Jets Analysis

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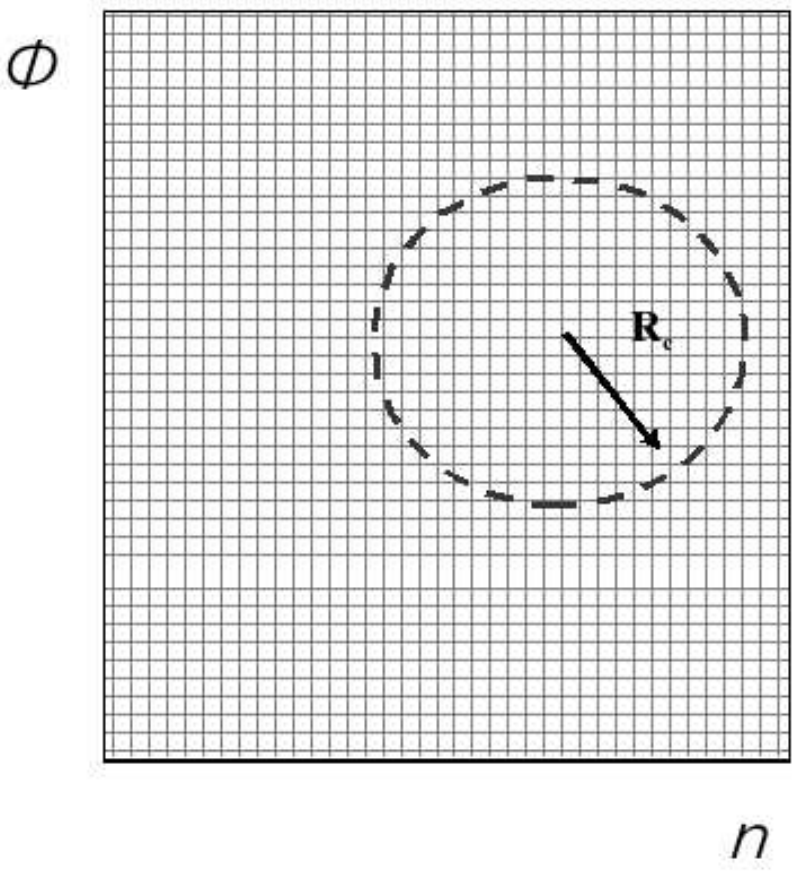
UA1 cone algorithm



(1) Estimate the average energy per grid cell from all grid cells.

(2) Sort cells in decreasing cell energy η^i.

(3) Execute the jet-finding loop for each cell, starting with the highest cell energy.

