Jets in the MinBias run 123151

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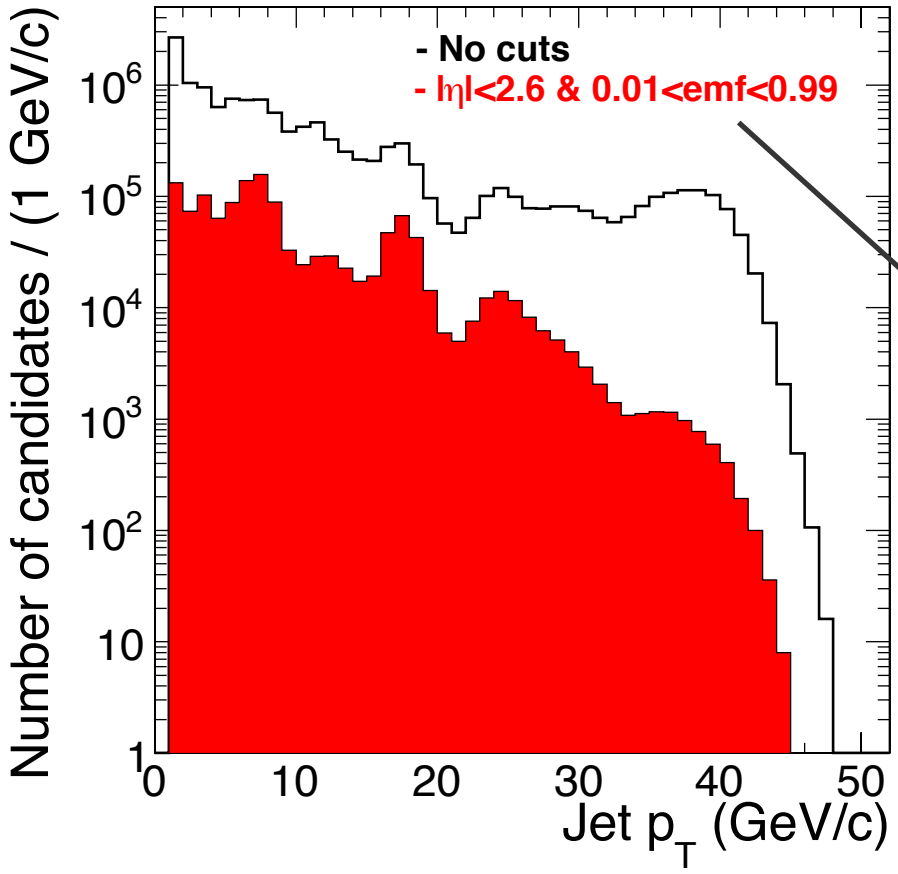
Data sample

