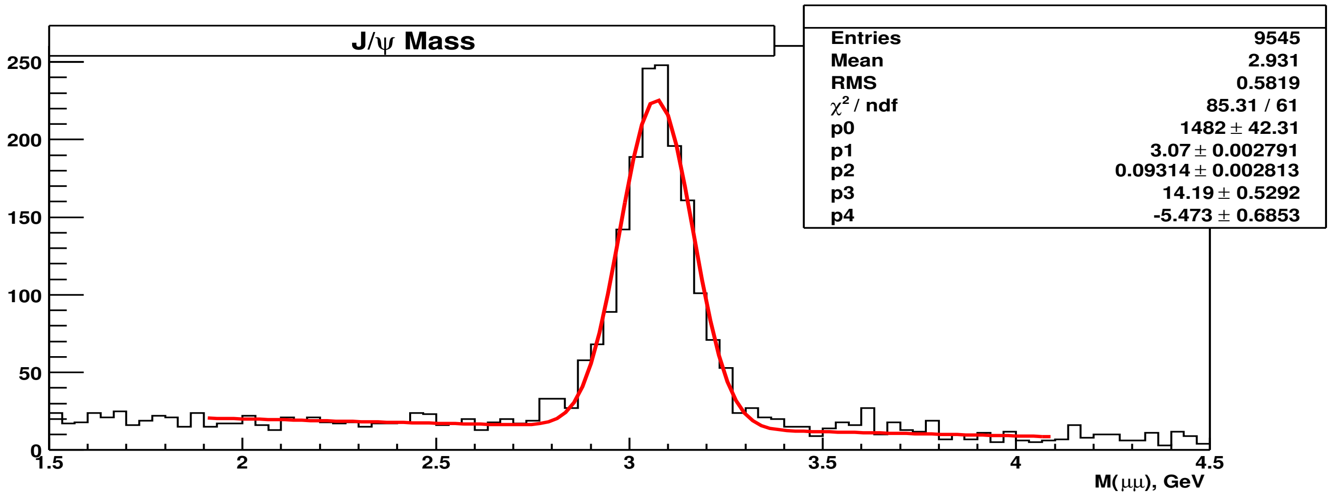

Tracking time vs. Number of MB Events
Time (sec)
400
350
300
250
200
150
100
50
0
2
4
6
8
10
12
14
Number of MB events
GTR + HTF p13.04.00
GTR from p13.04.00
HTF from p13.04.00
GTR from p11

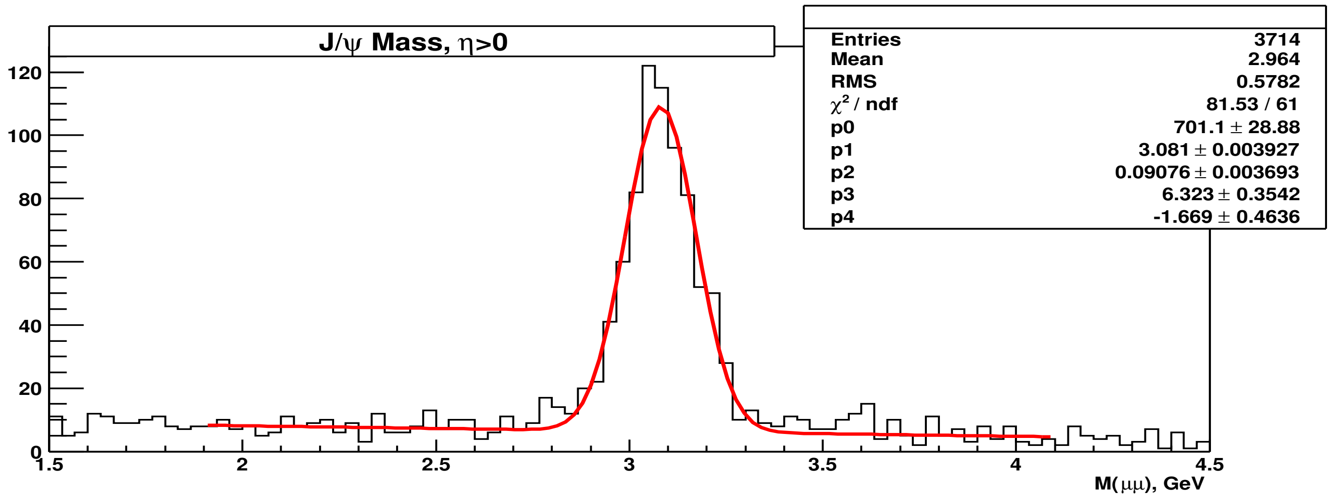
MC Timing

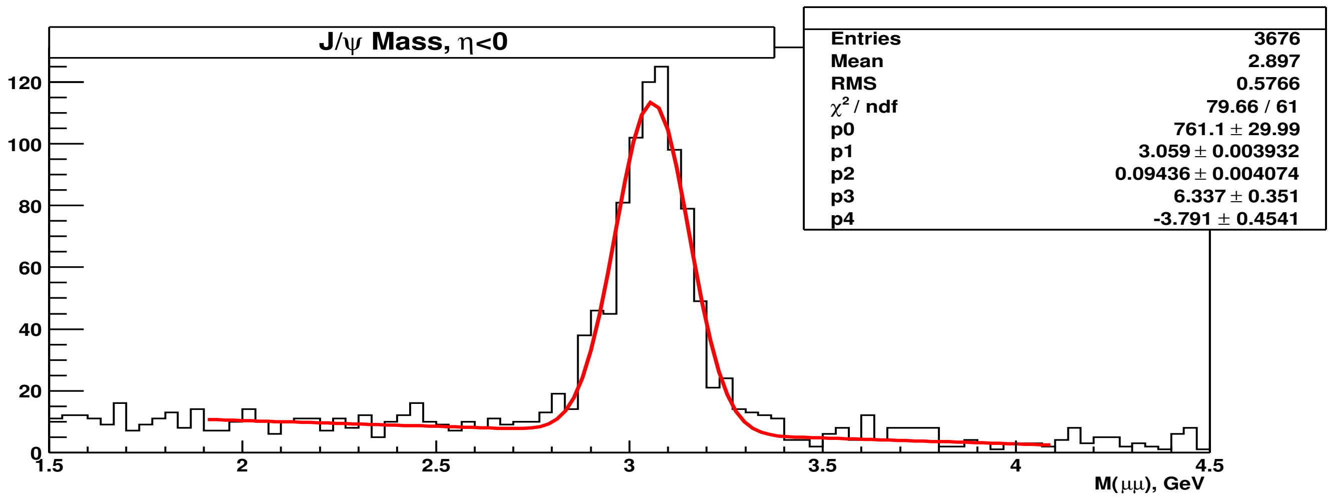


Tracking time vs. Number of MB Events
Time (sec)
10^3
10^2
10
1
GTR + HTF p13.04.00
GTR from p13.04.00
HTF from p13.04.00
GTR from p11
0
2
4
6
8
10
12
14
Number of MB events

