Análisis con eventos de 2- y 3- jets y diferente radio de reconocimiento de jets.

Búsqueda de dijets ($\Delta\varphi \approx \pi$) y jets de gluones.

Identificación de partículas con el método Bayes.

Razones de partícula – antipartícula y protón/pion.

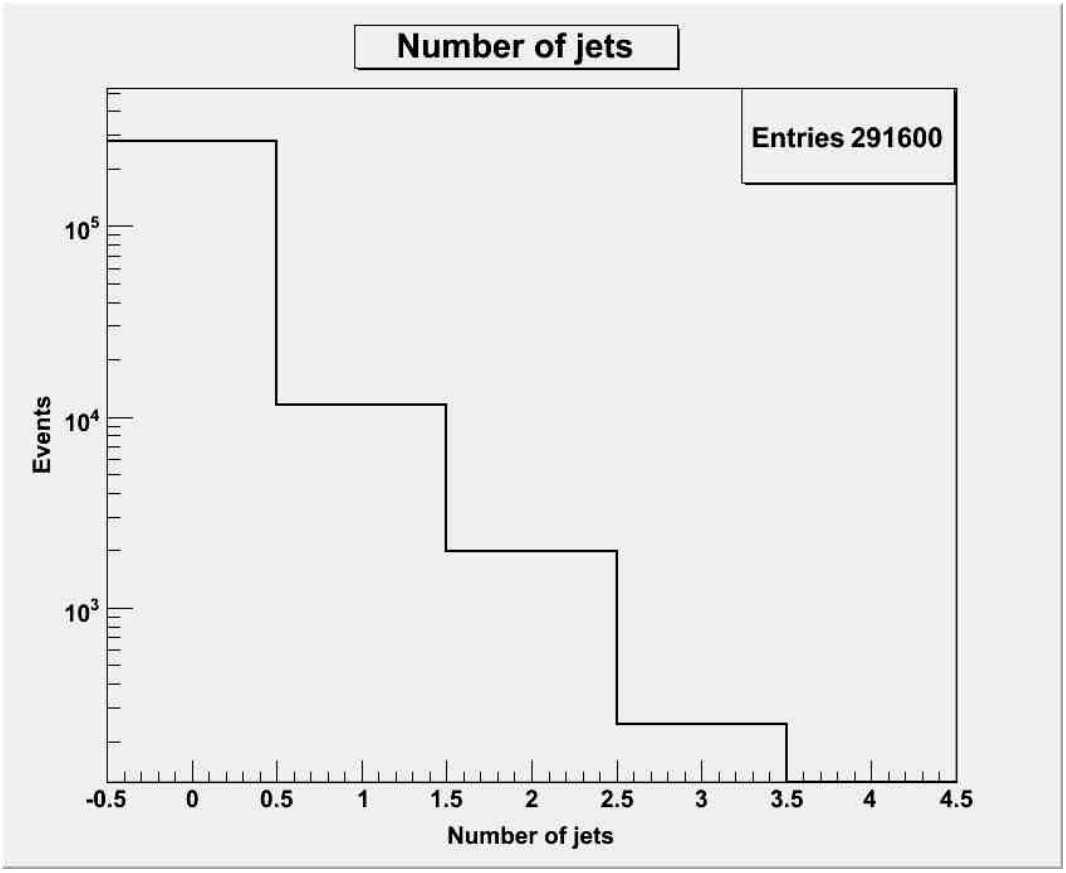
Análisis de partículas asociadas a la más energética.

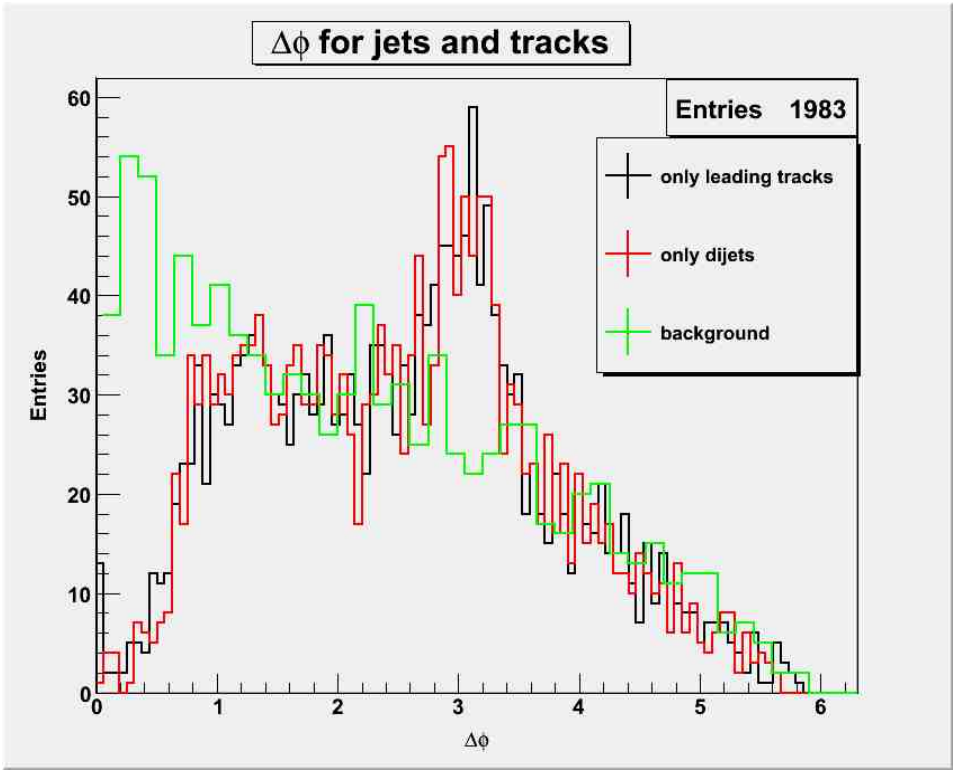
Búsqueda de jets con protones como "leading".

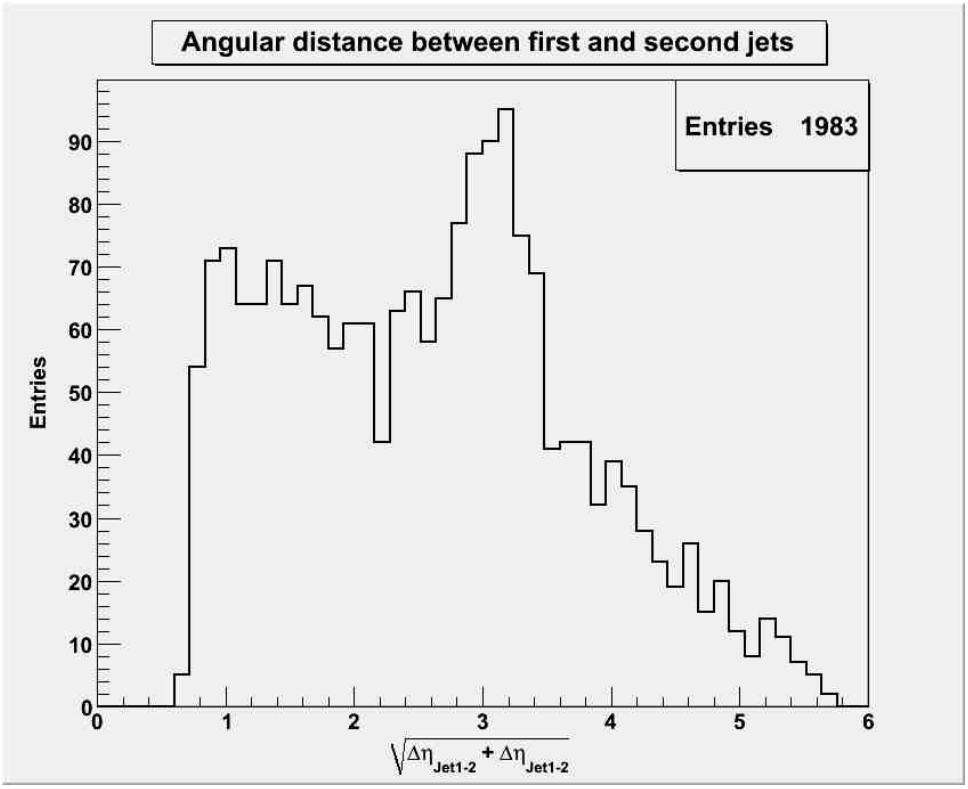
Datos: PDC06, PDC07, PDC08

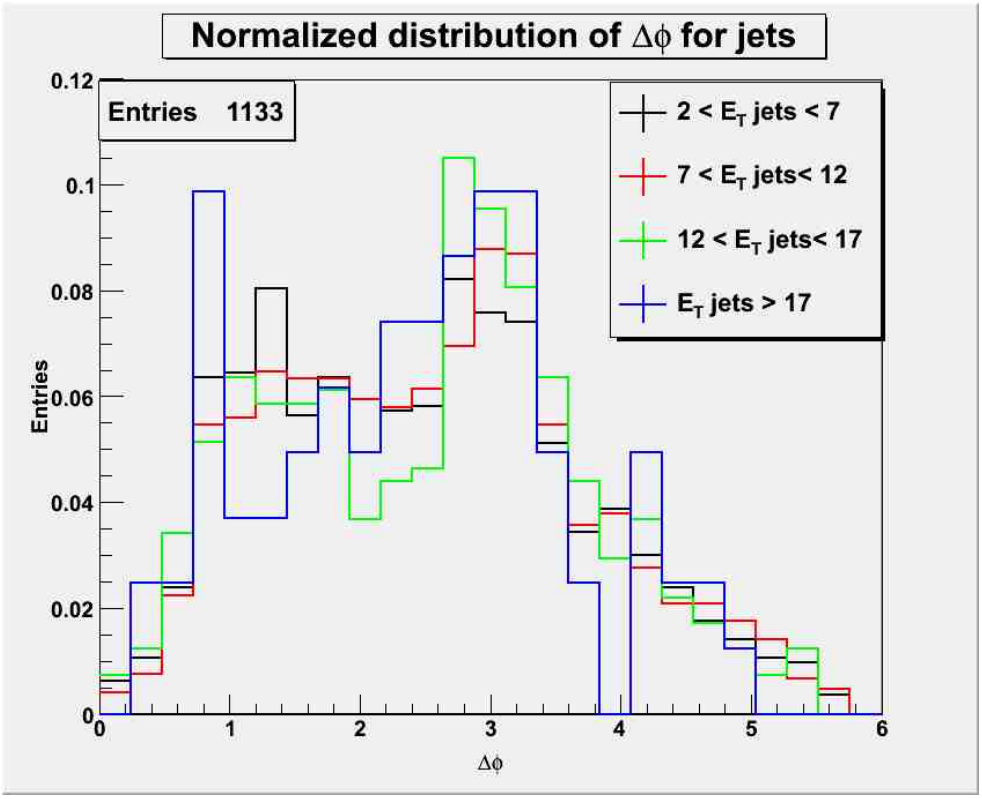
Simulación: Pythia6, Pythia8, Phojet

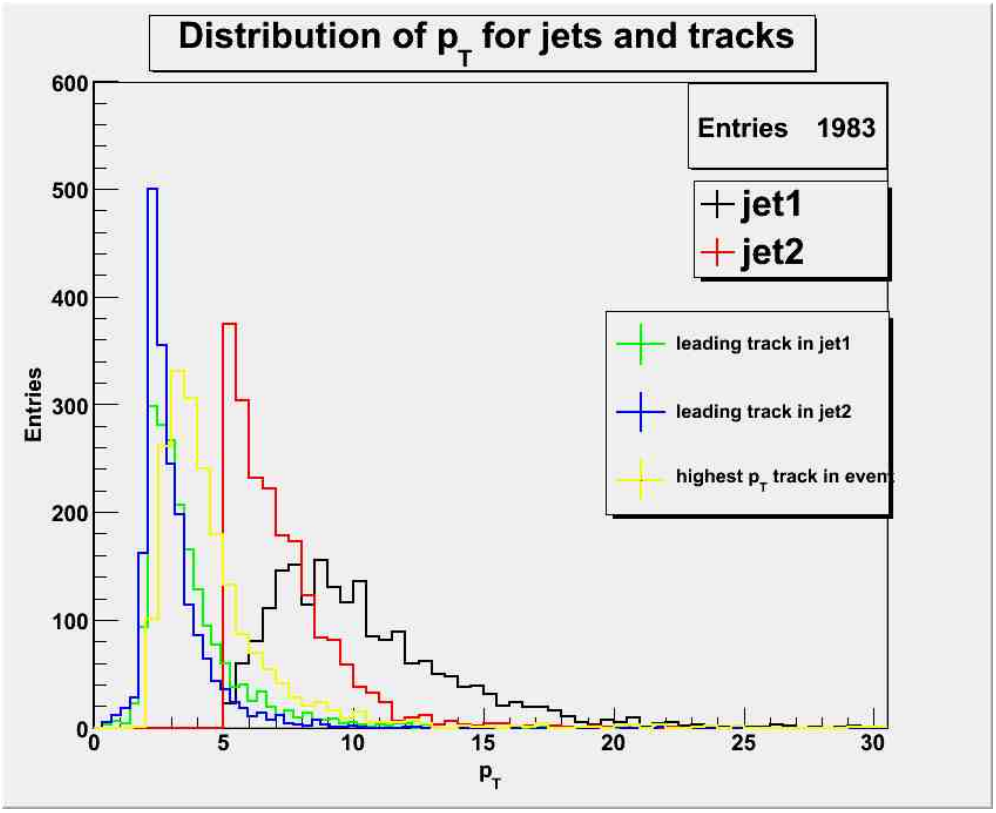
Cortes: $|\Delta\eta_{leading}| < 0.5$, $E^{jet}_{T} > 5$, $R = 0.7$