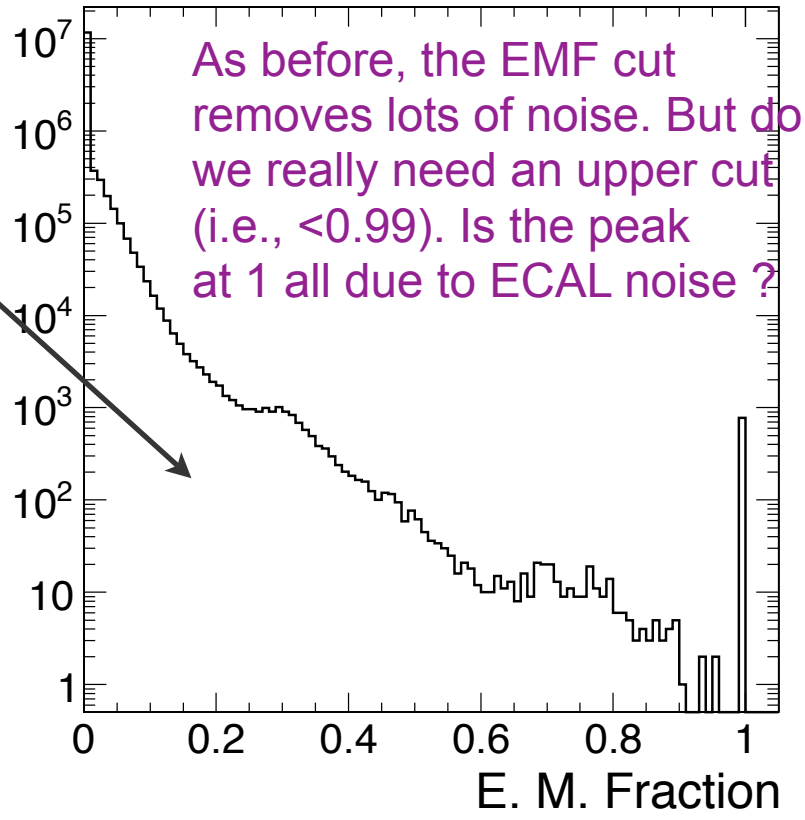
- This preliminary analysis uses run 123151
  - Min Bias data at $\sqrt{s}$ = 900 GeV
  - B-field off, tracker TOB on
  - 505000 events
  - almost all HCAL noise, beam halo, beam-gas interaction, ...
- Use uncorrected anti-kt 0.7 CaloJets, CMSSW 3.3.4

Purpose: take a look at "jet" p_T distribution and jet Id / event variables in these noisy events.

p_T distribution (with no track cuts applied)