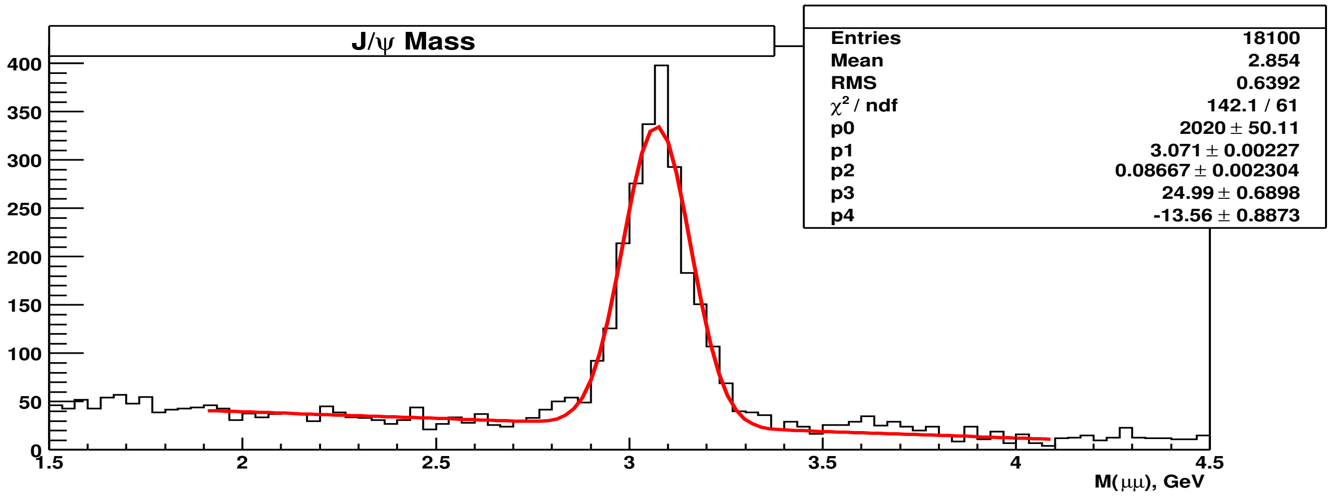
J/ψ Asymmetry in p11/gtrhtf

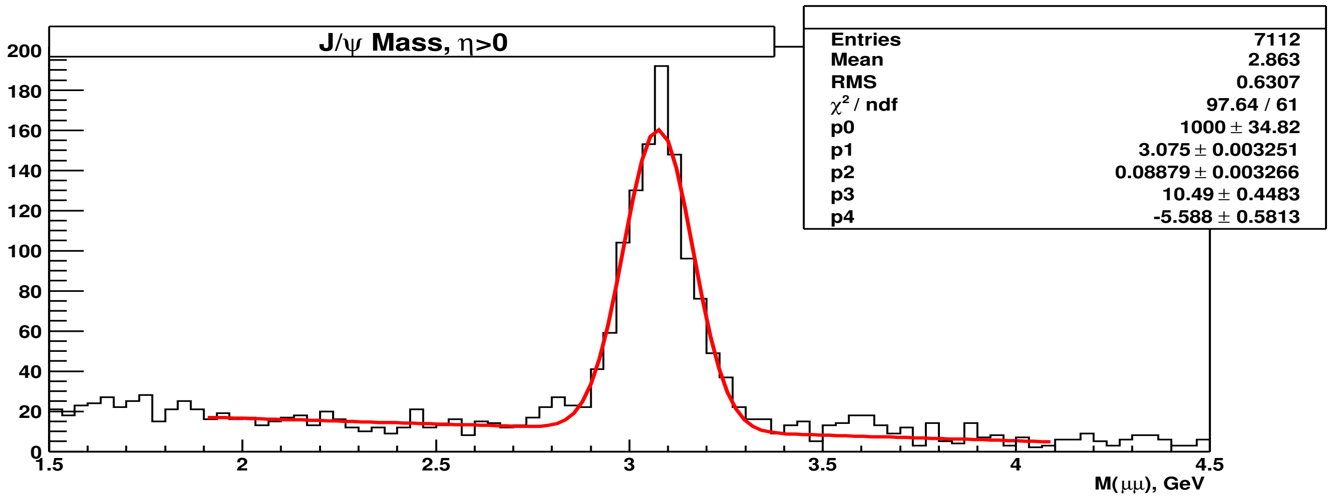


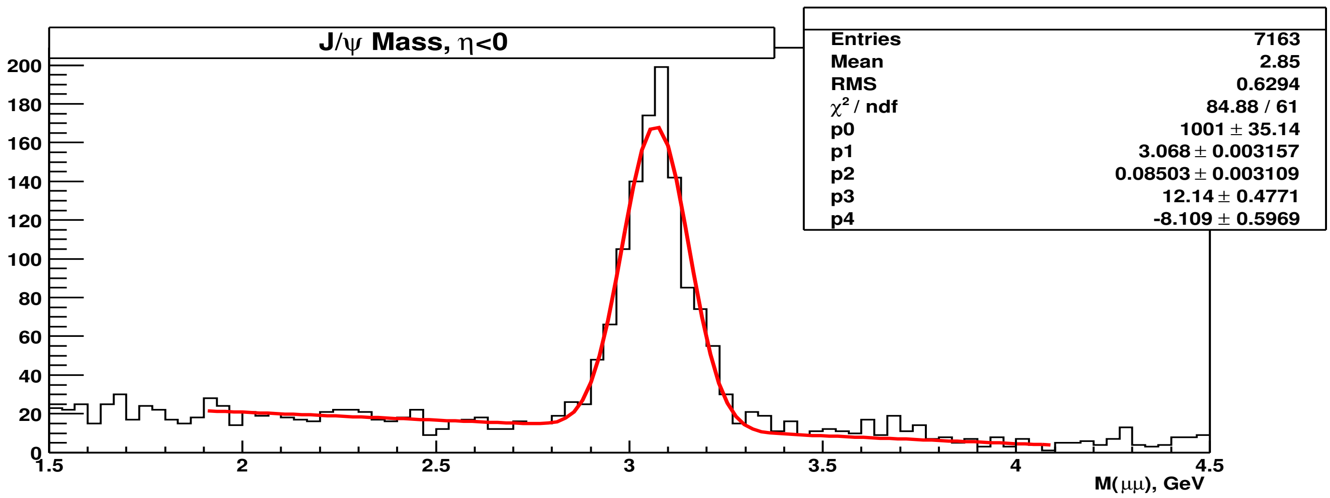




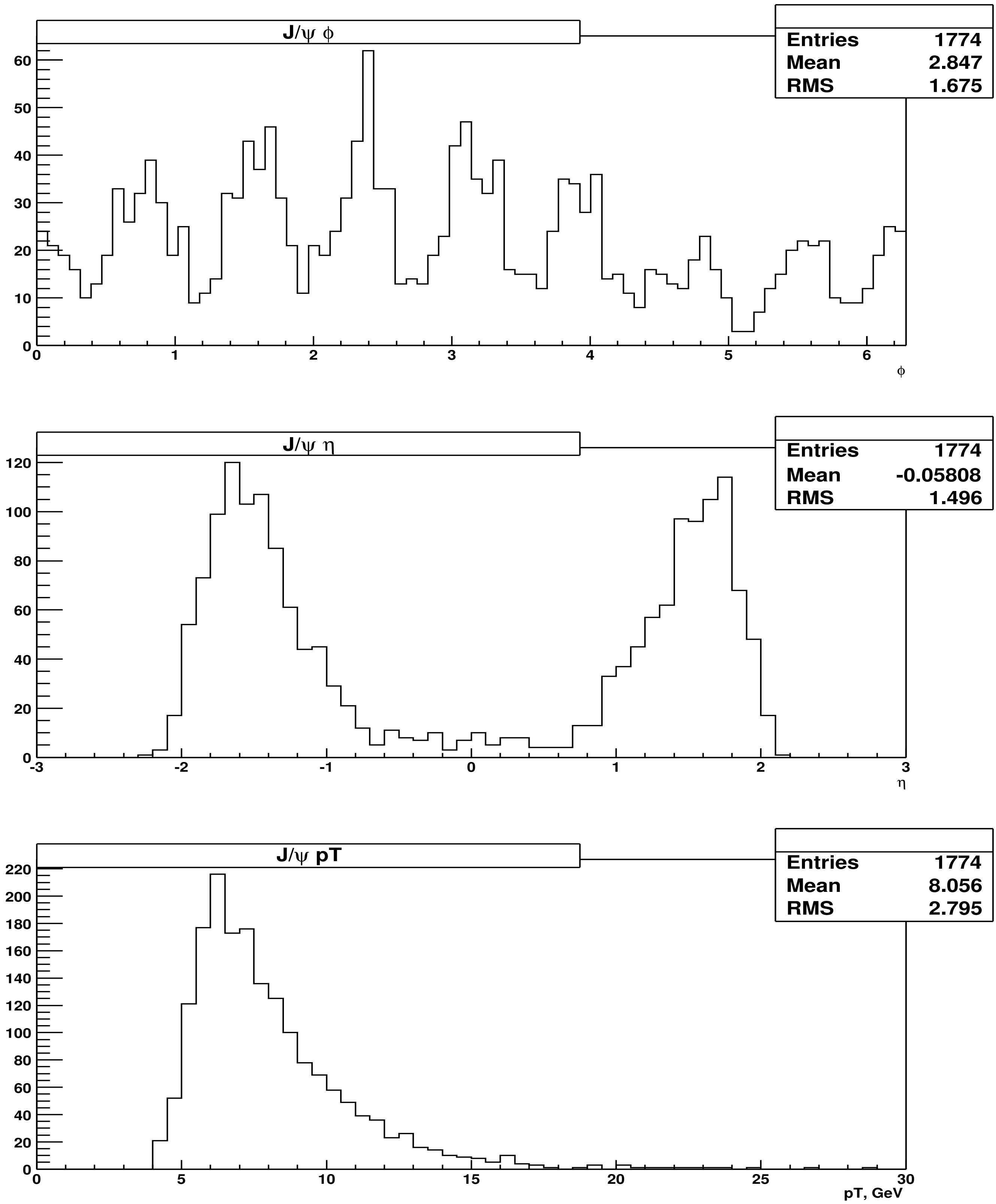