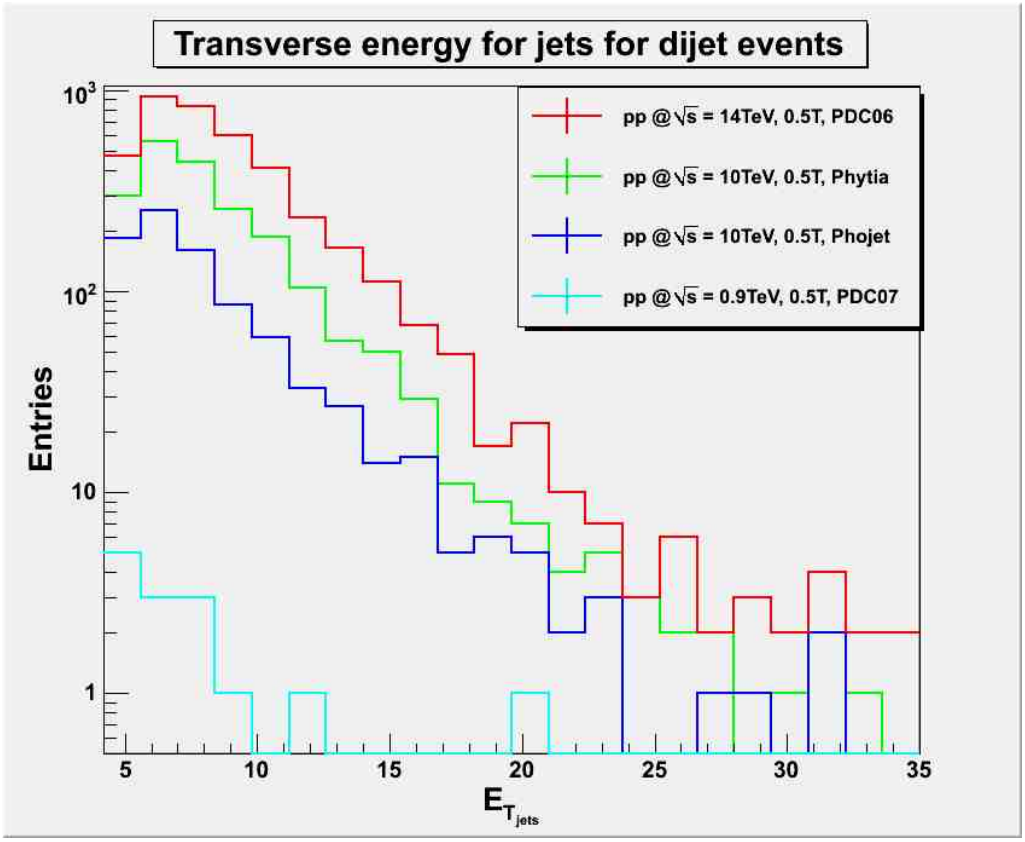


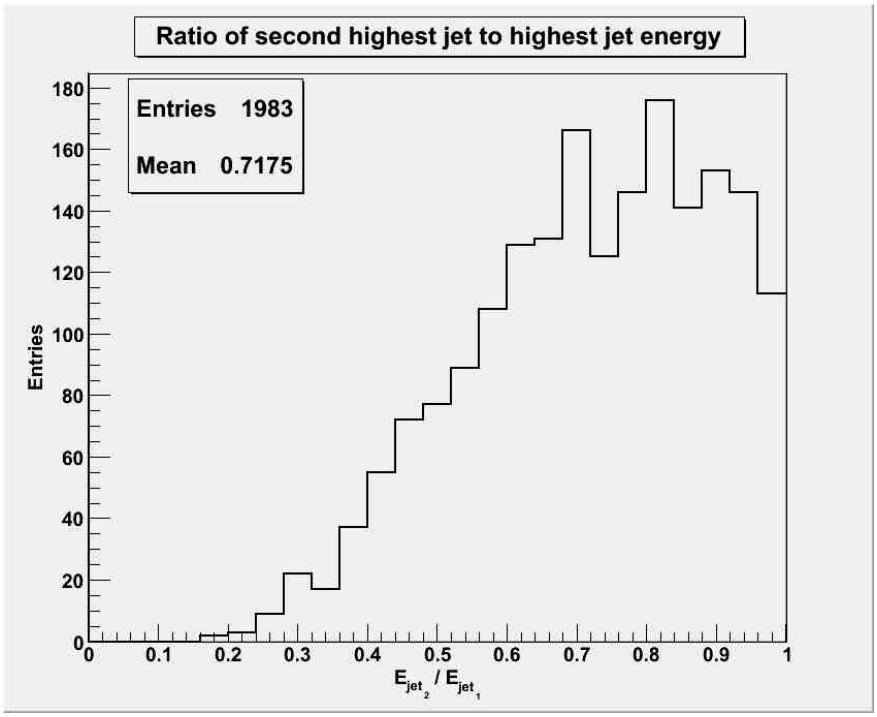

Δφ for jets and tracks
Entries 1983
only leading tracks
only dijets
background
Entries
Δφ
0
10
20
30
40
50
60
0
1
2
3
4
5
6

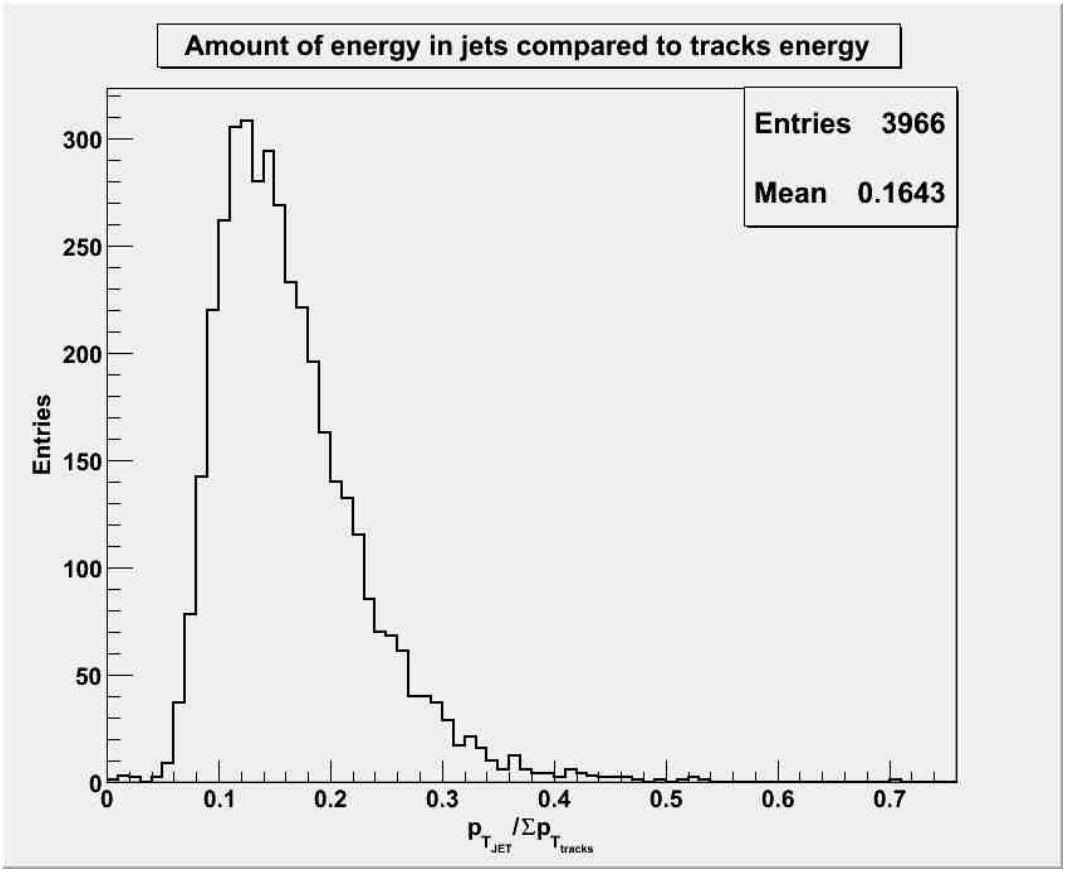

Angular distance between first and second jets
Entries 1983
Entries
$\sqrt{\Delta\eta_{Jet1\text{-}2} + \Delta\eta_{Jet1\text{-}2}}$
0
10
20
30
40
50
60
70
80
90
0
1
2
3
4
5
6

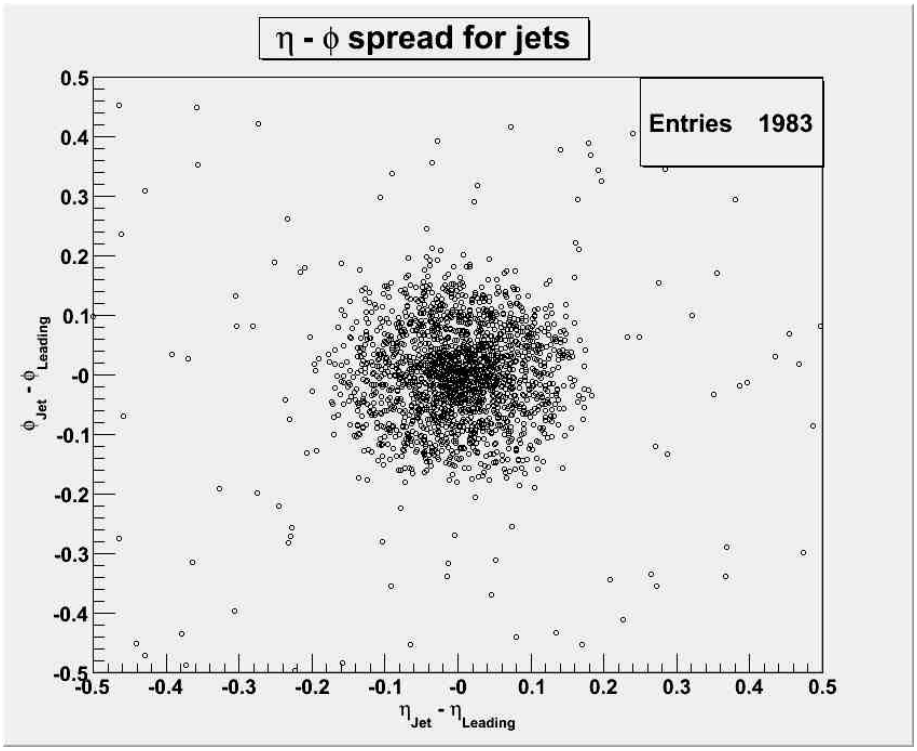

Normalized distribution of Δφ for jets
Entries 1133
2 < E_T jets < 7
7 < E_T jets< 12
12 < E_T jets< 17
E_T jets > 17
Entries
Δφ
0.12
0.1
0.08
0.06
0.04
0.02
0
0
1
2
3
4
5
6

