PROGRESS REPORT ON EVENT SHAPE ANALYSIS

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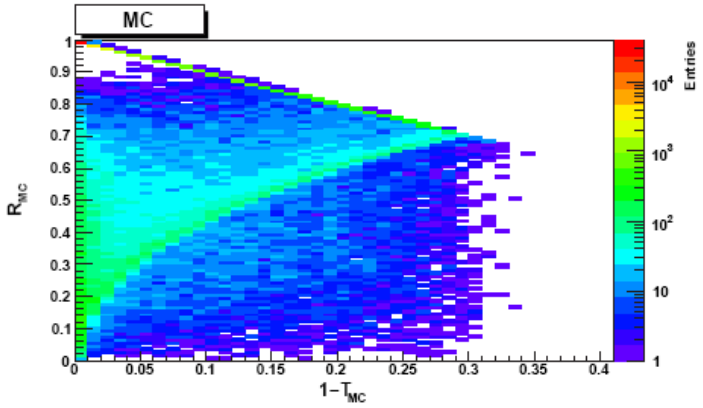
Details of the simulations:

Generator: Pythia, proton-proton collisions at 14 TeV in the c. m., magnetic field 0.5 T, 15 GeV/c <pt hard <50 GeV/c., 300 K events.

Using the variables: thrust (T) and recoil (R), defined as:

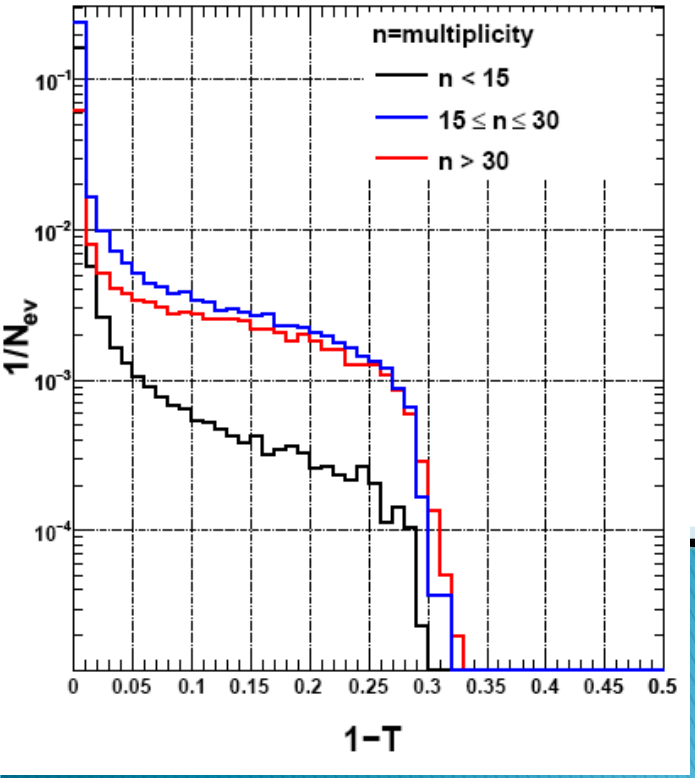
$$T \equiv \underbrace{max}_{\vec{n}_t} \frac{\sum_i |\vec{p}_{t,i} \cdot \vec{n}_t|}{\sum_i |\vec{p}_{t,i}|} \qquad \& \qquad R \equiv \frac{1}{\sum_i |\vec{p}_{t,i}|} \left| \sum_i \vec{p}_{ti} \right|$$

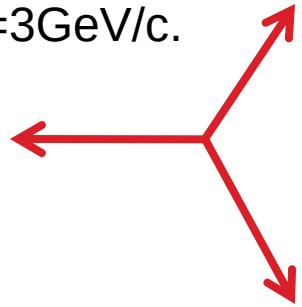
We were able to construct the "thrust map"((1-T) vs R):



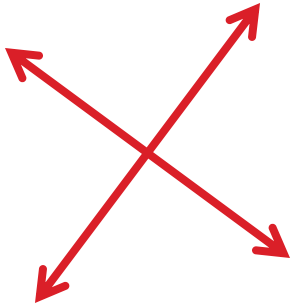
In our previous results we applied the following cuts:

1. Events with at least one particle with pt>= 3GeV/c.
2. Participants are particles with pt>=3GeV/c.



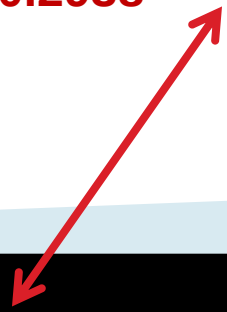


1-T=0.3333



1-T=0.2938

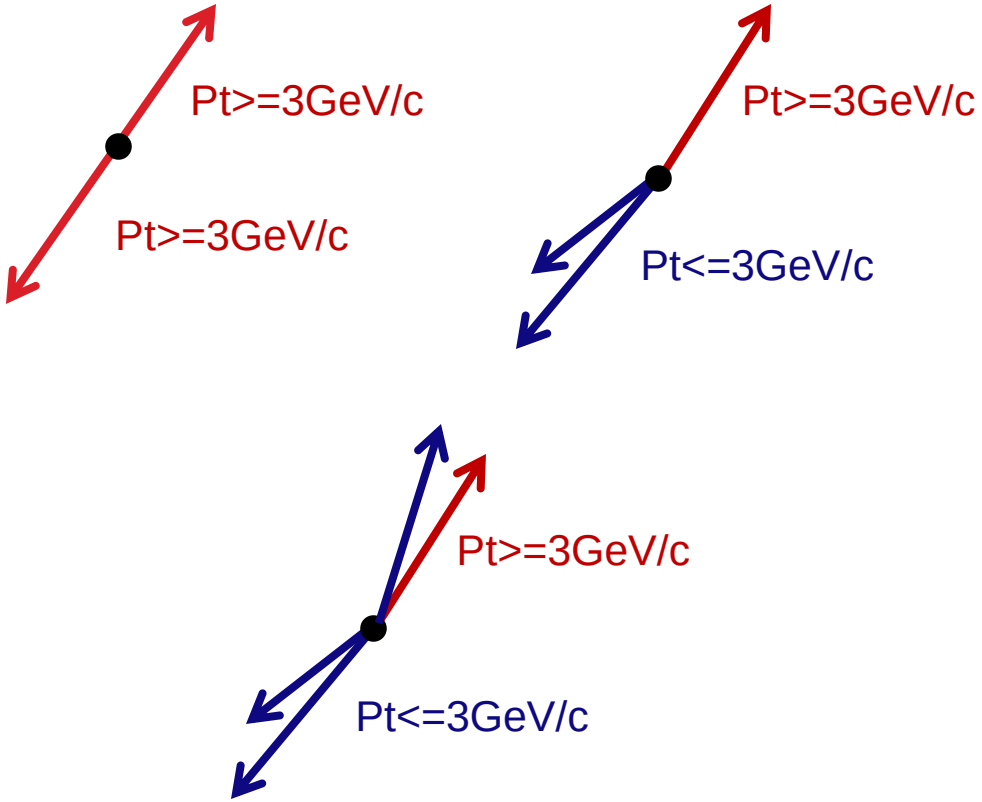
1-T=0



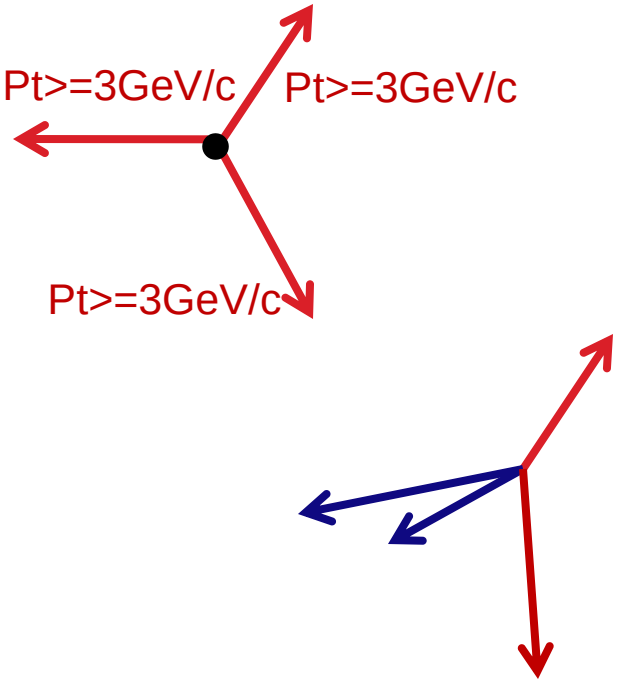
1-T=0

Topology	n < 15	15 ≤ n ≤ 30	n > 30
Dijets	1890	6883	3377
Monojets	48095	68409	16888
Mercedes	3	116	252

Problem: Only events with two or more particles with pt>=3 GeV/c are identified as di-jet. But there are many cases which we should include:



Problem: Only events with three or more particles with pt>=3 GeV/c are identified as mercedes events. We need to include other cases:



Solution:

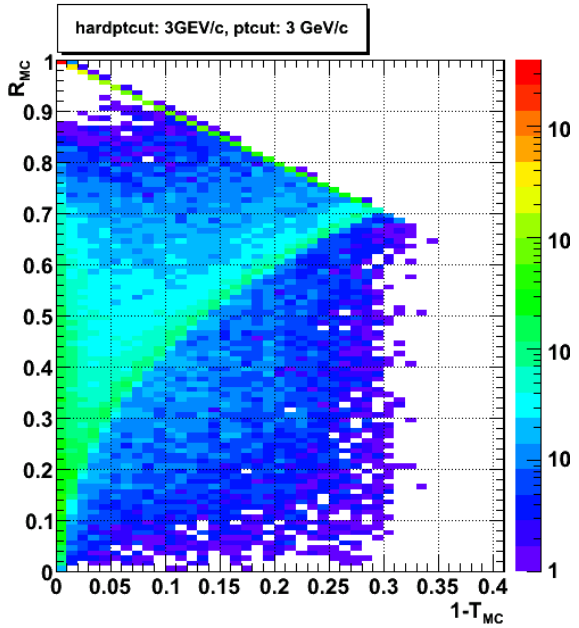
Now we applied the following cuts:

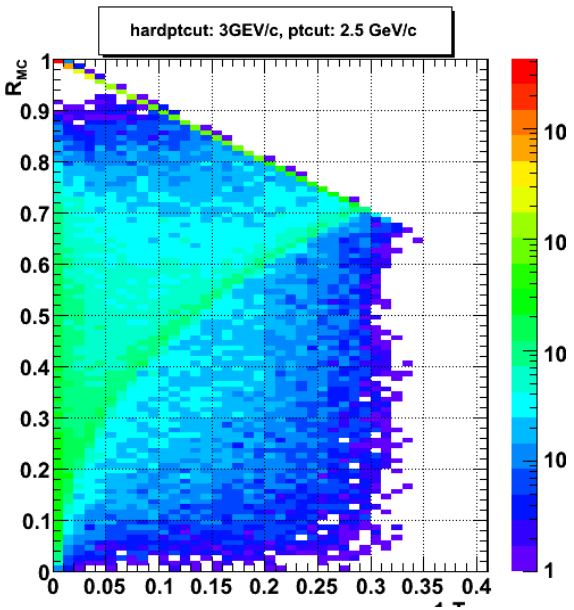
1. **Events with at least one particle with pt>= 3GeV/c.**
2. **Participants are particles with pt>=ptcutoff, ptcutoff<= 3GeV/c.**