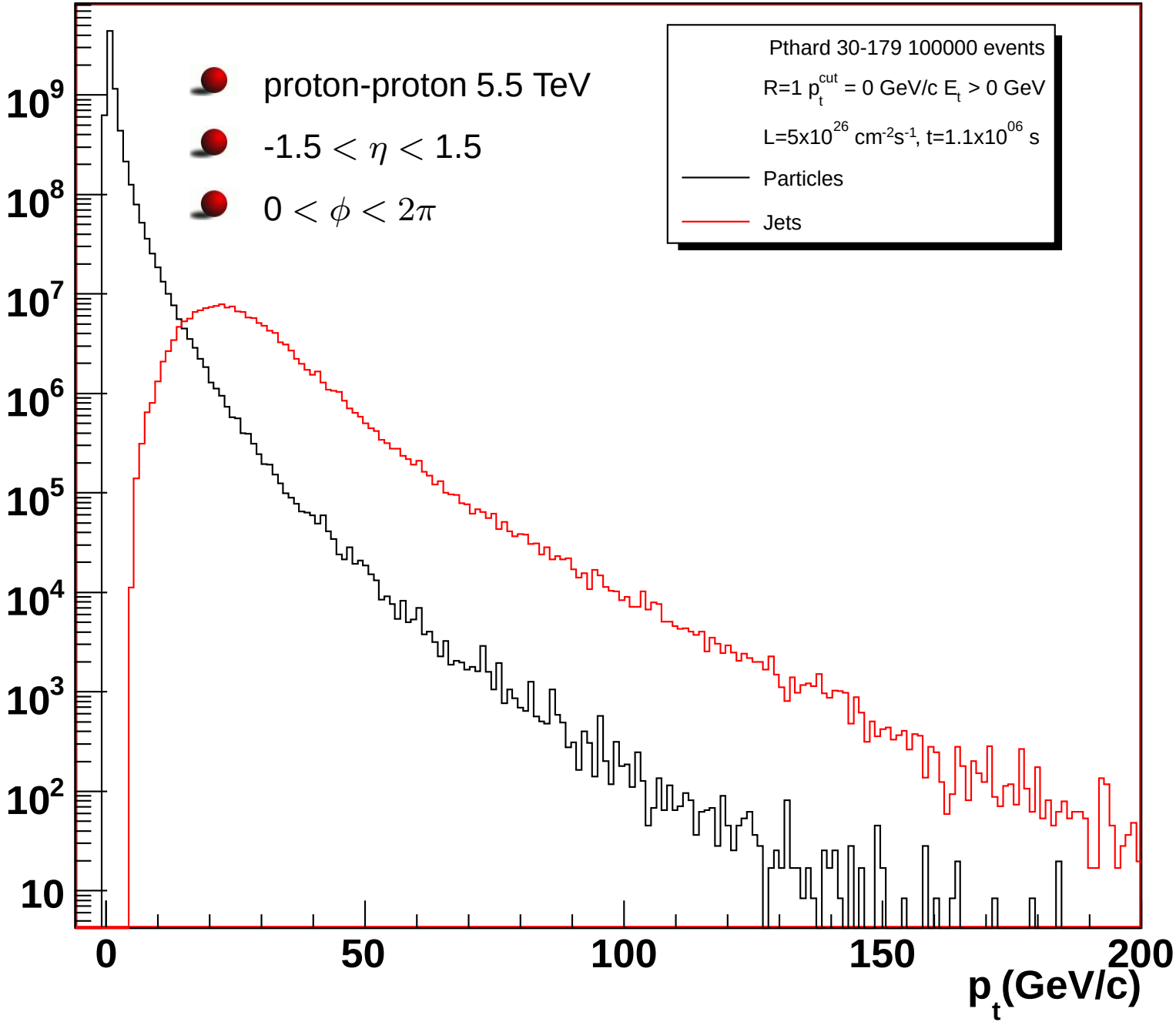
(4) Set the jet-cone centroid to be the center of the jet seed cell $(\eta^{\mathrm{C}}, \varphi^{\mathrm{C}})$ = (η^i, φ^i).

(5) Using all cells with $\sqrt{(\eta^i - \eta^{\mathrm{C}})^2 + (\varphi^i - \varphi^{\mathrm{C}})^2} < R_{\mathrm{c}}$ of the initial centroid, calculate the new energy weighted centroid to be the new initial centroid. Repeat the centroid calculation iteration until the difference between two subsequent centroids shifts by less than one cell.