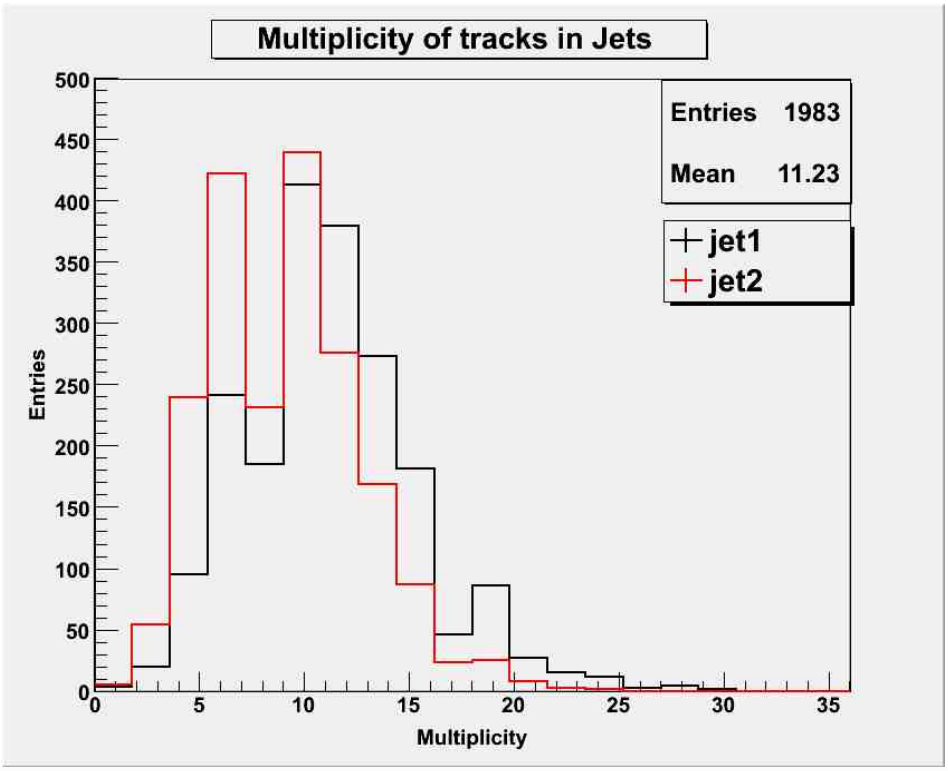

Distribution of p_T for jets and tracks
Entries 1983
jet1
jet2
leading track in jet1
leading track in jet2
highest p_T track in event
Entries
p_T
600
500
400
300
200
100
0
0
5
10
15
20
25
30

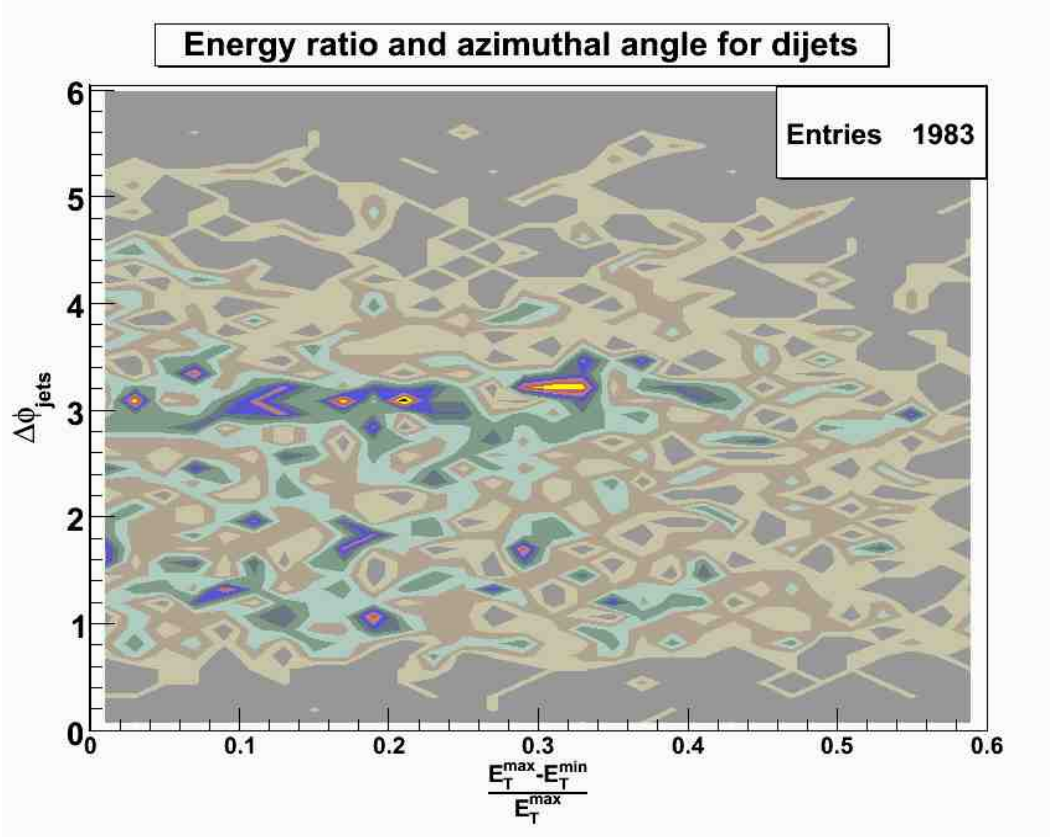

Transverse energy for jets for dijet events
pp @√s = 14TeV, 0.5T, PDC06
pp @√s = 10TeV, 0.5T, Phytia
pp @√s = 10TeV, 0.5T, Phojet
pp @√s = 0.9TeV, 0.5T, PDC07
Entries
10^3
10^2
10
1
5
10
15
20
25
30
35
$E_{T_{jets}}$

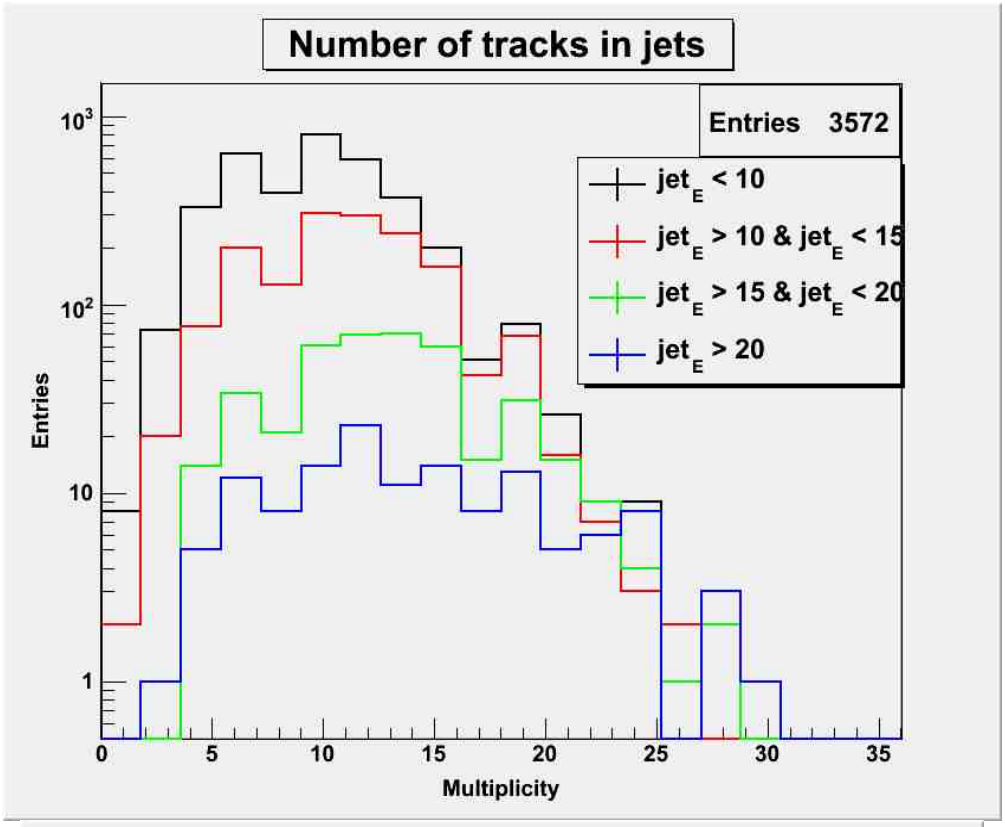

Ratio of second highest jet to highest jet energy
Entries 1983
Mean 0.7175
Entries
180
160
140
120
100
80
60
40
20
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
E_{jet_2} / E_{jet_1}

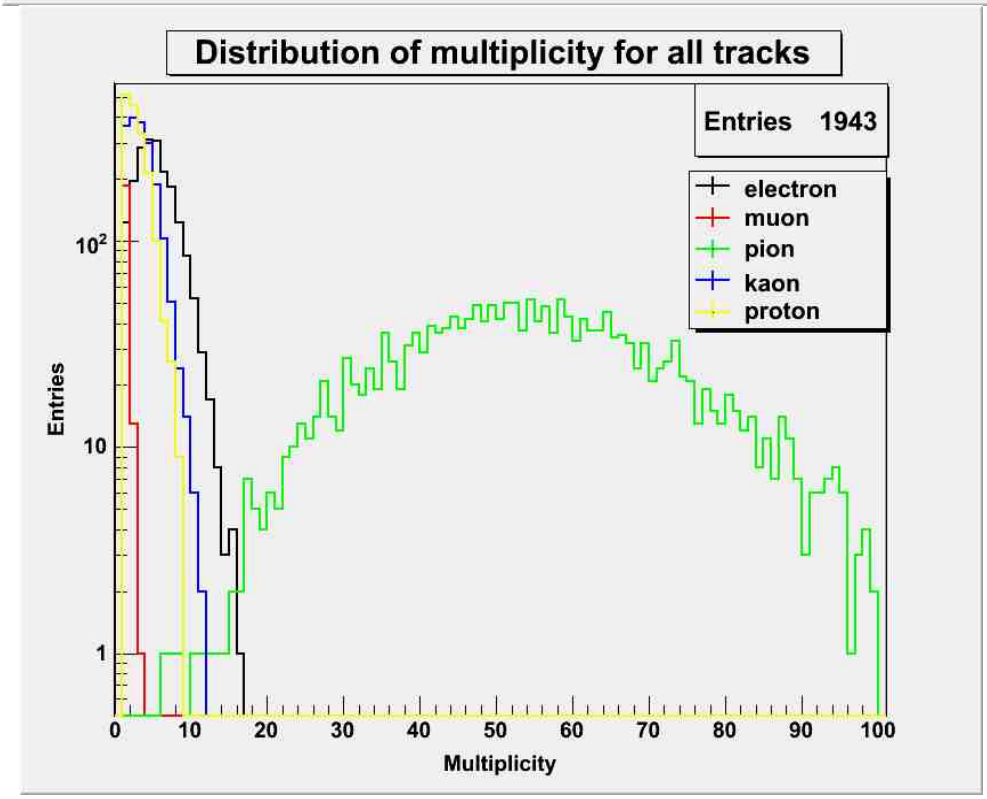

Amount of energy in jets compared to tracks energy
Entries 3966
Mean 0.1643
Entries
300
250
200
150
100
50
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
$p_{T_{JET}}/\Sigma p_{T_{tracks}}$

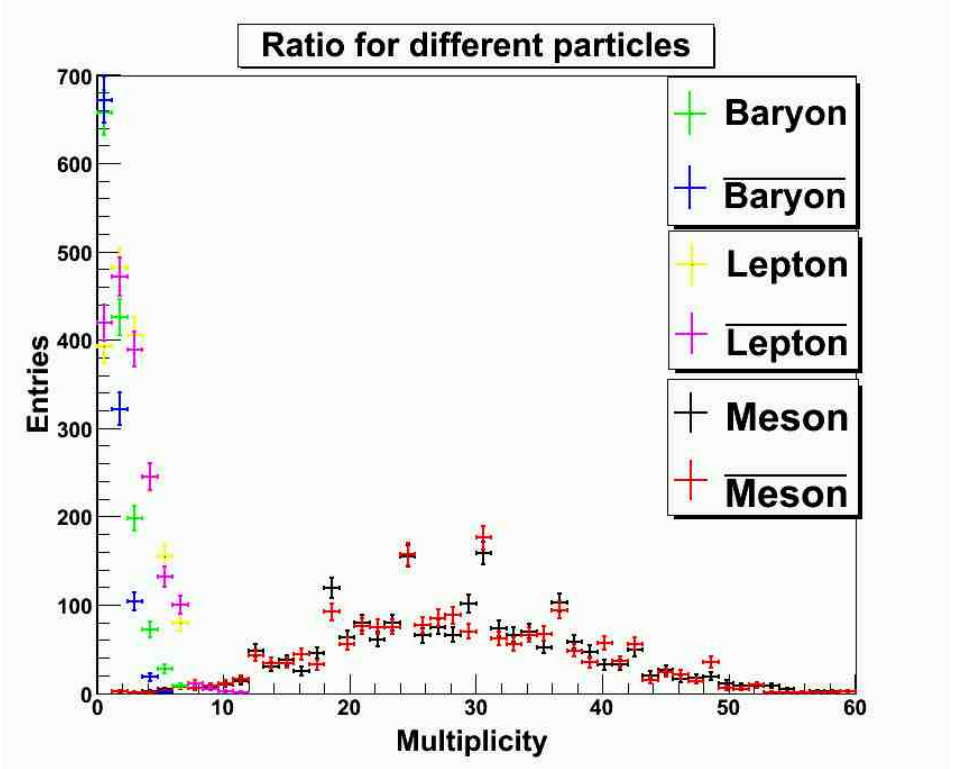

η - φ spread for jets
Entries 1983
$\phi_{Jet} - \phi_{Leading}$
0.5
0.4
0.3
0.2
0.1
-0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.5
-0.4
-0.3
-0.2
-0.1
-0
0.1
0.2
0.3
0.4
0.5
$\eta_{Jet} - \eta_{Leading}$

