GEFÖRDERT VOM
Bundesministerium
für Bildung
und Forschung

FSP 101 ATLAS

How to deal with HEC quadrant off in top mass analyses?

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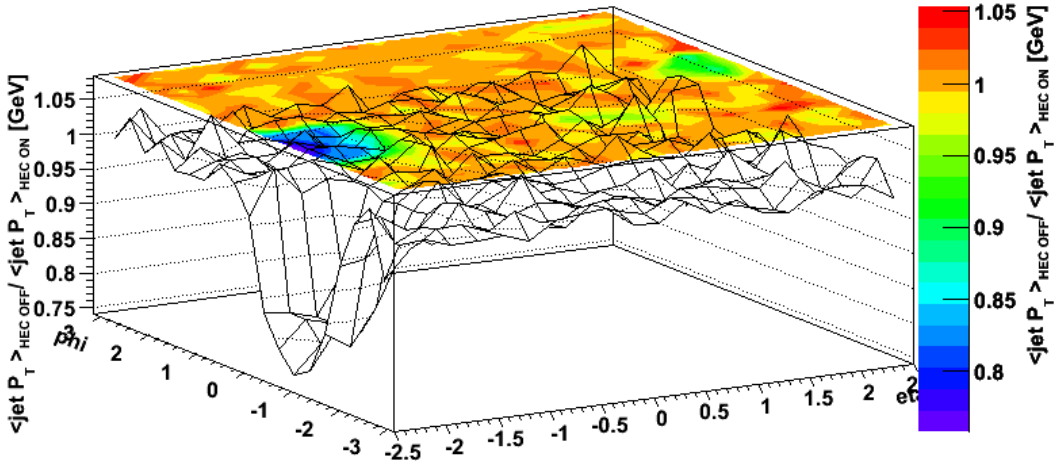
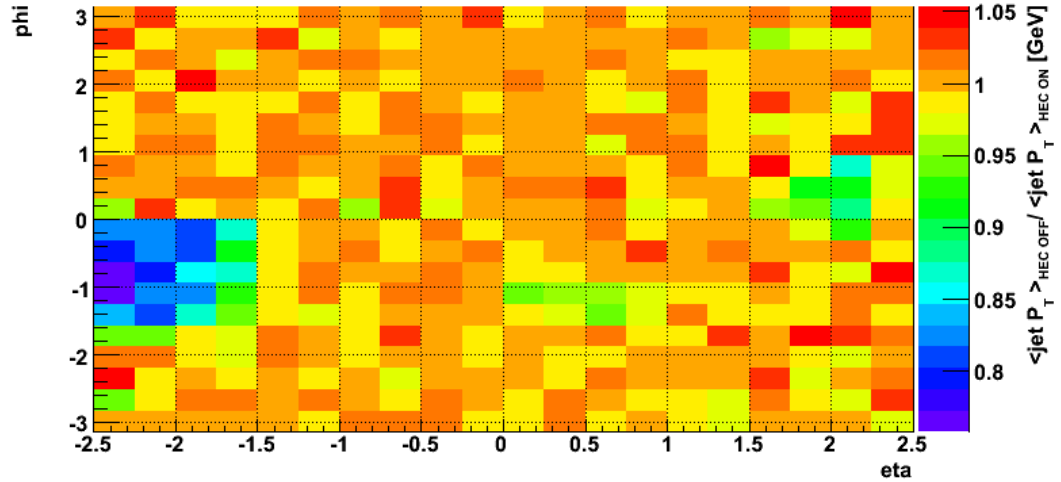
the problem

- We need to avoid biases due to bad reconstructed jets entering our top mass analysis.
- Not only! We also need to be sure that events surviving event selections are not affected by the HECQ off. We do not want to loose any potential good jet for mtop reco in that region.