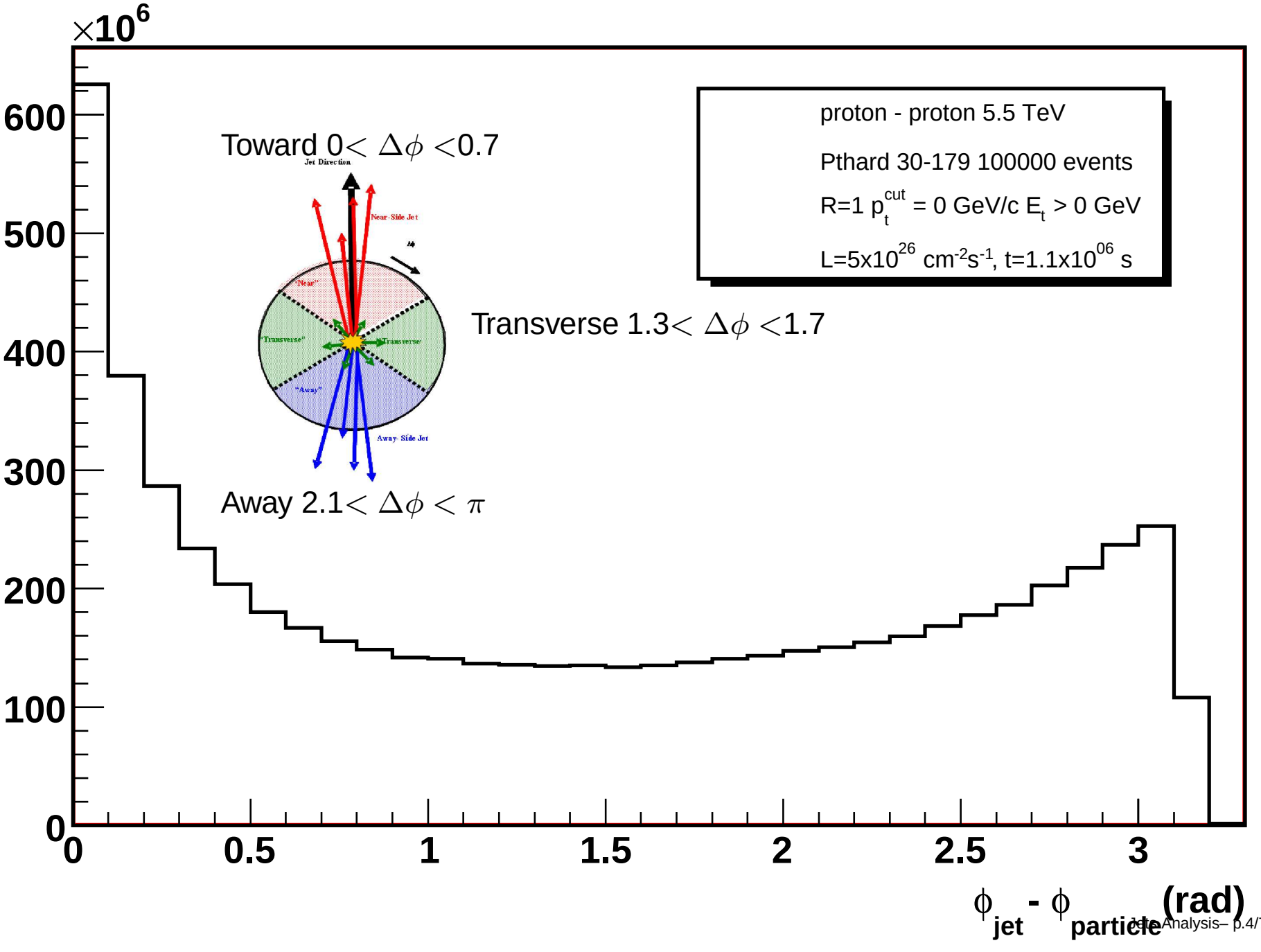
(6) Store the centroid as a jet candidate and flag all cells within the cone as inside a jet.

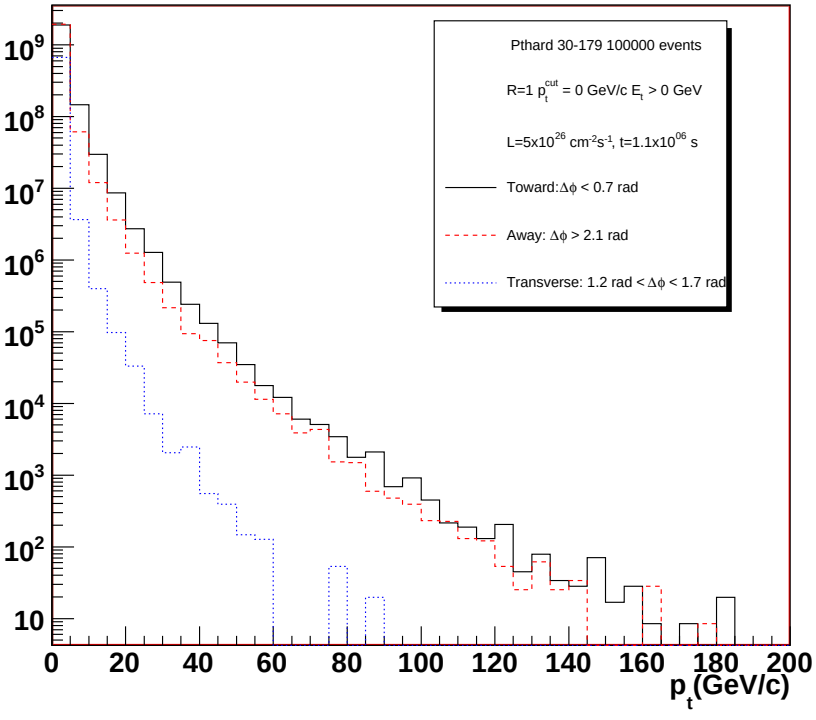
(7) For each jet candidate, calculate the energy by summing the energies of the cells