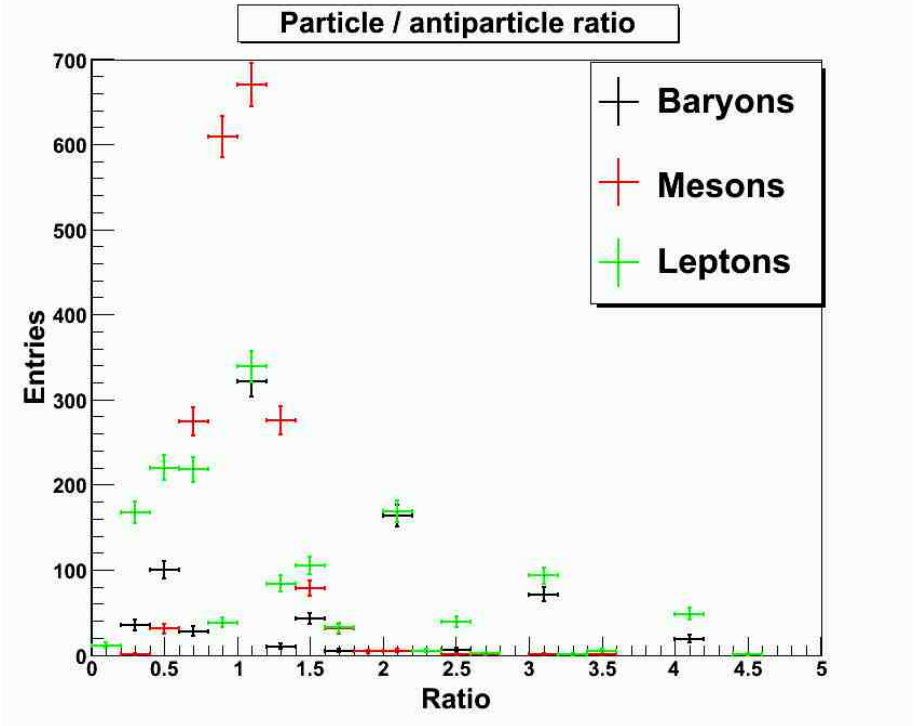

Multiplicity of tracks in Jets
Entries 1983
Mean 11.23
jet1
jet2
Entries
Multiplicity
0
50
100
150
200
250
300
350
400
450
500
0
5
10
15
20
25
30
35

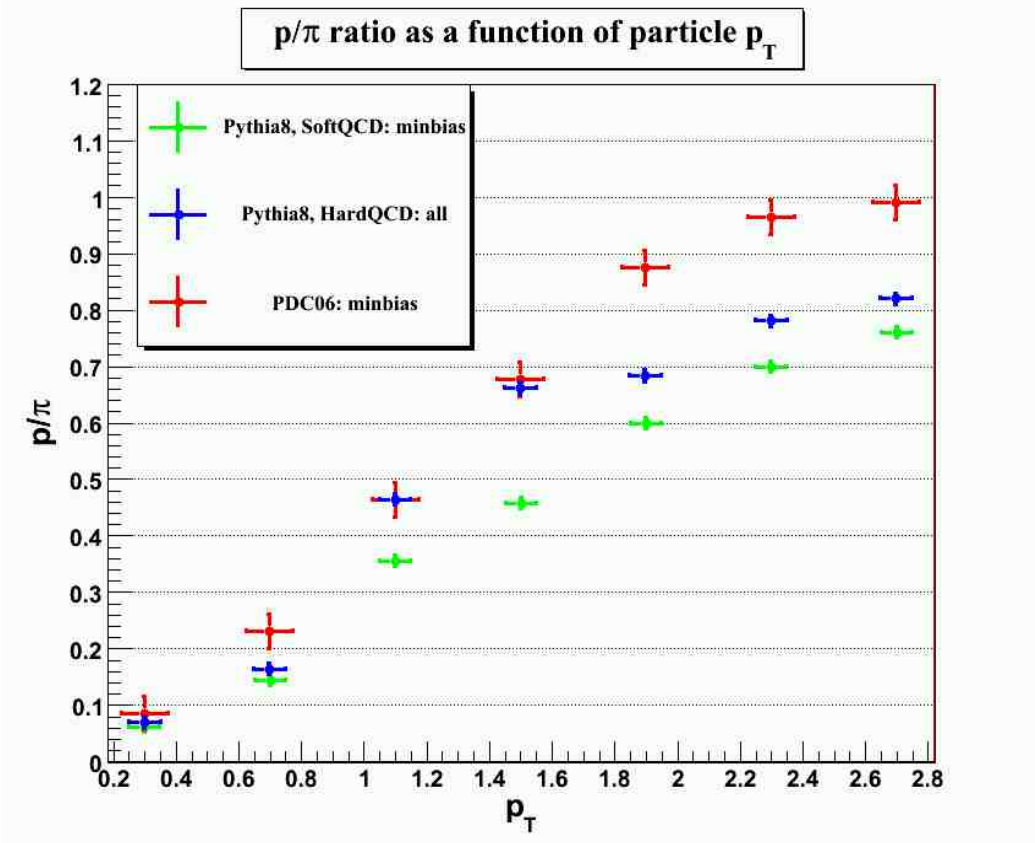

Energy ratio and azimuthal angle for dijets
Entries 1983
$\Delta\phi_{jets}$
$\frac{E_T^{max}-E_T^{min}}{E_T^{max}}$
0
1
2
3
4
5
6
0
0.1
0.2
0.3
0.4
0.5
0.6

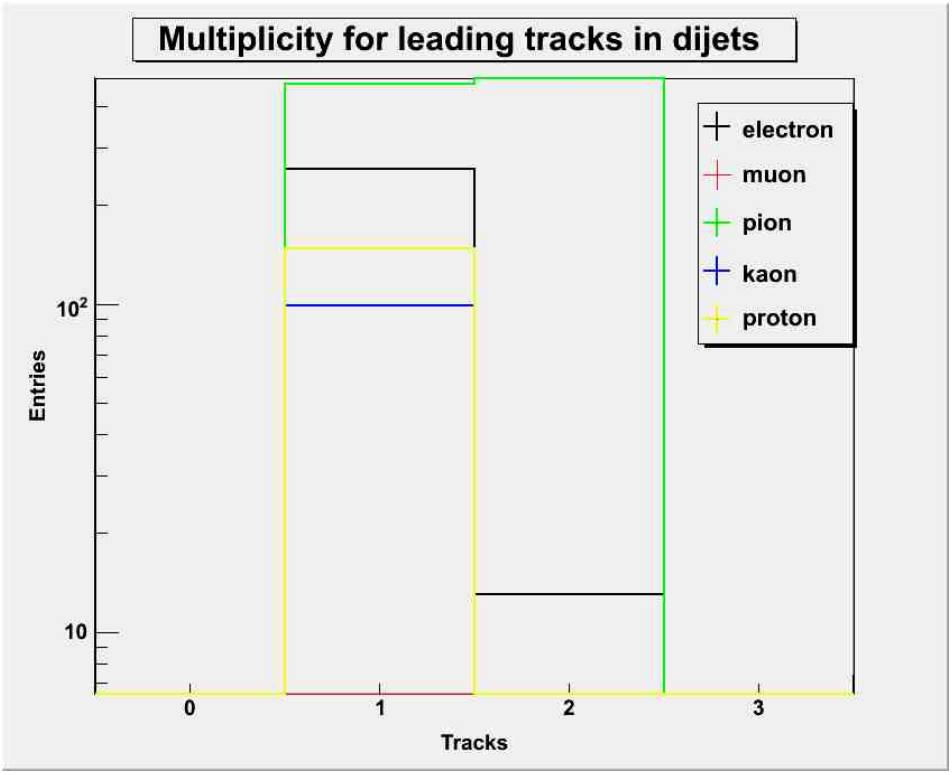

Number of tracks in jets
Entries 3572
jet_E < 10
jet_E > 10 & jet_E < 15
jet_E > 15 & jet_E < 20
jet_E > 20
Entries
Multiplicity

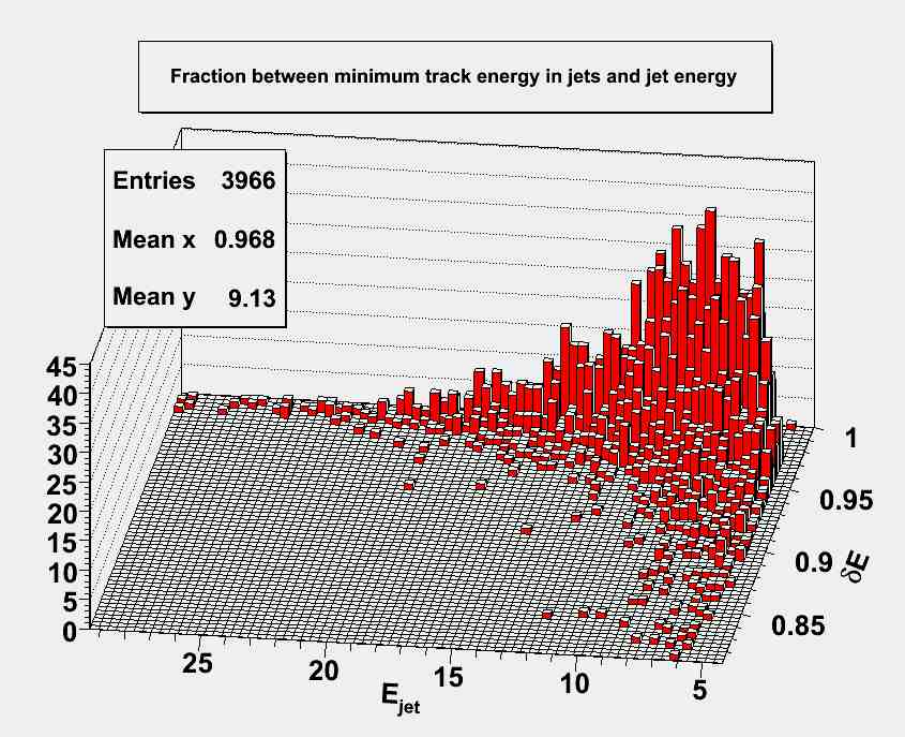

Distribution of multiplicity for all tracks
Entries 1943
electron
muon
pion
kaon
proton
Entries
Multiplicity

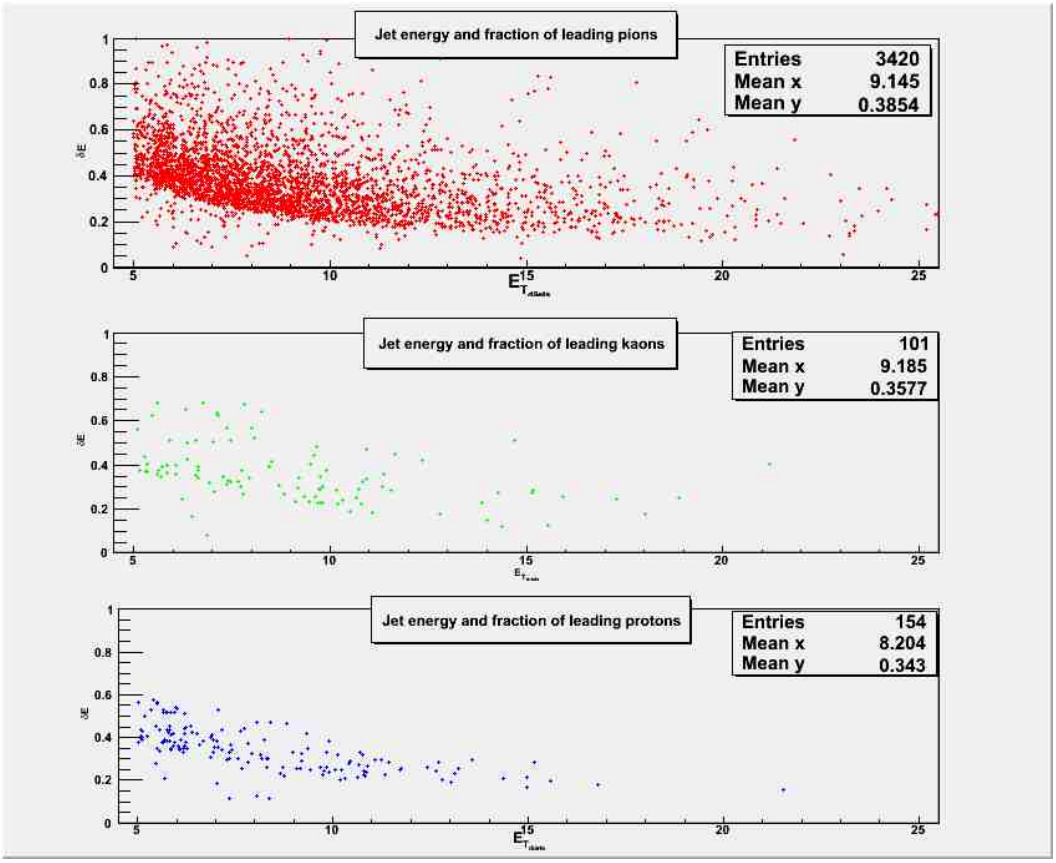

Ratio for different particles
Baryon
$\overline{\text{Baryon}}$
Lepton
$\overline{\text{Lepton}}$
Meson
$\overline{\text{Meson}}$
Entries
Multiplicity
0
100
200
300
400
500
600
700
0
10
20
30
40
50
60