J/ψ Asymmetry in p13/gtrhtf



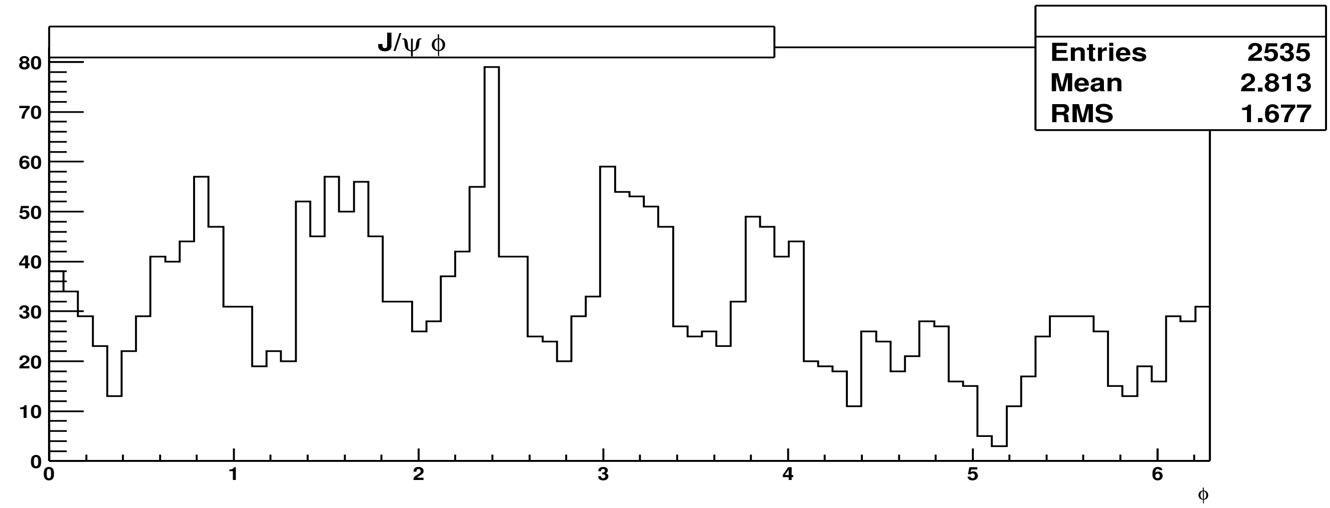


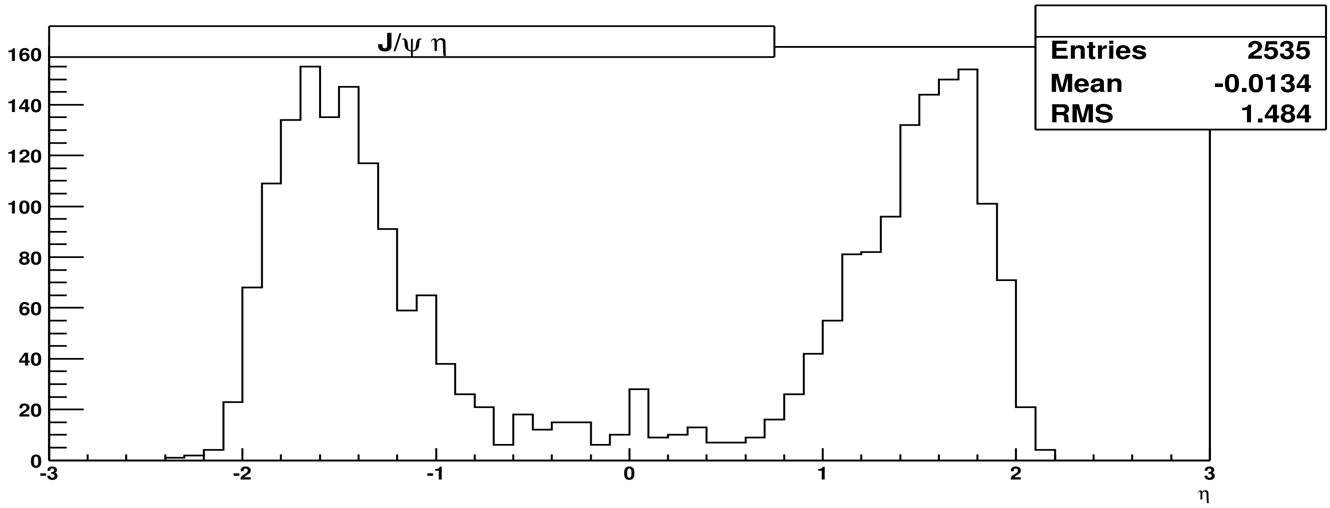


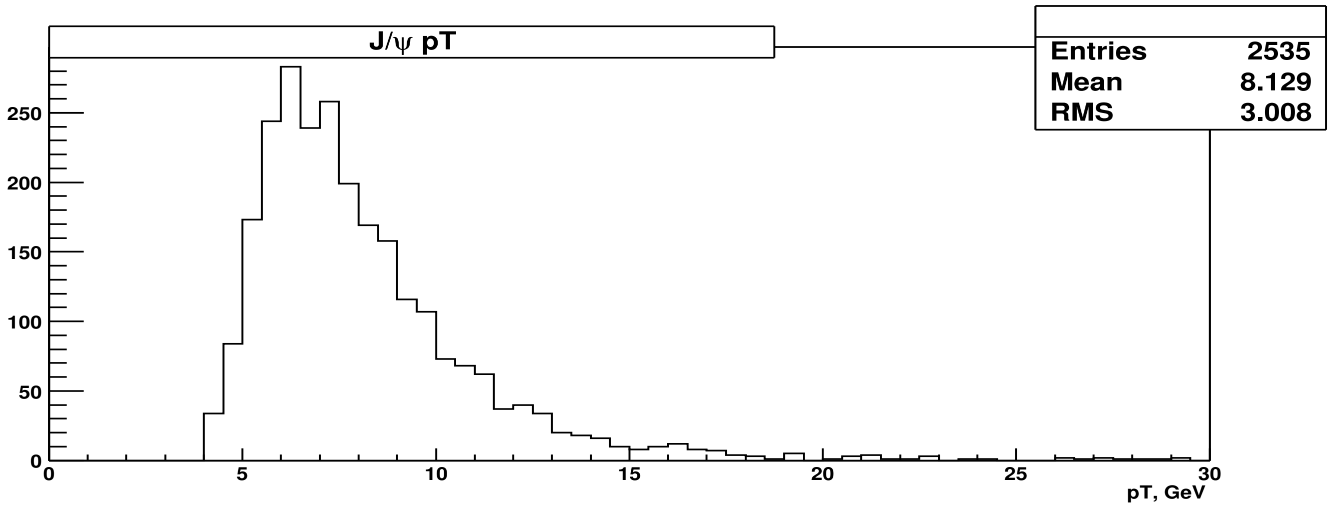
J/ψ Spectrum in p11/gtrhtf



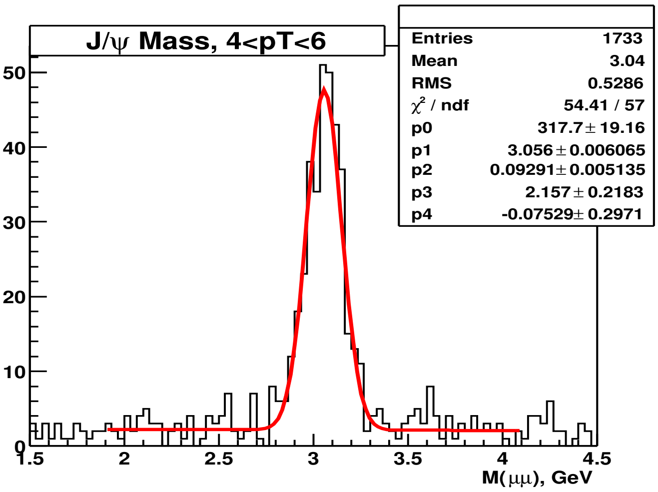