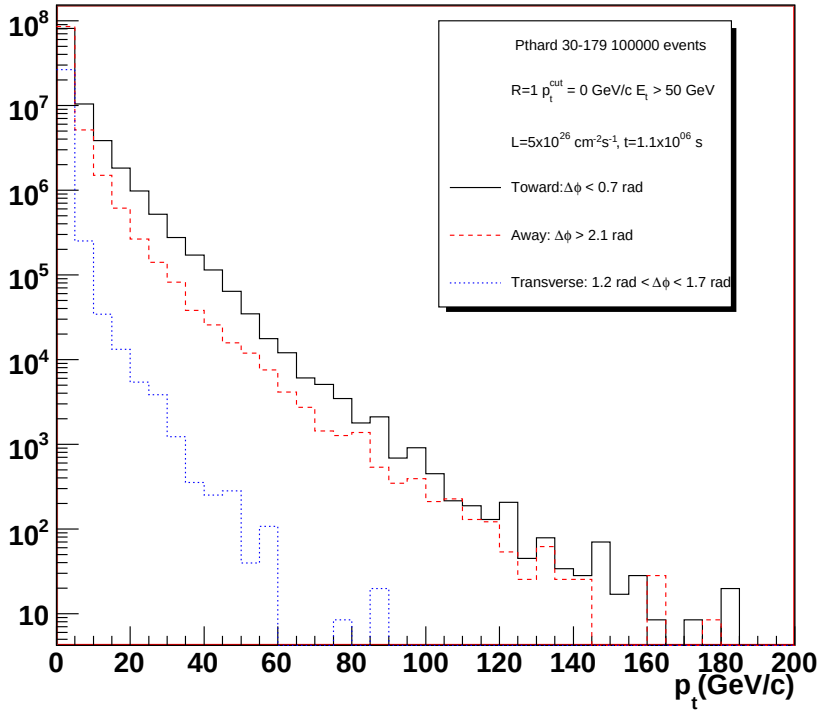
Jets

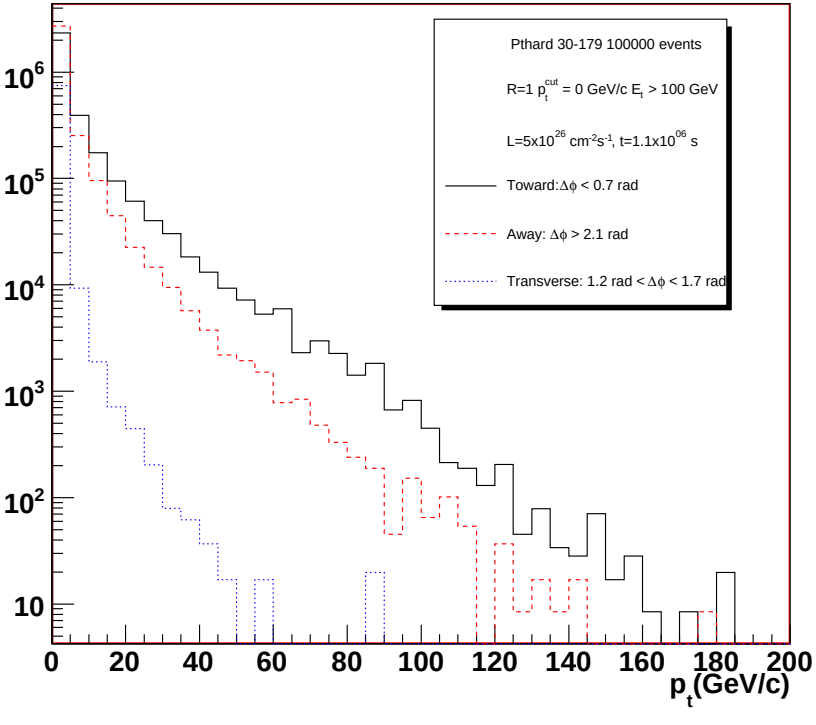

proton-proton 5.5 TeV
$-1.5 < \eta < 1.5$
$0 < \phi < 2\pi$
Pthard 30-179 100000 events
R=1 p_t^{cut} = 0 GeV/c E_t > 0 GeV
L=5x10^{26} cm^{-2}s^{-1}, t=1.1x10^{06} s
Particles
Jets
10^9
10^8
10^7
10^6
10^5
10^4
10^3
10^2
10
0
50
100
150
200
p_t (GeV/c)