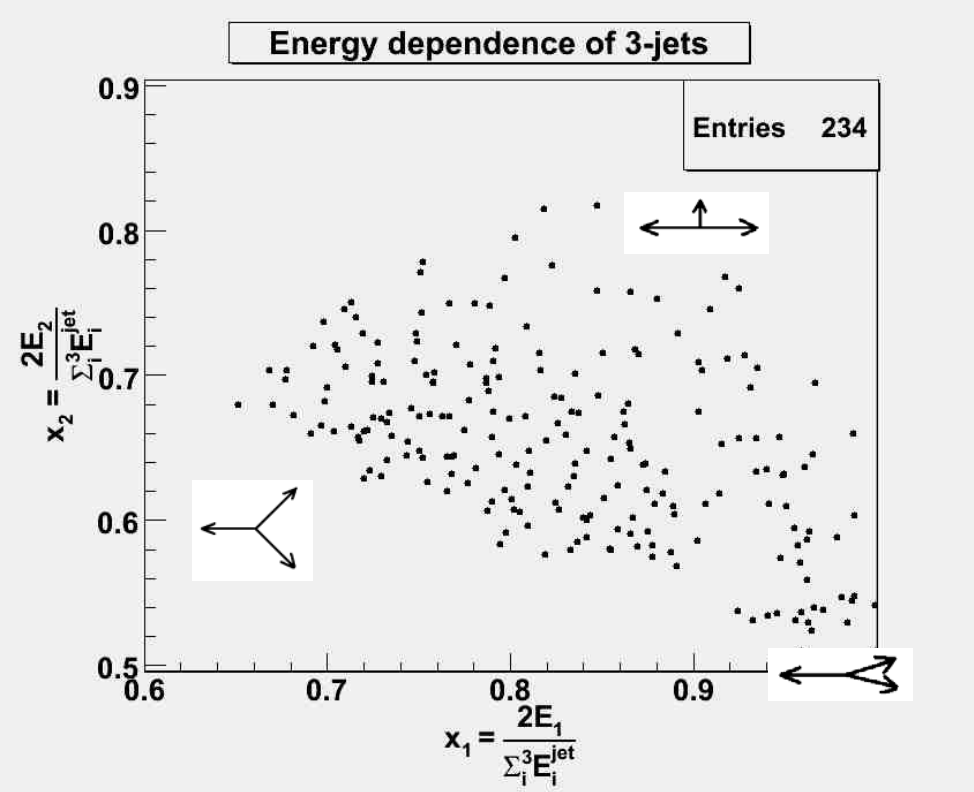

Particle / antiparticle ratio
Baryons
Mesons
Leptons
Entries
Ratio
0
100
200
300
400
500
600
700
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5

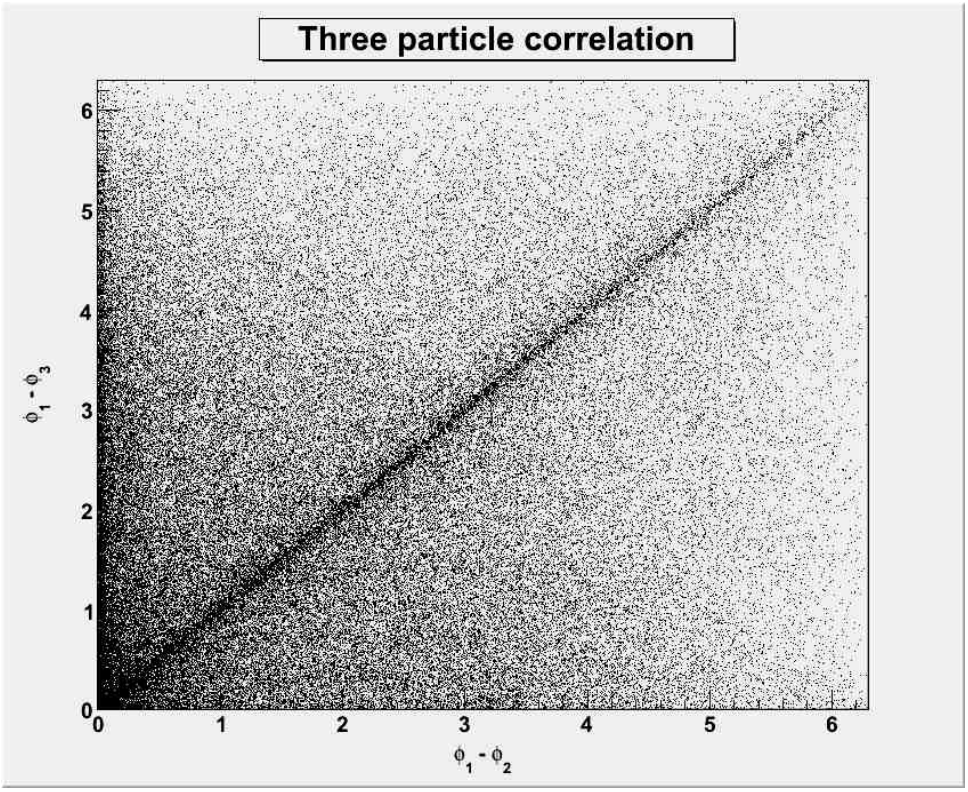

p/π ratio as a function of particle p_T
Pythia8, SoftQCD: minbias
Pythia8, HardQCD: all
PDC06: minbias
p/π
p_T
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8

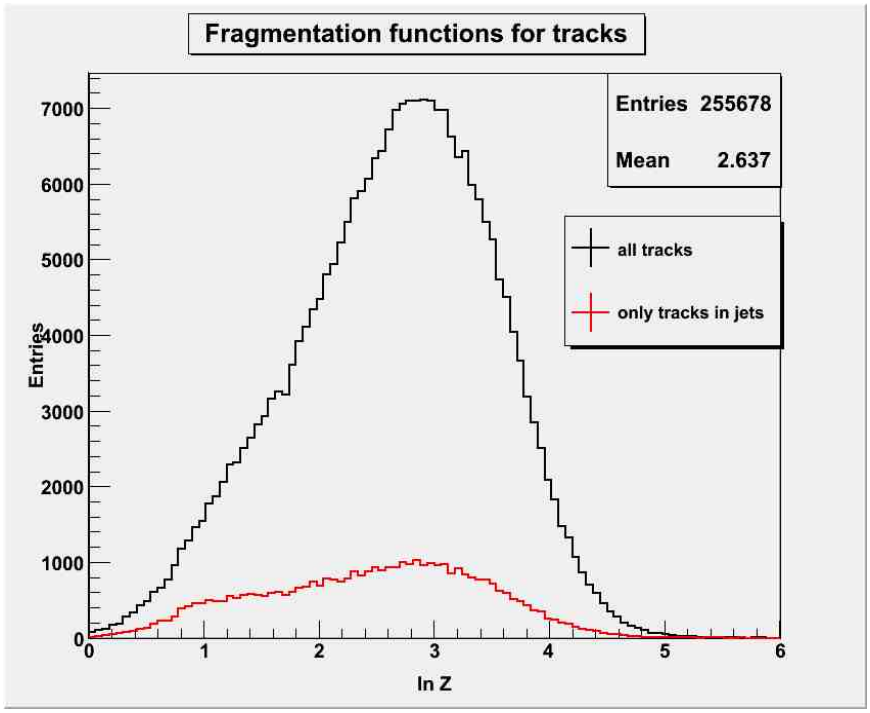

Multiplicity for leading tracks in dijets
electron
muon
pion
kaon
proton
Entries
10^2
10
0
1
2
3
Tracks

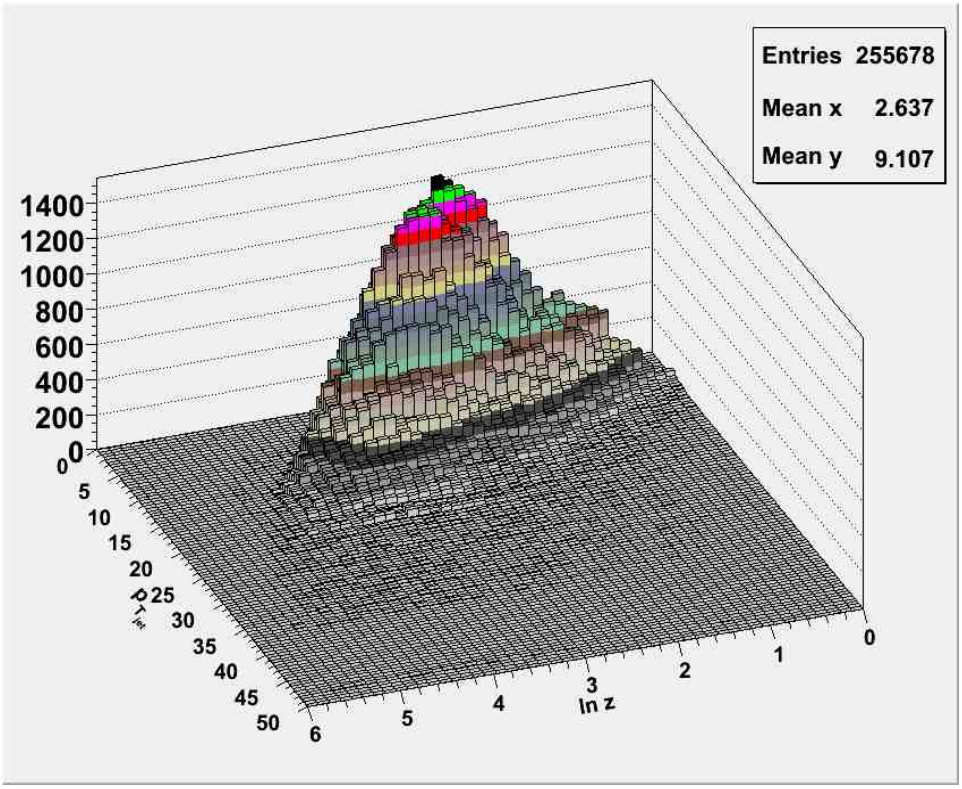

Fraction between minimum track energy in jets and jet energy
Entries 3966
Mean x 0.968
Mean y 9.13
45
40
35
30
25
20
15
10
5
0
25
20
15
10
5
E_{jet}
1
0.95
0.9
0.85
δE

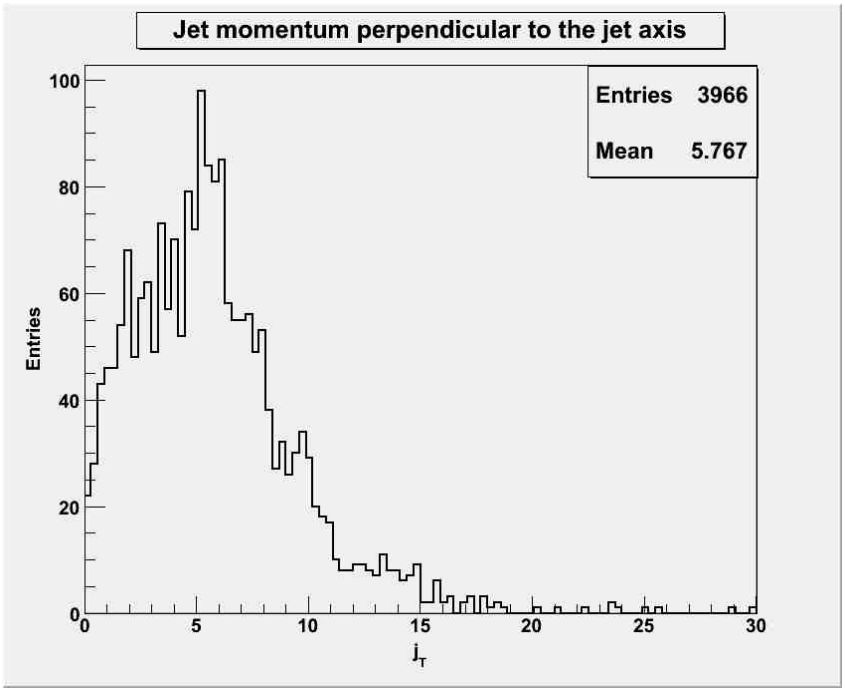

Jet energy and fraction of leading pions
Entries 3420
Mean x 9.145
Mean y 0.3854
Jet energy and fraction of leading kaons
Entries 101
Mean x 9.185
Mean y 0.3577
Jet energy and fraction of leading protons
Entries 154
Mean x 8.204
Mean y 0.343
δE
0
0.2
0.4
0.6
0.8
1
5
10
15
20
25