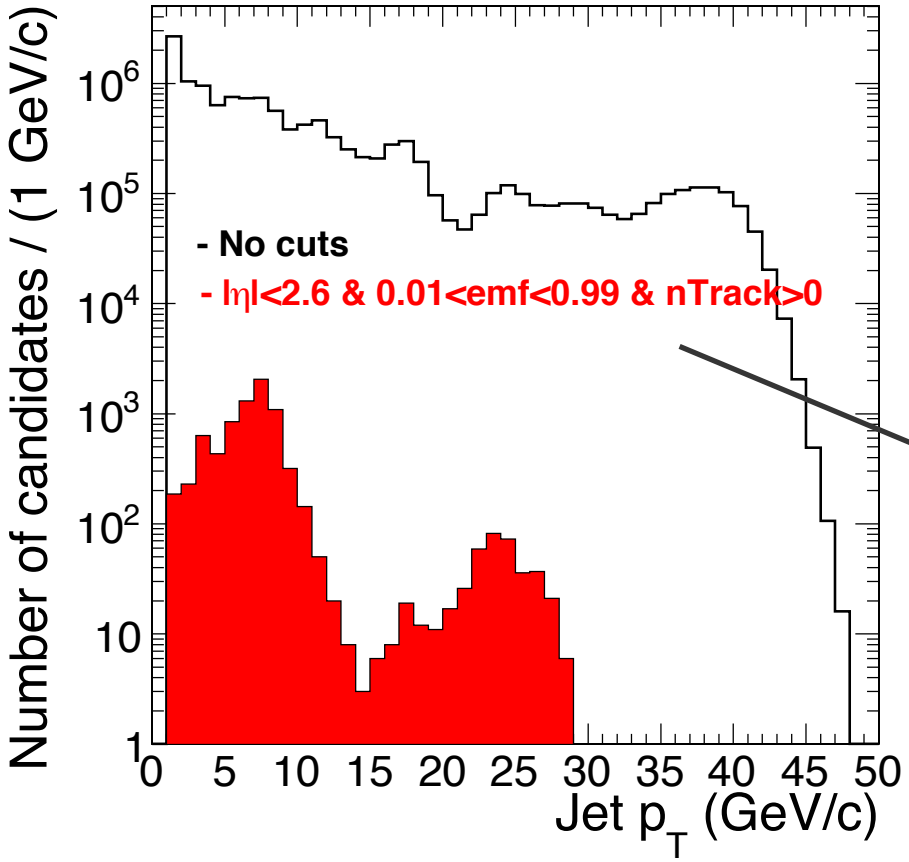
p_T is uncorrected



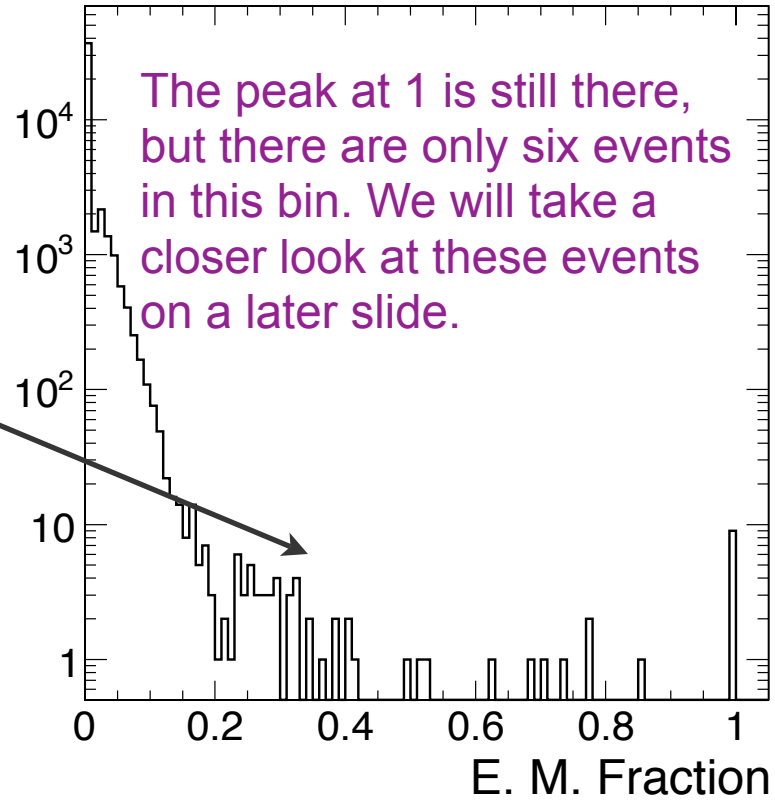


Wow, the p_T goes up to about 50 GeV/c ! Now, let us require at least one associated track at the calo face, and see how the p_T distribution changes.

p_T distribution (after nTracks at calo face >0)