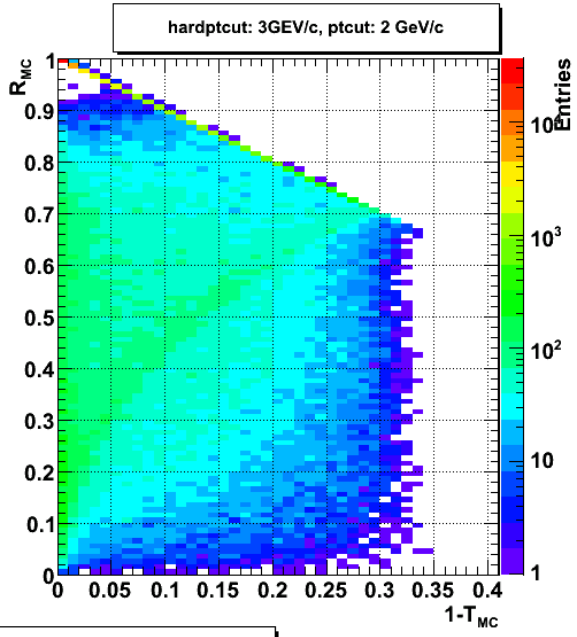
Topology	Pt>3	Pt>2.5	Pt>2	Pt>1.5	Pt>1
With SV	197600	197600	197600	197600	197600
Monojet	133400	102500	70660	41960	19300
Dijet	12150	13300	11920	8880	5195
Mercedes	371	844	1791	3555	6769
Nmercedes	7	38	96	229	651

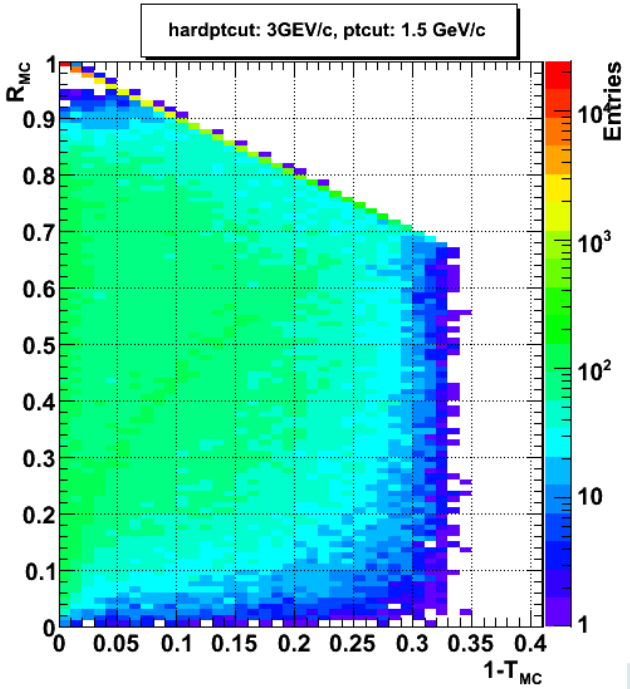
Region	Kind of event	Variables
A	Dijets	$R \leq 0.35, \tau \leq 0.03$
B	Monojets	$R \geq 0.9, \tau \leq 0.03$
C	Mercedes	$R \leq 0.4, \tau \geq 0.25$