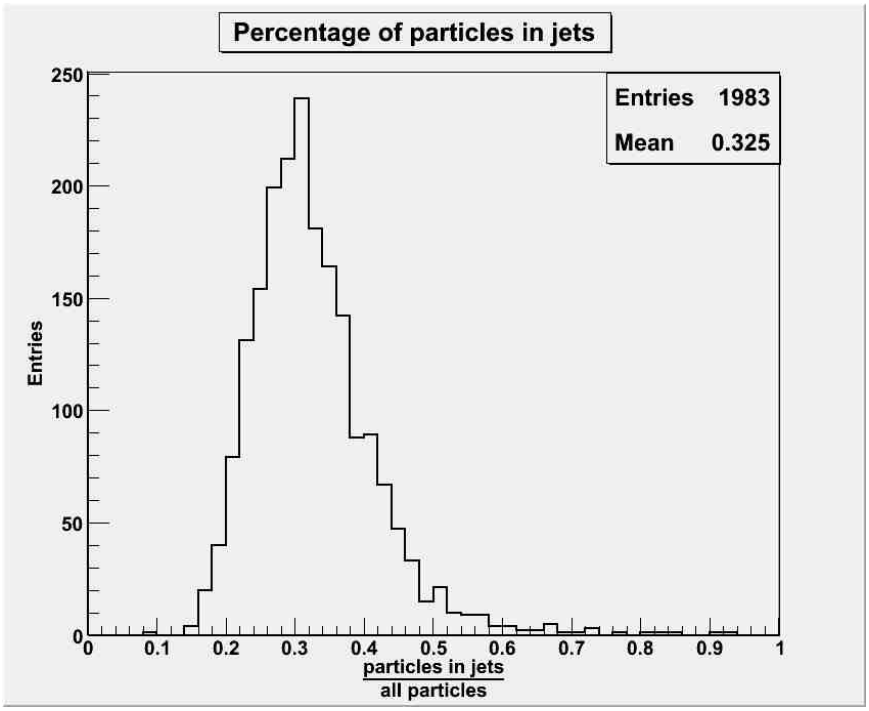

Energy dependence of 3-jets
Entries 234
0.9
0.8
0.7
0.6
0.5
0.6
0.7
0.8
0.9
$x_2 = \frac{2E_2}{\sum_i^3 E_i^{jet}}$
$x_1 = \frac{2E_1}{\sum_i^3 E_i^{jet}}$

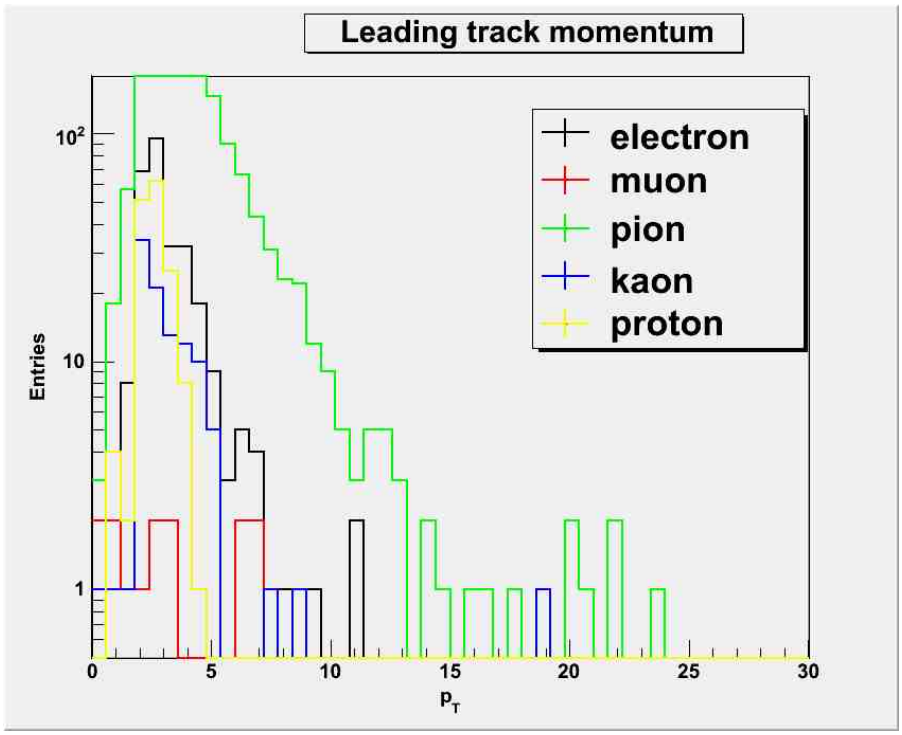

Three particle correlation
0
1
2
3
4
5
6
$\phi_1 - \phi_3$
$\phi_1 - \phi_2$

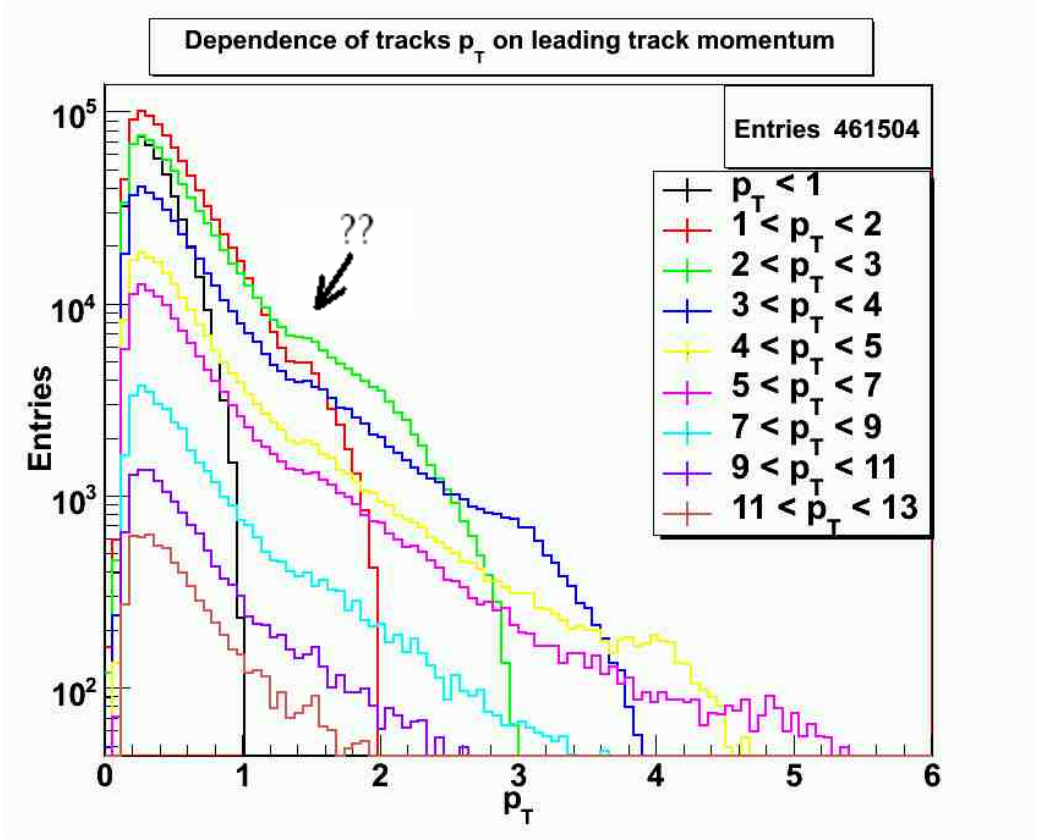

Fragmentation functions for tracks
Entries 255678
Mean 2.637
all tracks
only tracks in jets
Entries
ln Z

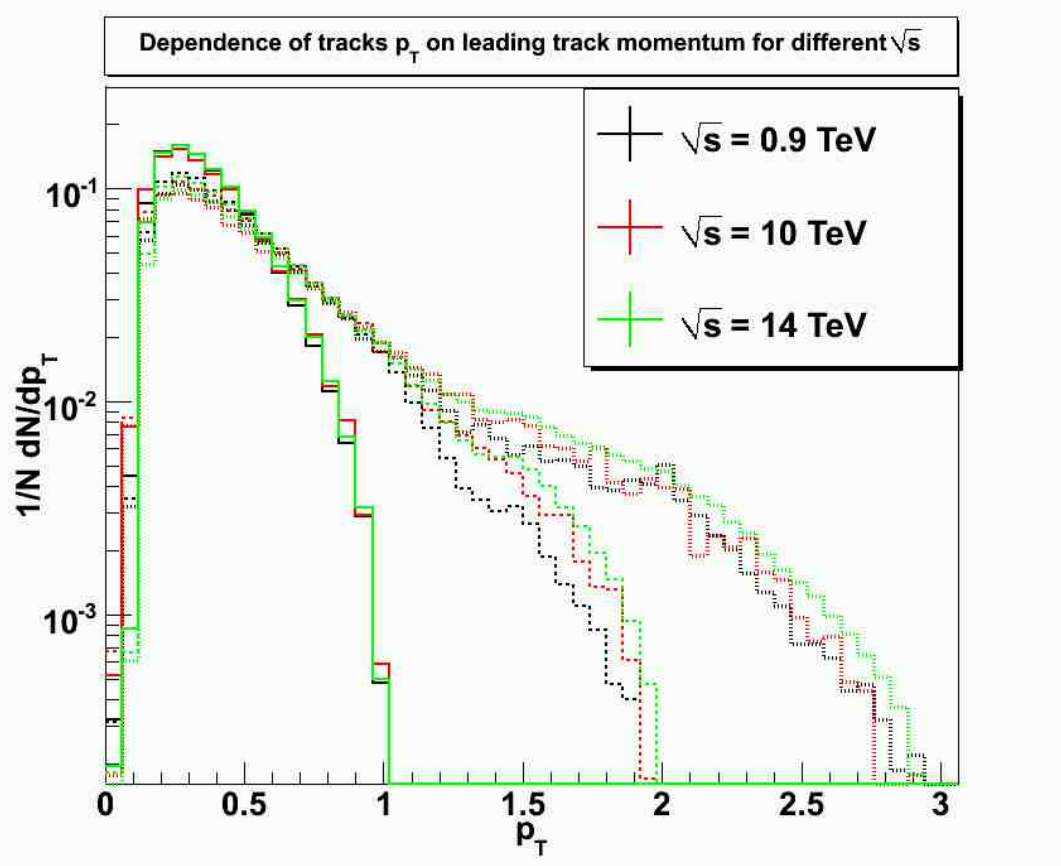

Entries 255678
Mean x 2.637
Mean y 9.107
ln z

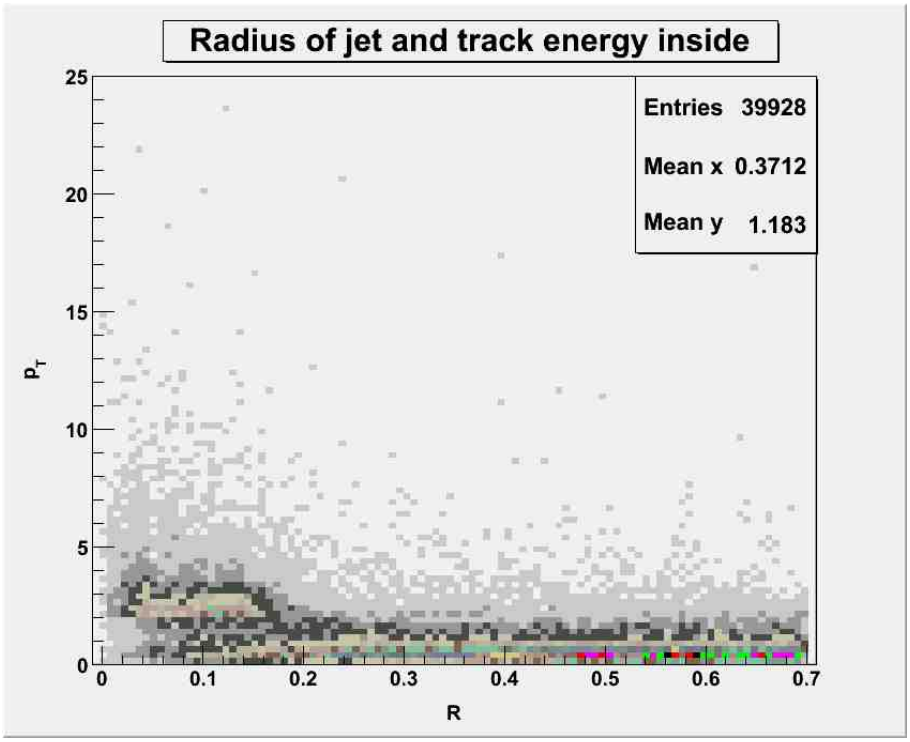

Jet momentum perpendicular to the jet axis
Entries 3966
Mean 5.767
Entries
j_T

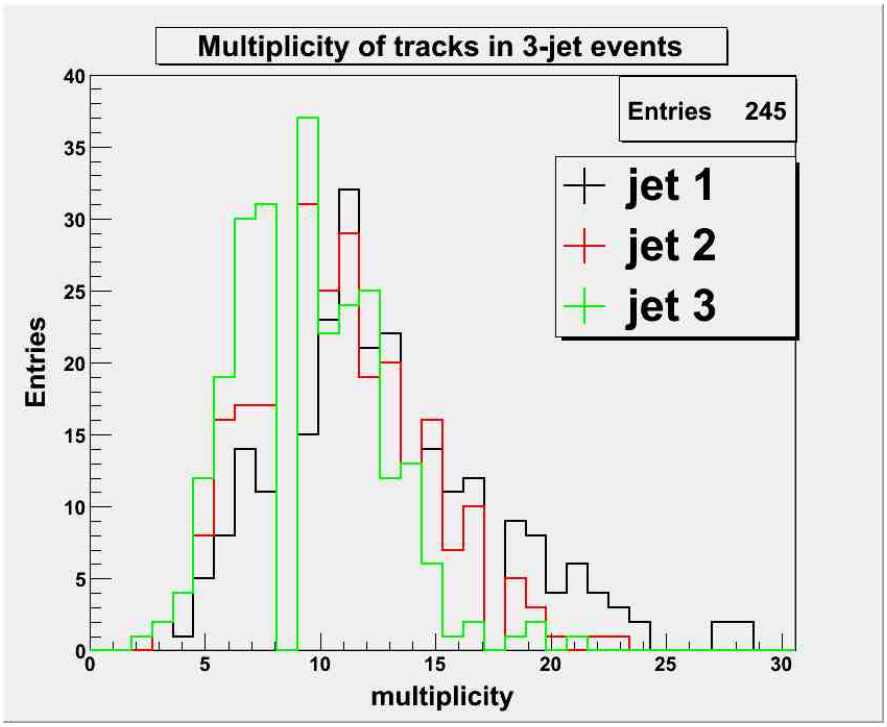

Percentage of particles in jets
Entries 1983
Mean 0.325
Entries
particles in jets
all particles