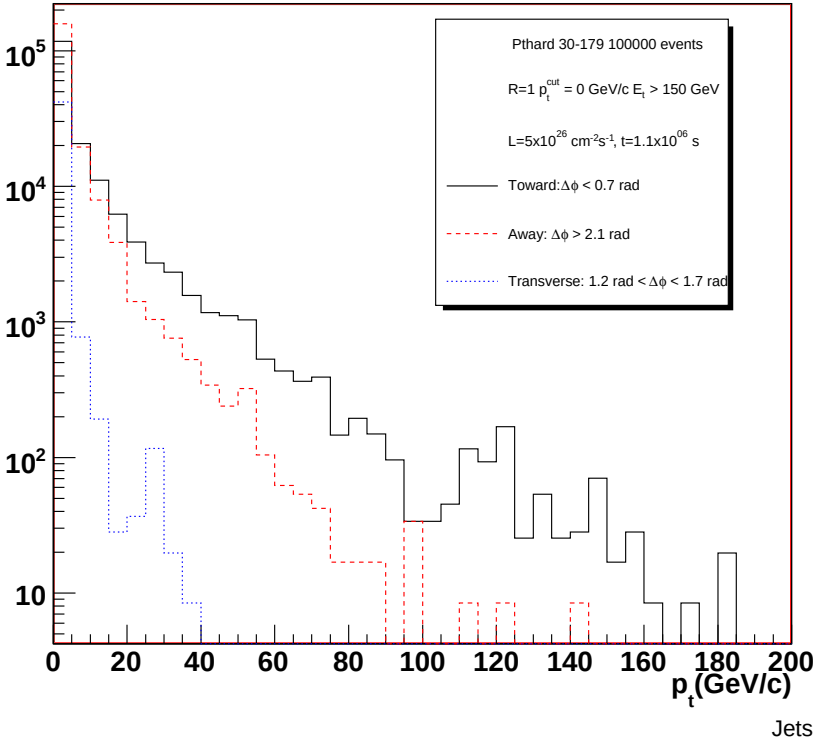
Azimuthal Correlations




Pthard 30-179 100000 events
R=1 p_t^{cut} = 0 GeV/c E_t > 0 GeV
L=5x10^{26} cm^{-2}s^{-1}, t=1.1x10^{06} s
Toward:Δφ < 0.7 rad
Away: Δφ > 2.1 rad
Transverse: 1.2 rad < Δφ < 1.7 rad
p_t(GeV/c)


Pthard 30-179 100000 events
R=1 p_t^{cut} = 0 GeV/c E_t > 50 GeV
L=5x10^{26} cm^{-2}s^{-1}, t=1.1x10^{06} s
Toward:Δφ < 0.7 rad
Away: Δφ > 2.1 rad
Transverse: 1.2 rad < Δφ < 1.7 rad
p_t(GeV/c)


Pthard 30-179 100000 events
R=1 p_t^{cut} = 0 GeV/c E_t > 100 GeV
L=5x10^{26} cm^{-2}s^{-1}, t=1.1x10^{06} s
Toward:Δφ < 0.7 rad
Away: Δφ > 2.1 rad
Transverse: 1.2 rad < Δφ < 1.7 rad
p_t(GeV/c)


Pthard 30-179 100000 events
R=1 p_t^{cut} = 0 GeV/c E_t > 150 GeV
L=5x10^{26} cm^{-2}s^{-1}, t=1.1x10^{06} s
Toward:Δφ < 0.7 rad
Away: Δφ > 2.1 rad
Transverse: 1.2 rad < Δφ < 1.7 rad
p_t(GeV/c)

	Σ $p_{T,part}$ [GeV/c] Toward $0 < \Delta\phi < 0.7$	Σ $p_{T,part}$[GeV/c] Away $2.1 < \Delta\phi < \pi$	Σ $p_{T,part}$[GeV/c] Transverse $1.3 < \Delta\phi < 1.$
$E_{T,jet}$ >0 GeV	3.85e+06	2.50e+06	2.52e+05
$E_{T,jet}$ >20 GeV	3.71e+06	2.37e+06	2.31e+05
$E_{T,jet}$ >40 GeV	2.85e+06	1.74e+06	1.44e+05
$E_{T,jet}$ >60 GeV	2.00e+06	1.16e+06	8.50e+04
$E_{T,jet}$ >80 GeV	1.23e+06	7.00e+05	4.51e+04
$E_{T,jet}$ >100 GeV	6.53e+05	3.41e+05	2.10e+04

	$\frac{\Sigma p_{T,part,Toward}}{\Sigma p_{T,part,Away}}$
E_T, jet >0 GeV	1.54
$E_{T,jet}$ >20 GeV	1.60
$E_{T,jet}$ >40 GeV	1.64
$E_{T,jet}$ >60 GeV	1.72
$E_{T,jet}$ >80 GeV	1.76
$E_{T,jet}$ >100 GeV	2.00