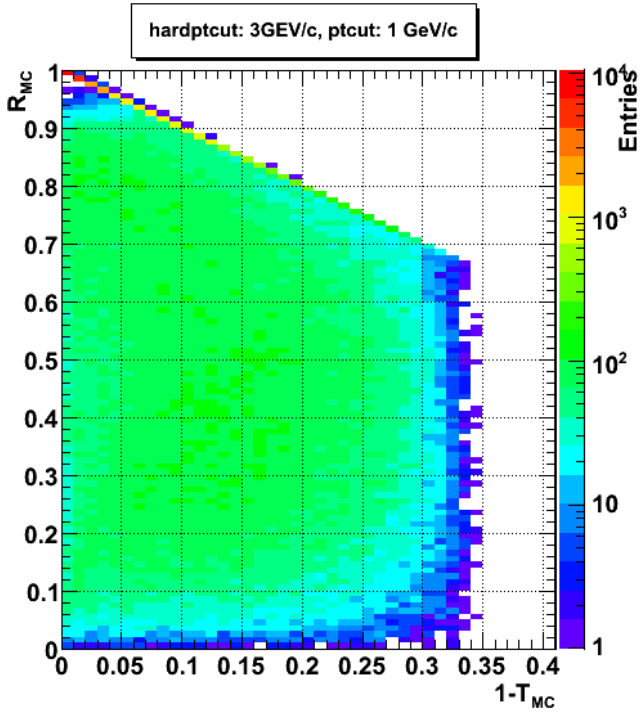
Thrust map











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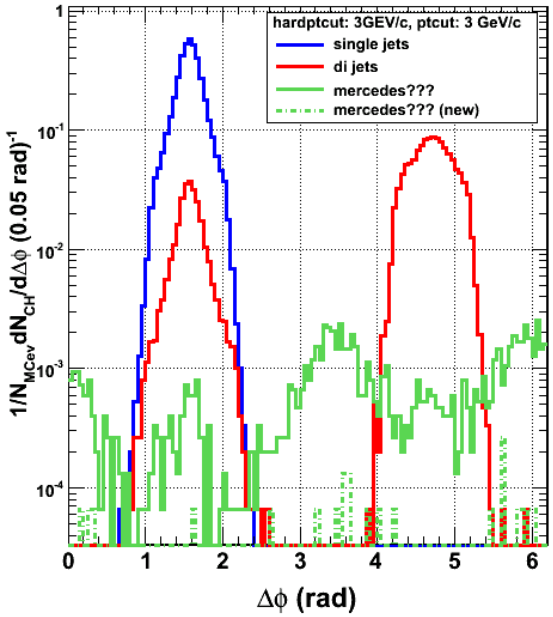