J/ψ Spectrum in p13/gtrhtf

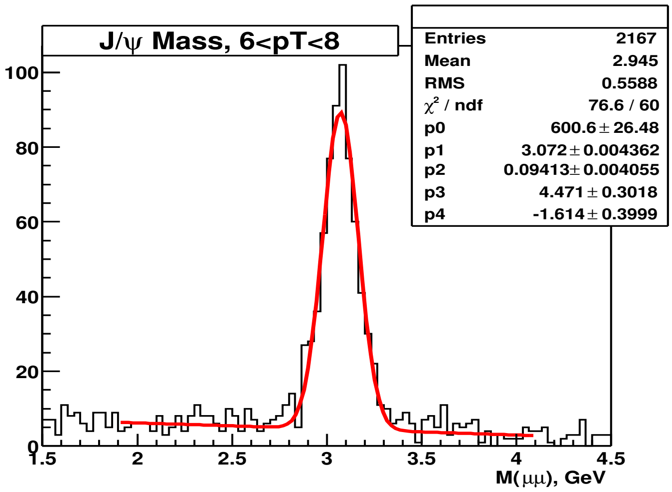


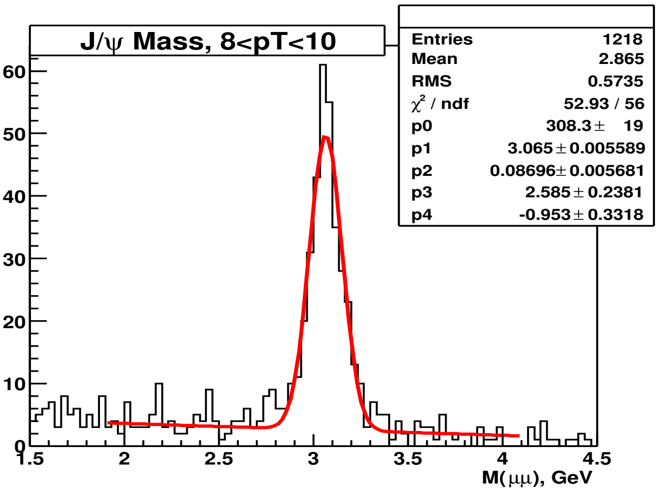


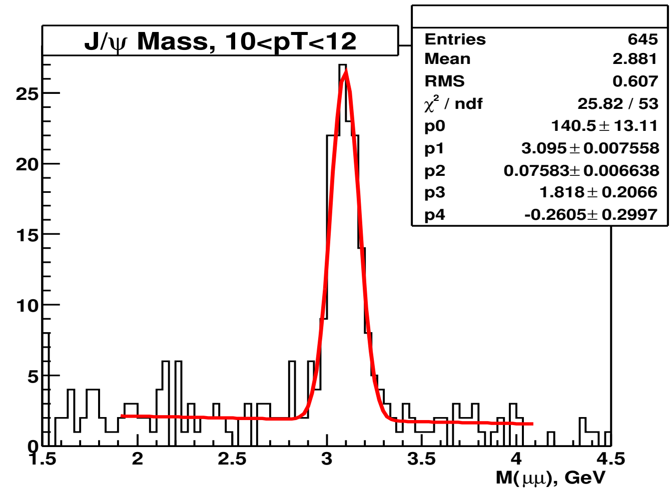


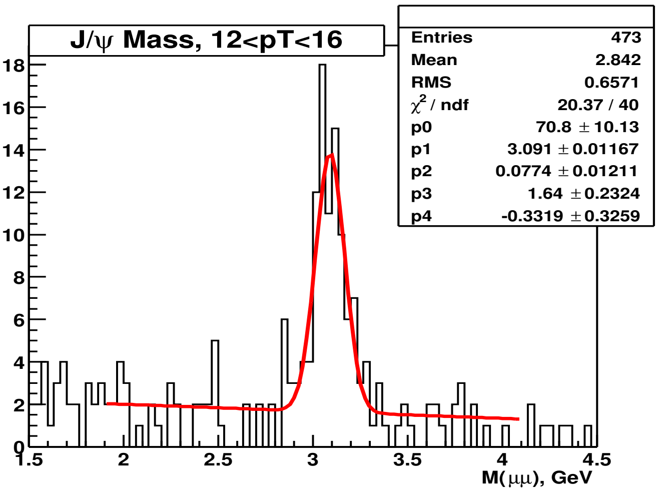