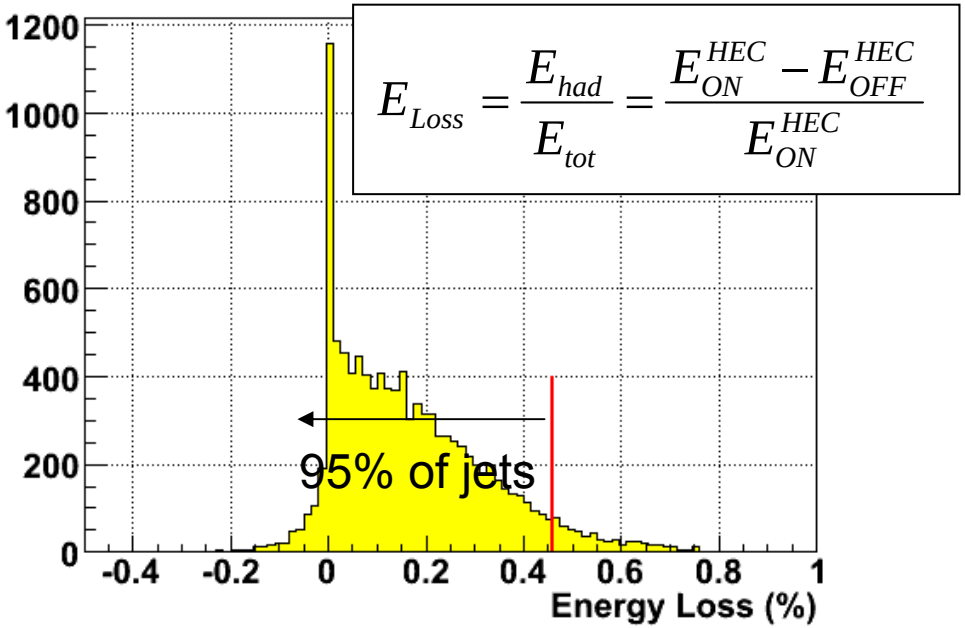


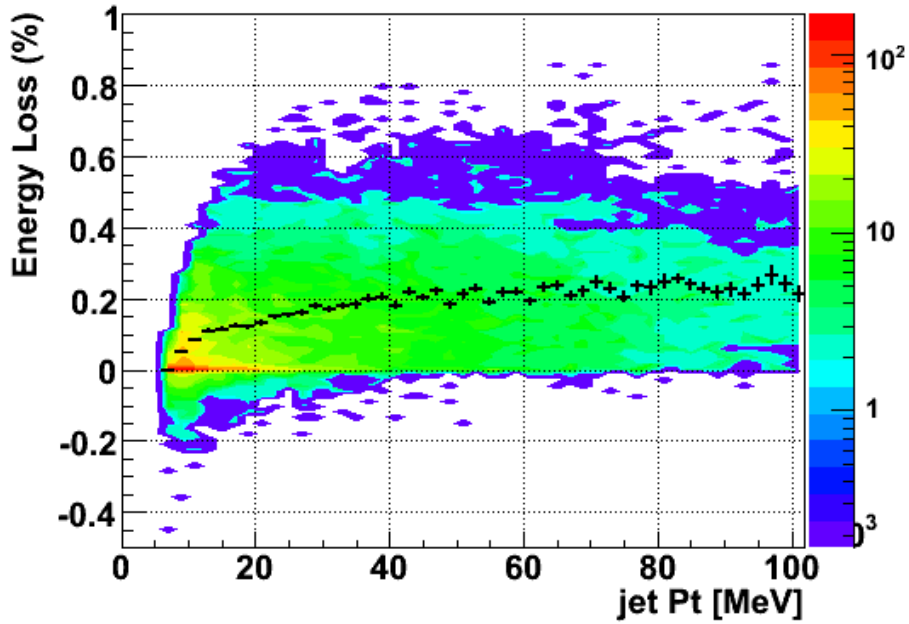


Fullsim HEC off :sample e357_s463_r541
Fullsim HEC on: sample e357_s462_r579

proposed solution

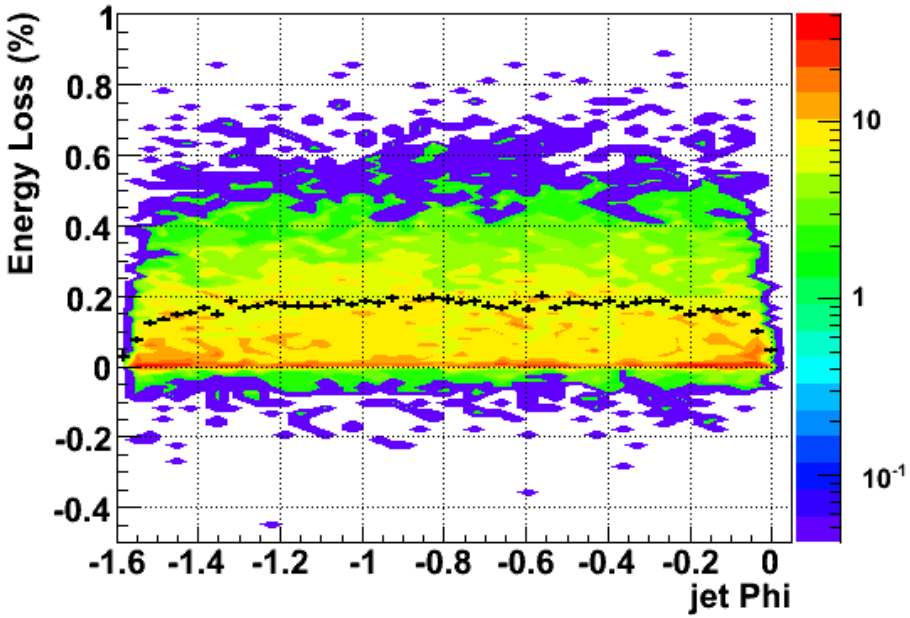
Jet-by-jet matching (sample w/ HEC On and sample with HEC Off)