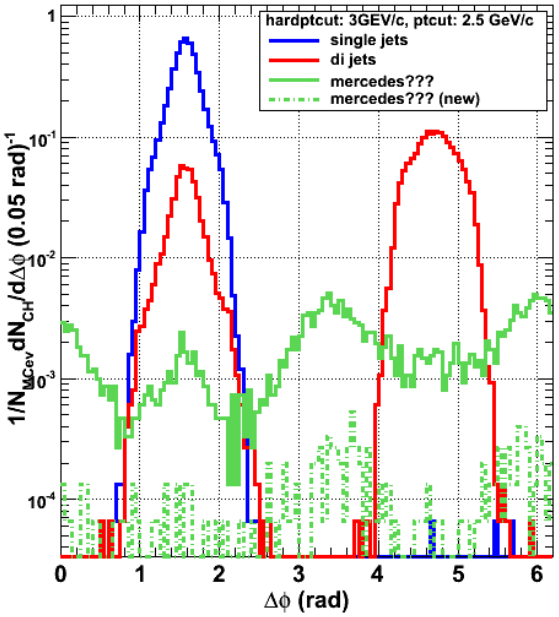
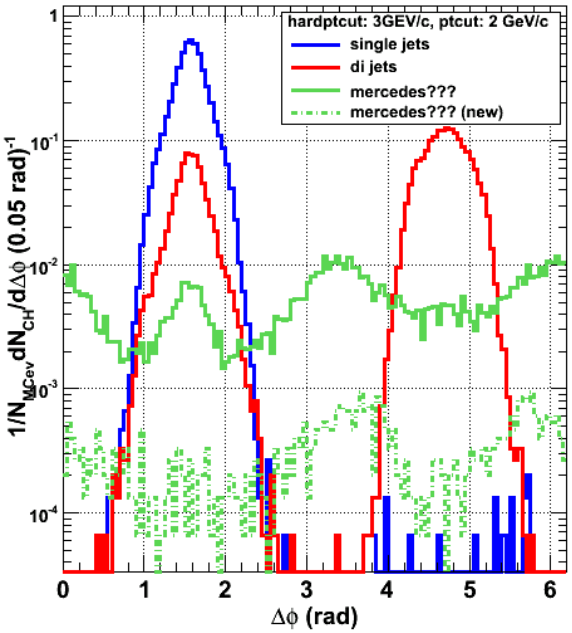
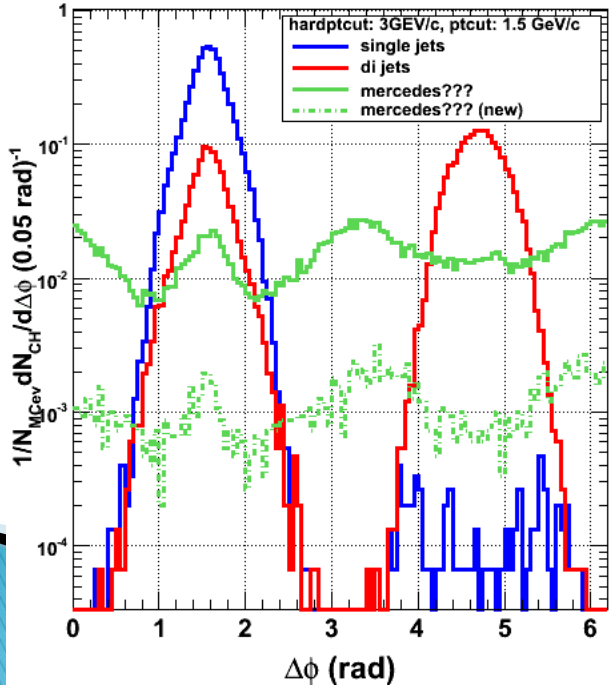
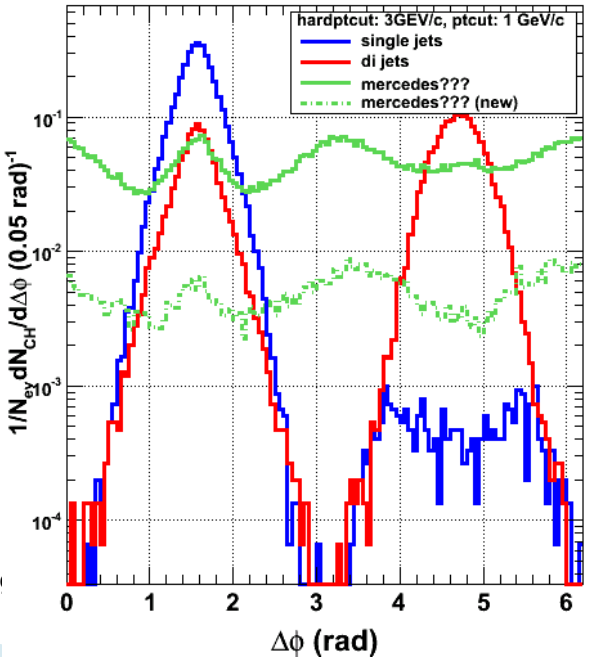