J/ψ Mass in p_T Bins in p11/gtrhtf

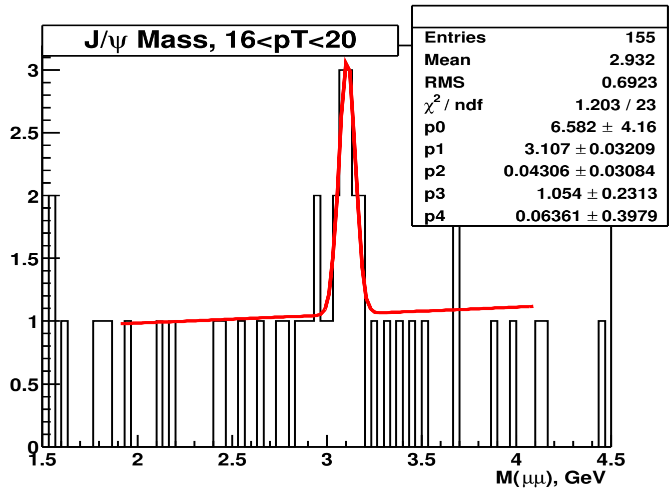




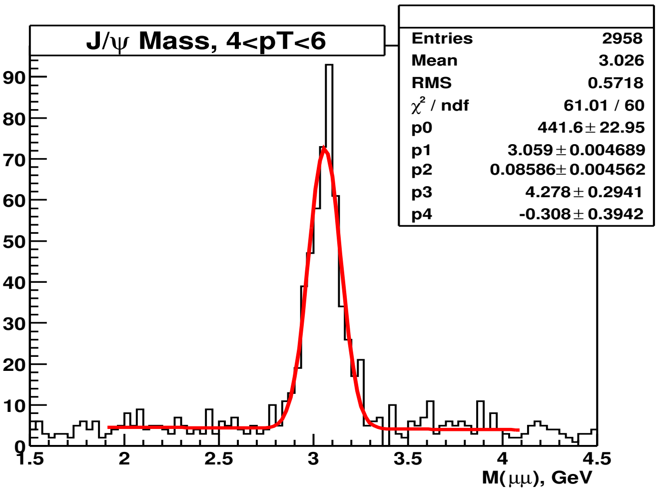


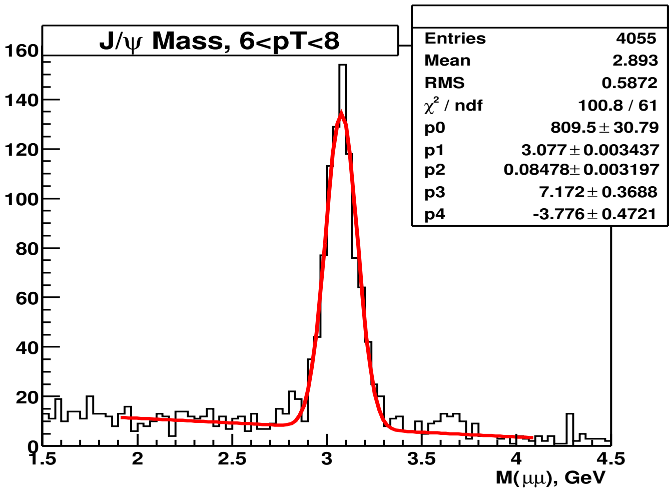


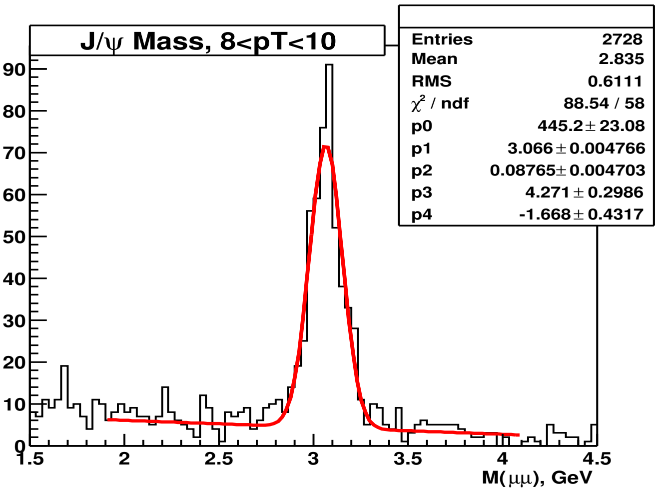