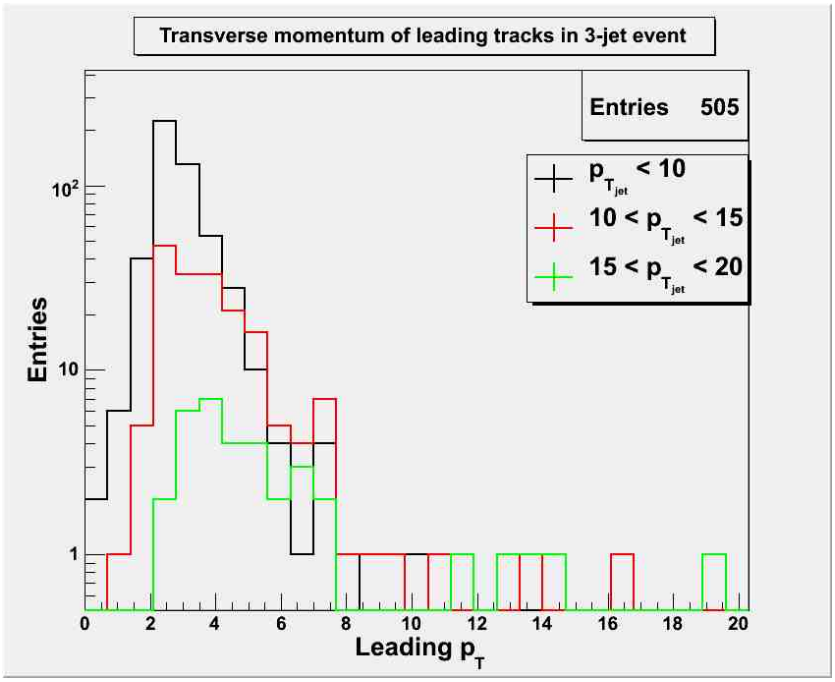

Leading track momentum
electron
muon
pion
kaon
proton
Entries
10^2
10
1
0
5
10
15
20
25
30
p_T

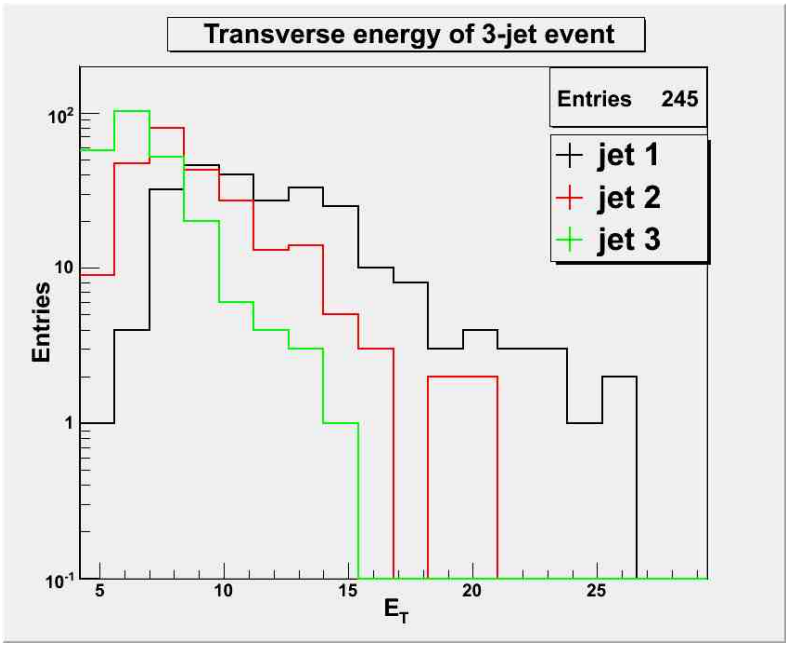

Dependence of tracks p_T on leading track momentum
Entries 461504
$p_T < 1$
$1 < p_T < 2$
$2 < p_T < 3$
$3 < p_T < 4$
$4 < p_T < 5$
$5 < p_T < 7$
$7 < p_T < 9$
$9 < p_T < 11$
$11 < p_T < 13$
??
Entries
10^5
10^4
10^3
10^2
0
1
2
3
4
5
6
p_T

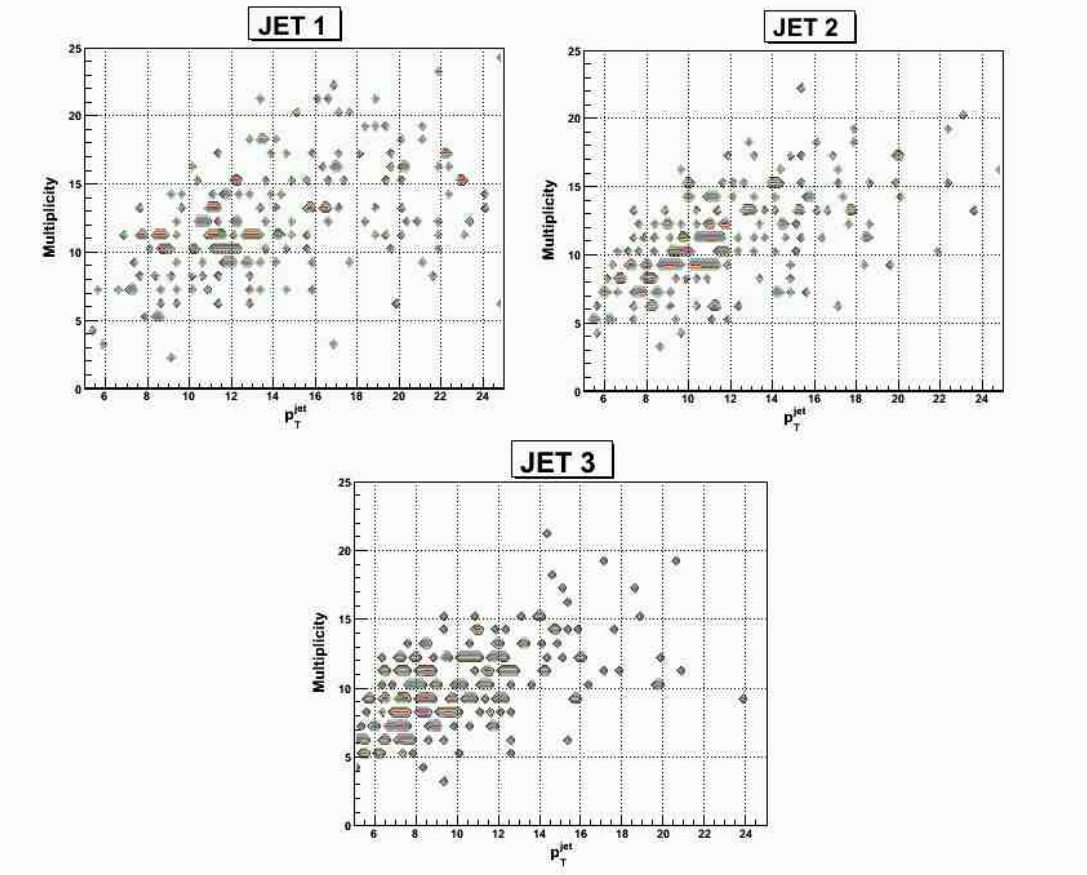

Dependence of tracks p_T on leading track momentum for different $\sqrt{s}$
$\sqrt{s}$ = 0.9 TeV
$\sqrt{s}$ = 10 TeV
$\sqrt{s}$ = 14 TeV
1/N dN/dp$_T$
10^{-1}
10^{-2}
10^{-3}
0
0.5
1
1.5
2
2.5
3
p_T

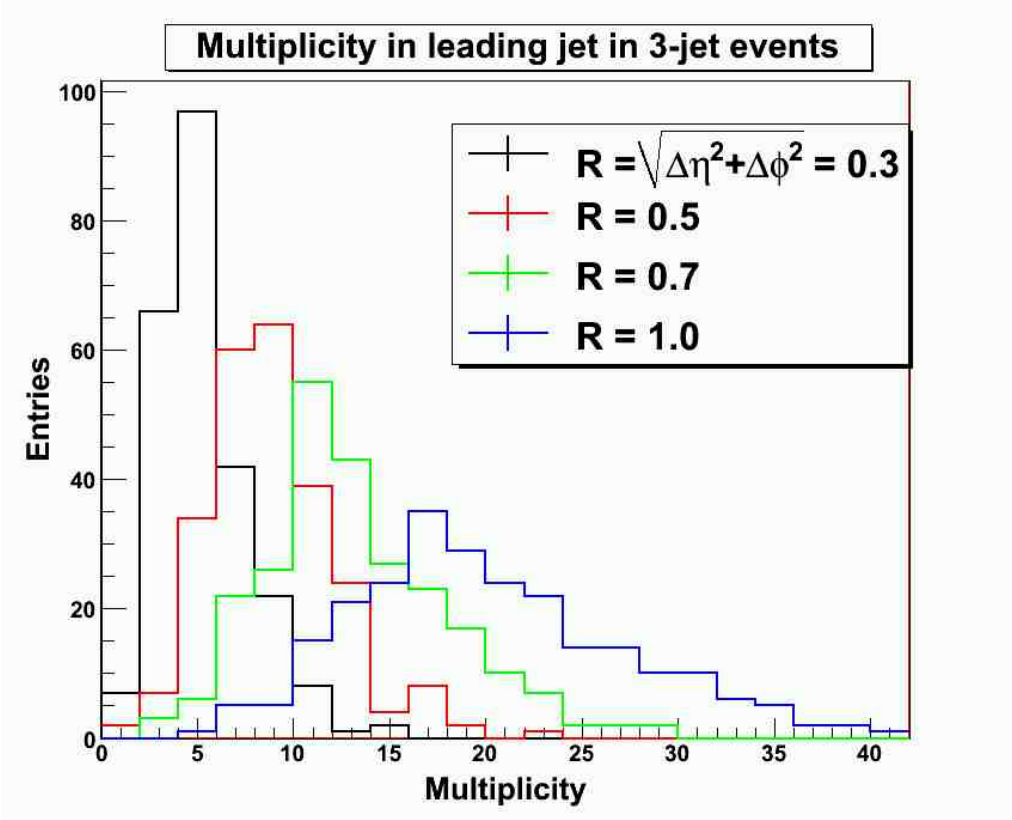

Radius of jet and track energy inside
Entries 39928
Mean x 0.3712
Mean y 1.183
p_T
25
20
15
10
5
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
R