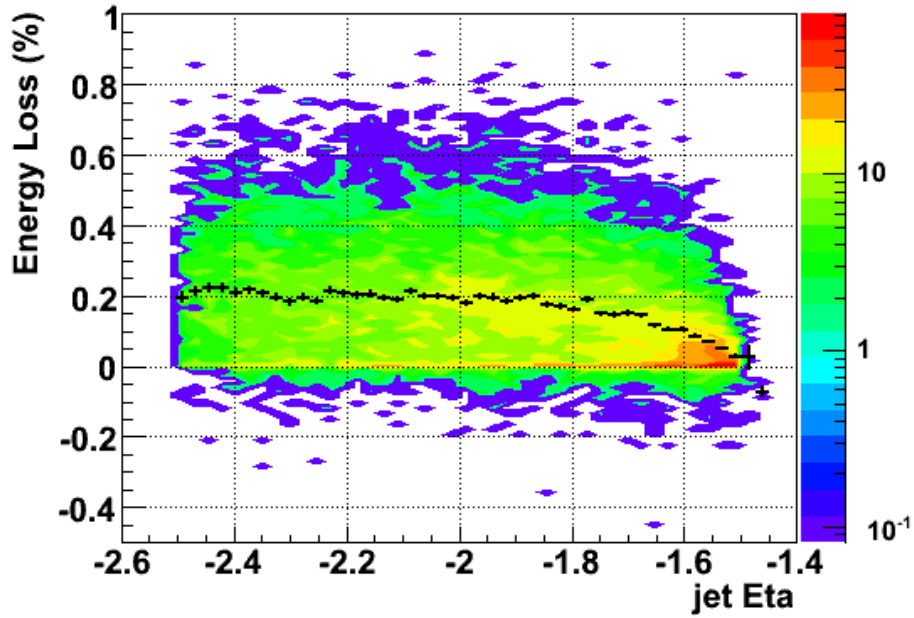




- A 46% energy loss accommodates 95 % the jets.
- if our lower threshold on jet pT is X, by vetoing jets with pT> X*(1-0.46) pointing to the HEC quadrant missing will eliminate 95% of the potential problematic jets in our analysis.
- ***NOTE:*** this does not solve missing ET problems.