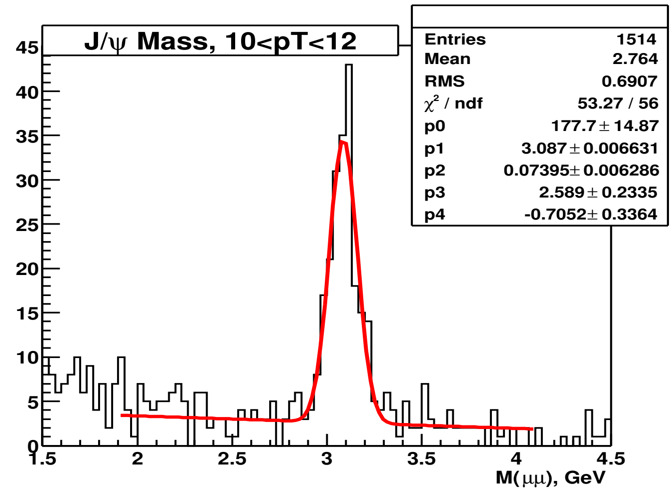


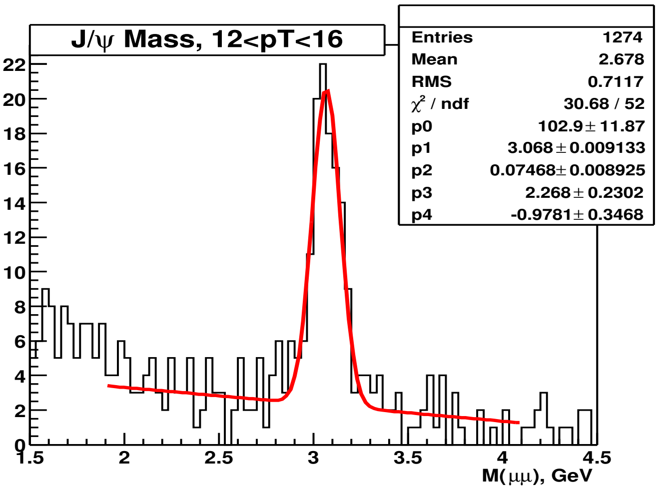
J/ψ Mass in p_T Bins in p11/gtrhtf

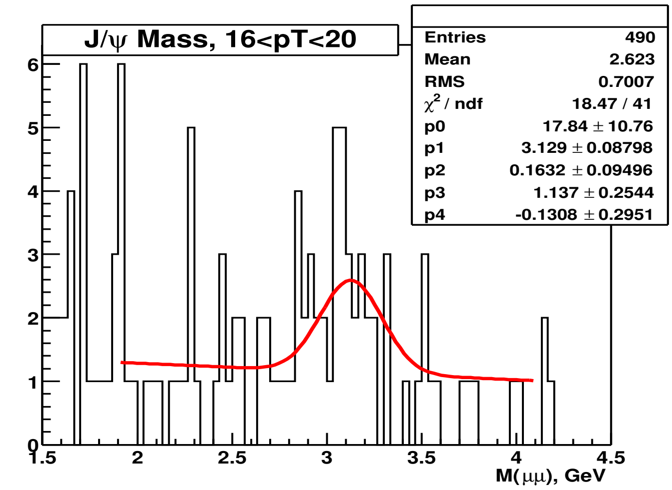




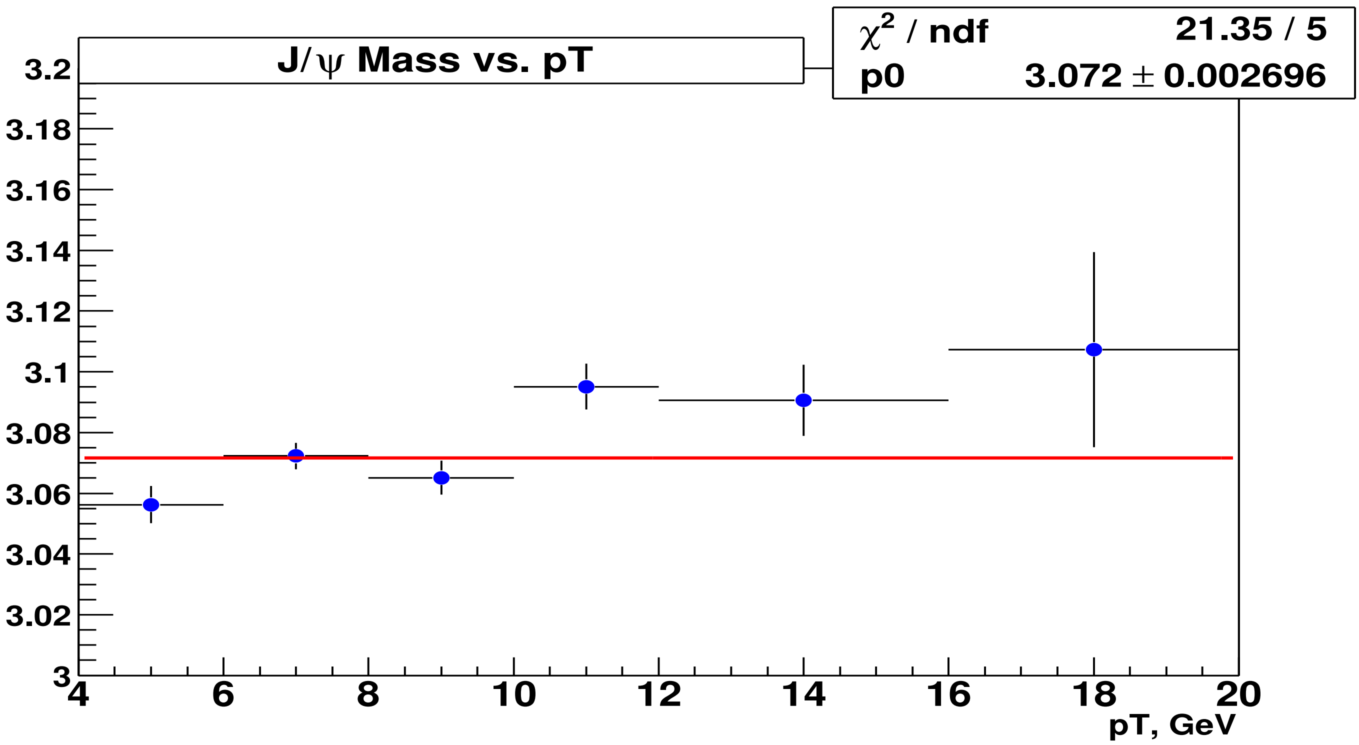