hardptcut: 3GEV/c, ptcut: 3 GeV/c
single jets
di jets
mercedes???
mercedes??? (new)
$1/N_{MCev}dN_{CH}/d\Delta\phi$ (0.05 rad)$^{-1}$
$\Delta\phi$ (rad)


hardptcut: 3GEV/c, ptcut: 2.5 GeV/c
single jets
di jets
mercedes???
mercedes??? (new)
$1/N_{MCev}dN_{CH}/d\Delta\phi$ (0.05 rad)$^{-1}$
$\Delta\phi$ (rad)


hardptcut: 3GEV/c, ptcut: 2 GeV/c
single jets
di jets
mercedes???
mercedes??? (new)
$1/N_{MCev}dN_{CH}/d\Delta\phi$ (0.05 rad)$^{-1}$
$\Delta\phi$ (rad)


hardptcut: 3GEV/c, ptcut: 1.5 GeV/c
single jets
di jets
mercedes???
mercedes??? (new)
$1/N_{MCev}dN_{CH}/d\Delta\phi$ (0.05 rad)$^{-1}$
$\Delta\phi$ (rad)


hardptcut: 3GEV/c, ptcut: 1 GeV/c
single jets
di jets
mercedes???
mercedes??? (new)
$1/N_{ev}dN_{CH}/d\Delta\phi$ (0.05 rad)$^{-1}$
$\Delta\phi$ (rad)

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