proposed solution





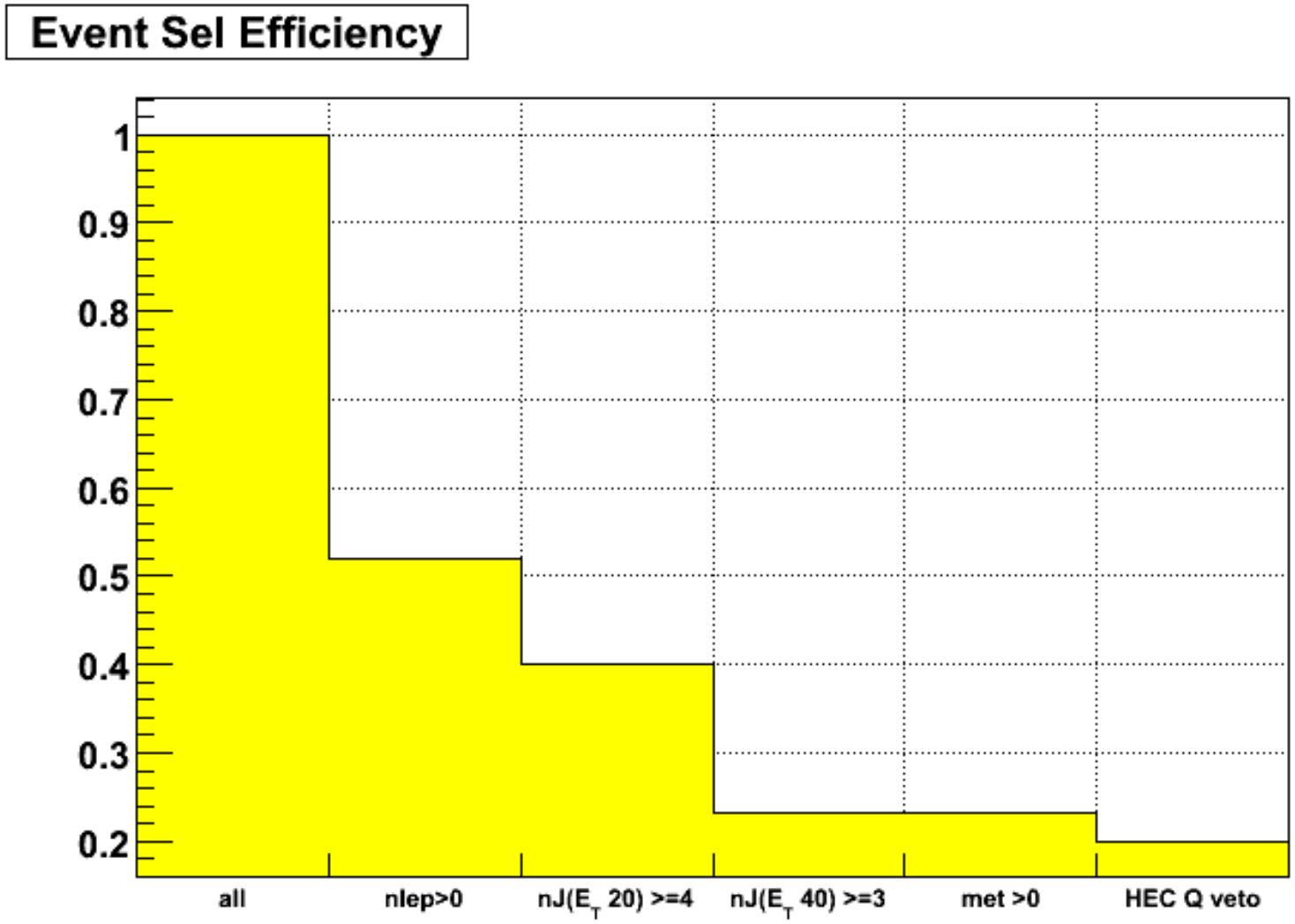
Preliminary efficiency loss estimate, using 25k ttbar events (sample 5200):

	Evt sel Efficiency HEC on sample	Evt sel Efficiency HEC off samples
Std sel (w/o met cut)	23.1 ± 0.2 %	22.2 ± 0.2 %
HEC jet veto (pT>10)	19.9 ± 0.2 %	19.8 ± 0.2 %
Absolute diff	***-3.2%***	***-2.4%***
Relative diff	***-16%***	***-12%***

Selection cuts applied:

- no trigger
- ≥1 tight lep
- $N_{jet}(p_T>20) \geq 4$
- $N_{jet}(p_T>40) \geq 3$

proposed solution



- backup slides -

scatter plots: jet Pt HEC Q off/on