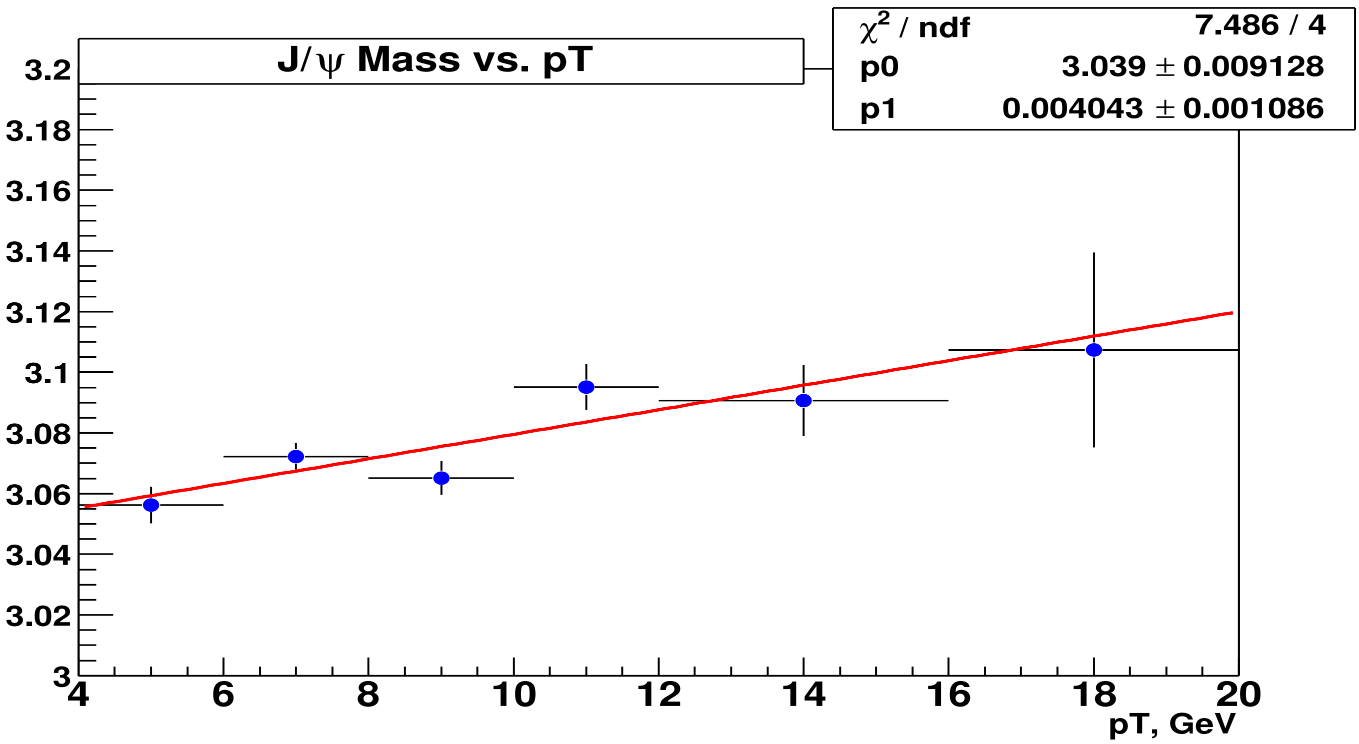




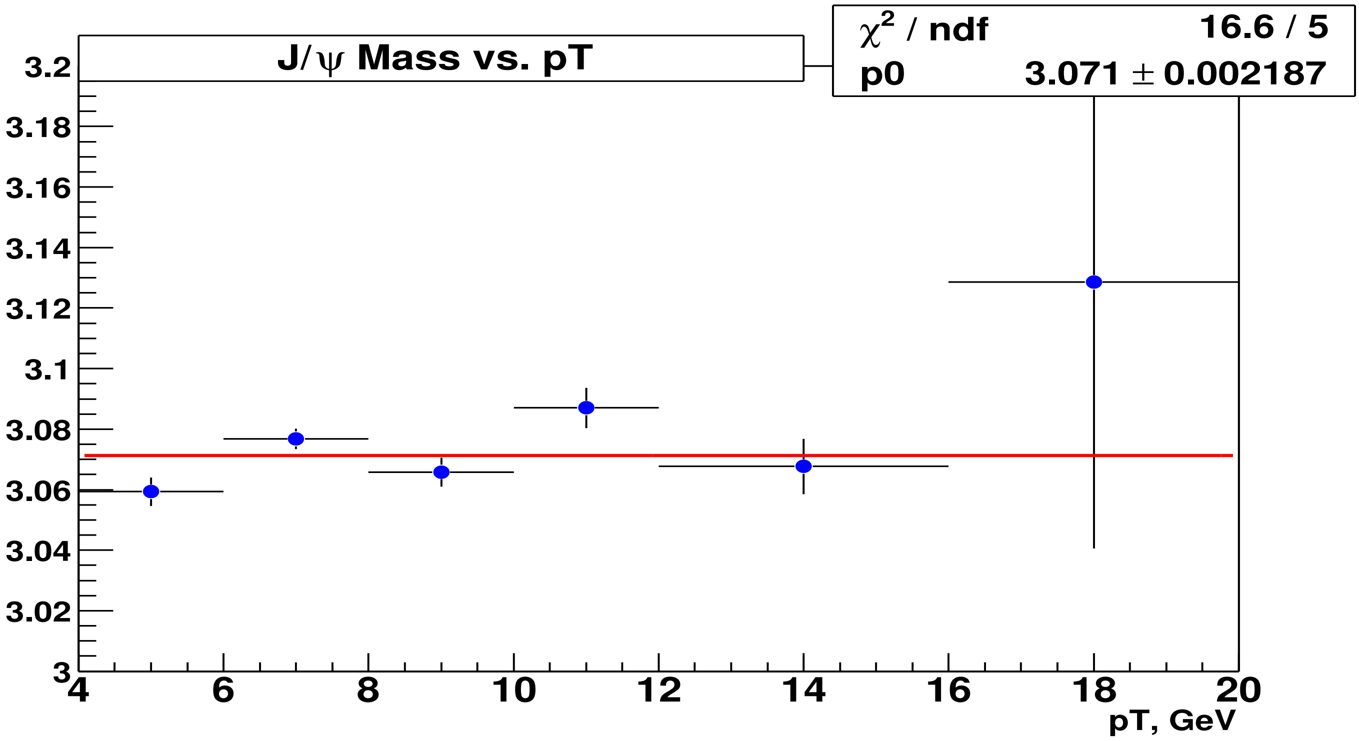


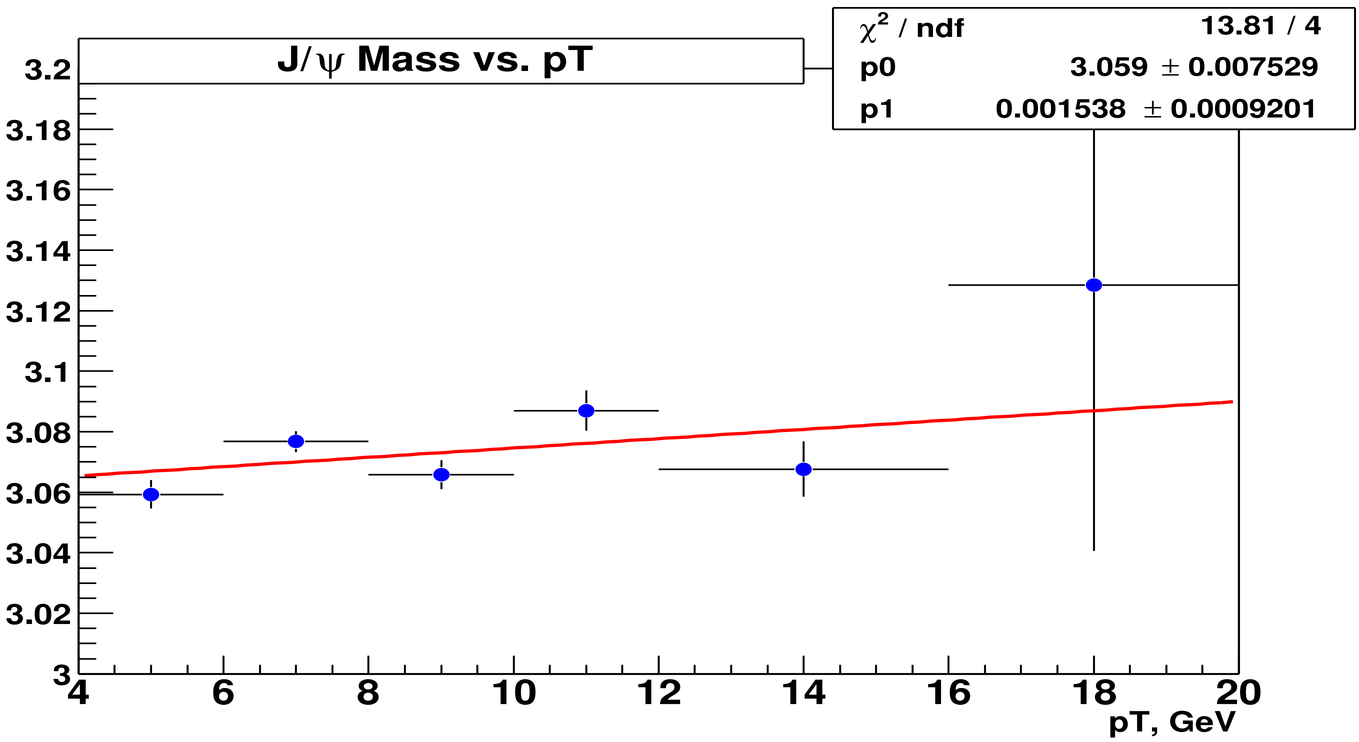
J/ψ Mass vs. p_T in p11/gtrhtf





J/ψ Mass vs. p_T in p13/gtrhtf





Conclusions

- P13 tracking performance is significantly better than p11 due to addition of htf algorithm.
- Recent modifications to p13 have improved J/ψ mass asymmetry and p_T slope.
- J/ψ mass remains low by about 30 MeV.