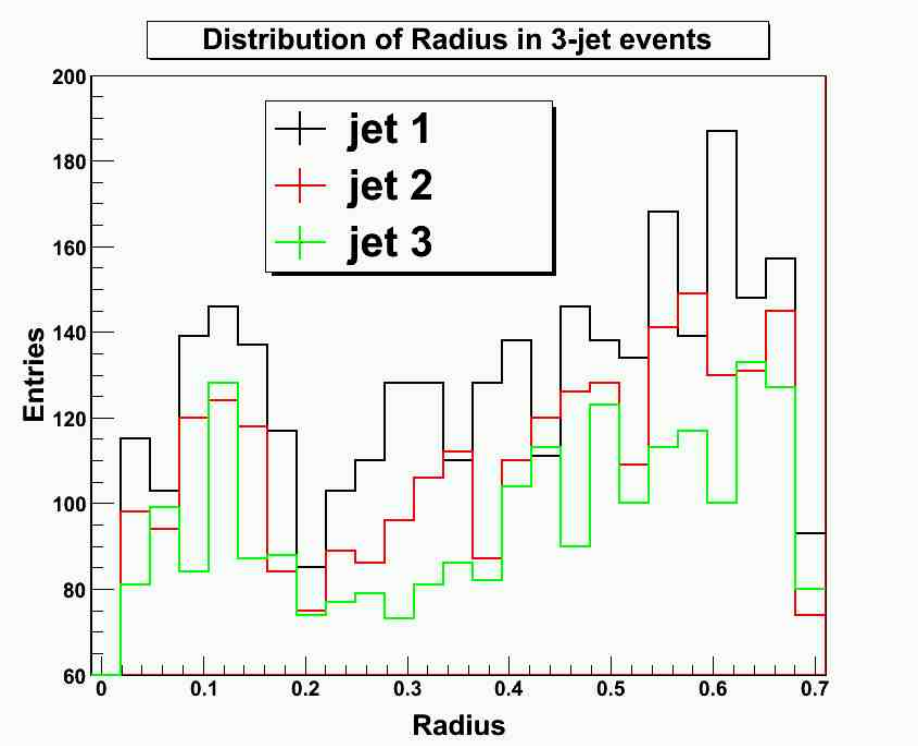

Multiplicity of tracks in 3-jet events
Entries 245
jet 1
jet 2
jet 3
Entries
multiplicity
0
5
10
15
20
25
30
35
40

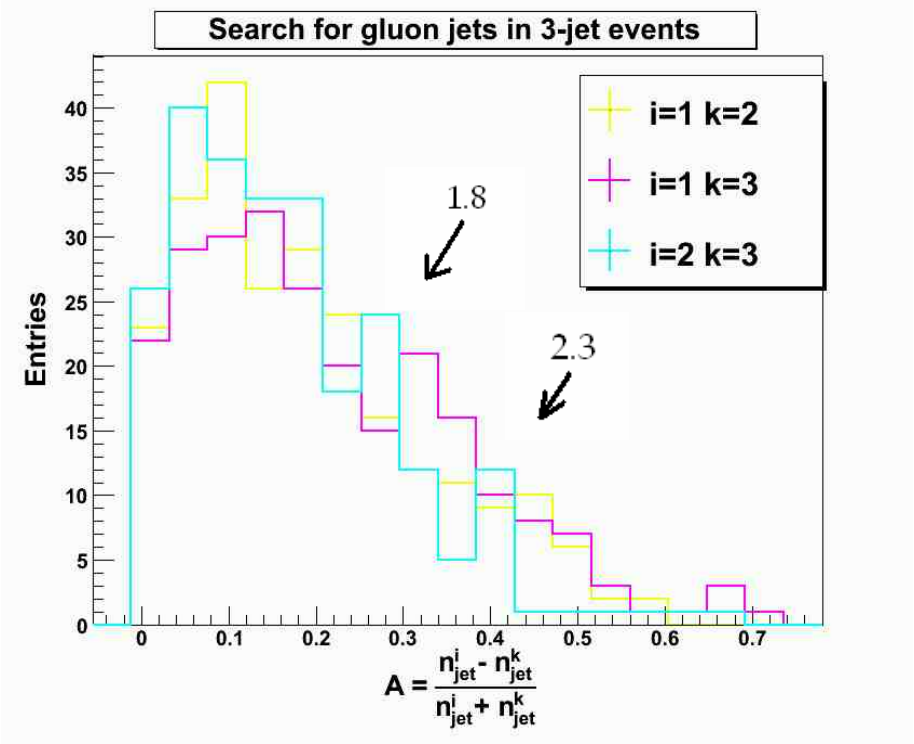

Transverse momentum of leading tracks in 3-jet event
Entries 505
$p_{T_{jet}} < 10$
$10 < p_{T_{jet}} < 15$
$15 < p_{T_{jet}} < 20$
Entries
Leading p_T
1
10
10^2
0
2
4
6
8
10
12
14
16
18
20

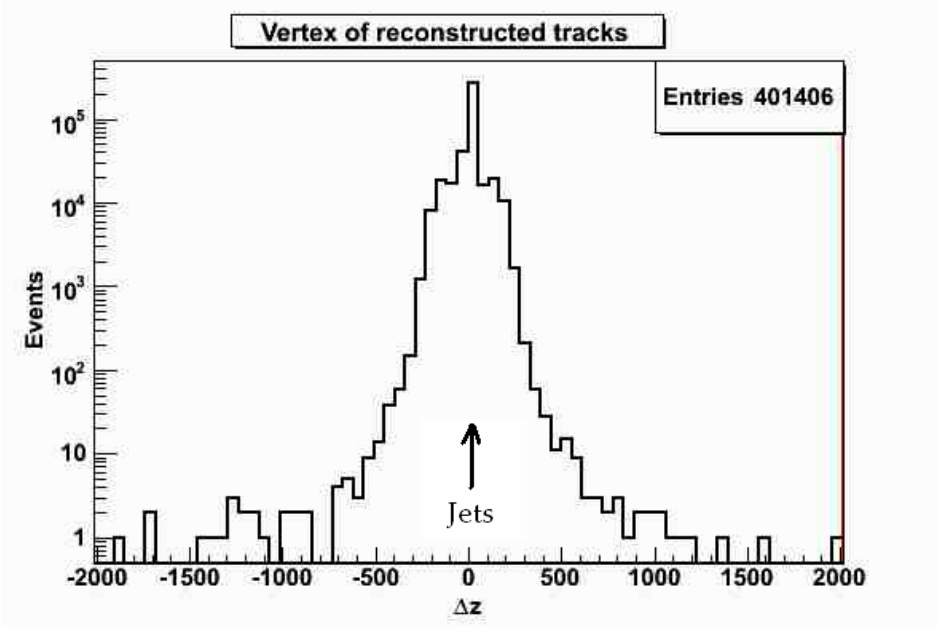

Transverse energy of 3-jet event
Entries 245
jet 1
jet 2
jet 3
Entries
E_T

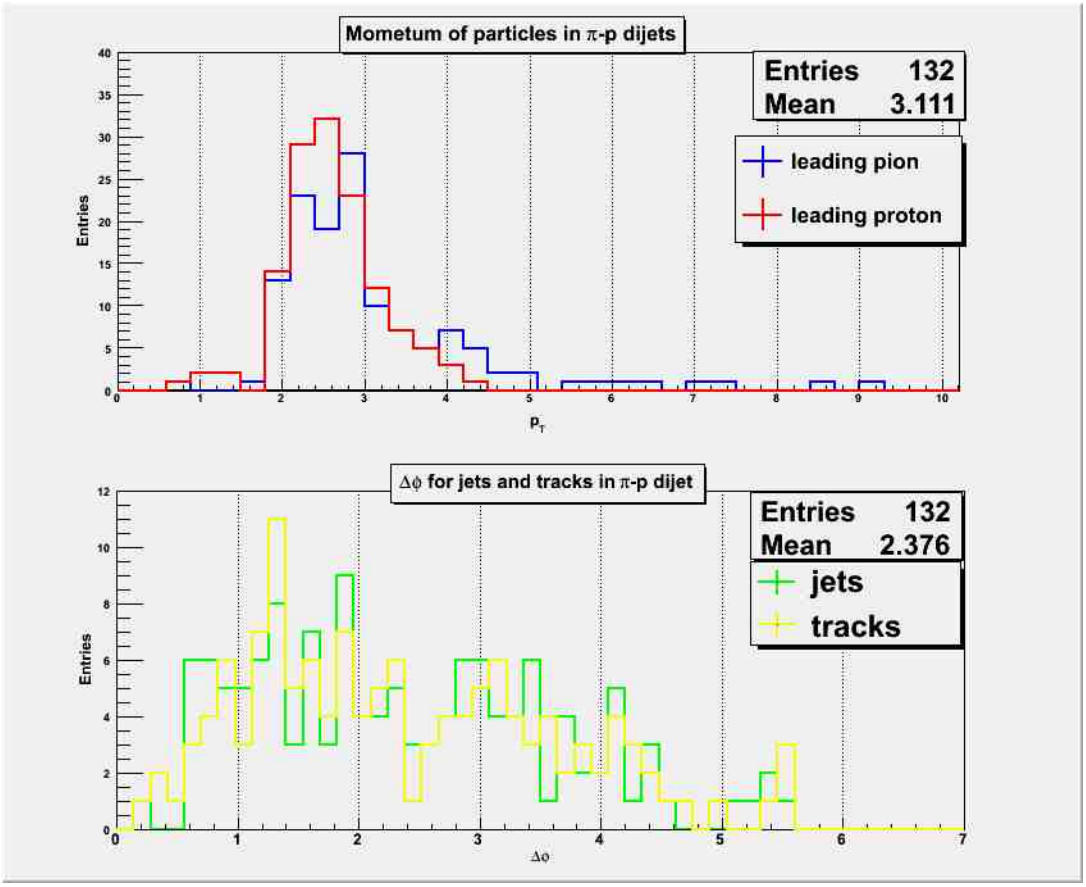

JET 1
JET 2
JET 3
Multiplicity
p_T^{jet}

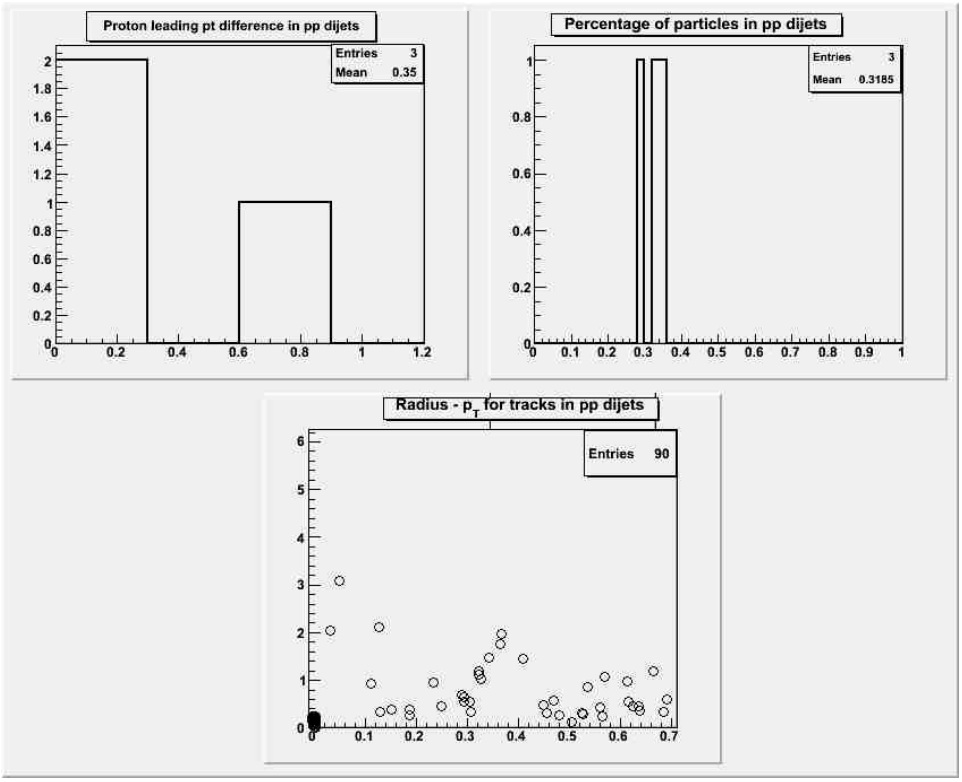

Multiplicity in leading jet in 3-jet events
R = $\sqrt{\Delta\eta^2+\Delta\phi^2}$ = 0.3
R = 0.5
R = 0.7
R = 1.0
Entries
Multiplicity
0
20
40
60
80
100
0
5
10
15
20
25
30
35
40


Distribution of Radius in 3-jet events
jet 1
jet 2
jet 3
Entries
Radius
60
80
100
120
140
160
180
200
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7


Search for gluon jets in 3-jet events
i=1 k=2
i=1 k=3
i=2 k=3
1.8
2.3
Entries
A = (n^i_jet - n^k_jet) / (n^i_jet + n^k_jet)


Vertex of reconstructed tracks
Entries 401406
Events
Jets
Δz


Mometum of particles in π-p dijets
Entries 132
Mean 3.111
leading pion
leading proton
Entries
p_T
Δϕ for jets and tracks in π-p dijet
Entries 132
Mean 2.376
jets
tracks
Entries
Δφ


Proton leading pt difference in pp dijets
Entries 3
Mean 0.35
Percentage of particles in pp dijets
Entries 3
Mean 0.3185
Radius - p_T for tracks in pp dijets
Entries 90