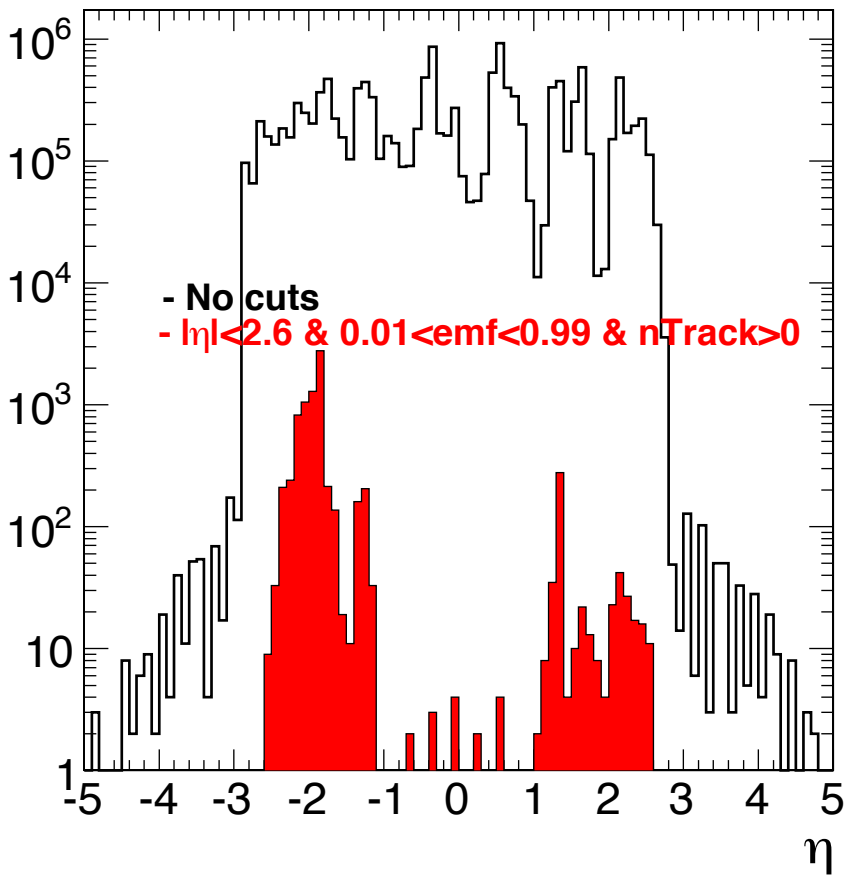
p_T is uncorrected

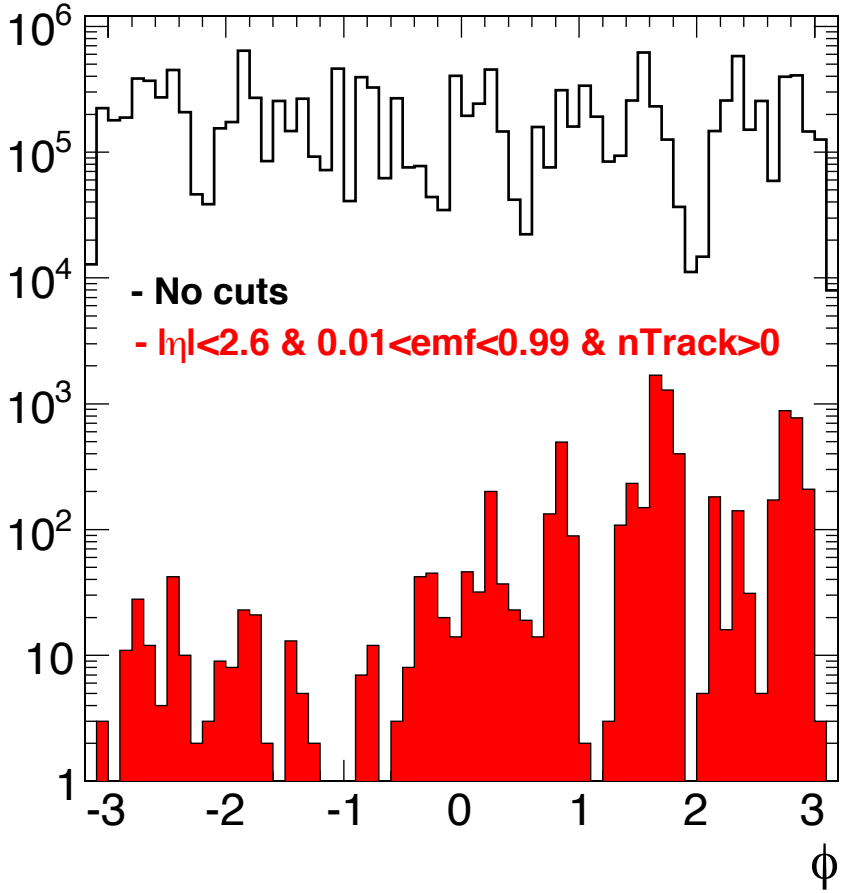


The peak at 1 is still there, but there are only six events in this bin. We will take a closer look at these events on a later slide.

The noise is now reduced by three orders of magnitude, and the p_T distribution goes up to about 28 GeV/c. Also, there are two distinct peaks in the p_T distribution !!! I am not sure why - but maybe the HCAL noise and beam halo have different distributions ? !

η and ϕ distributions

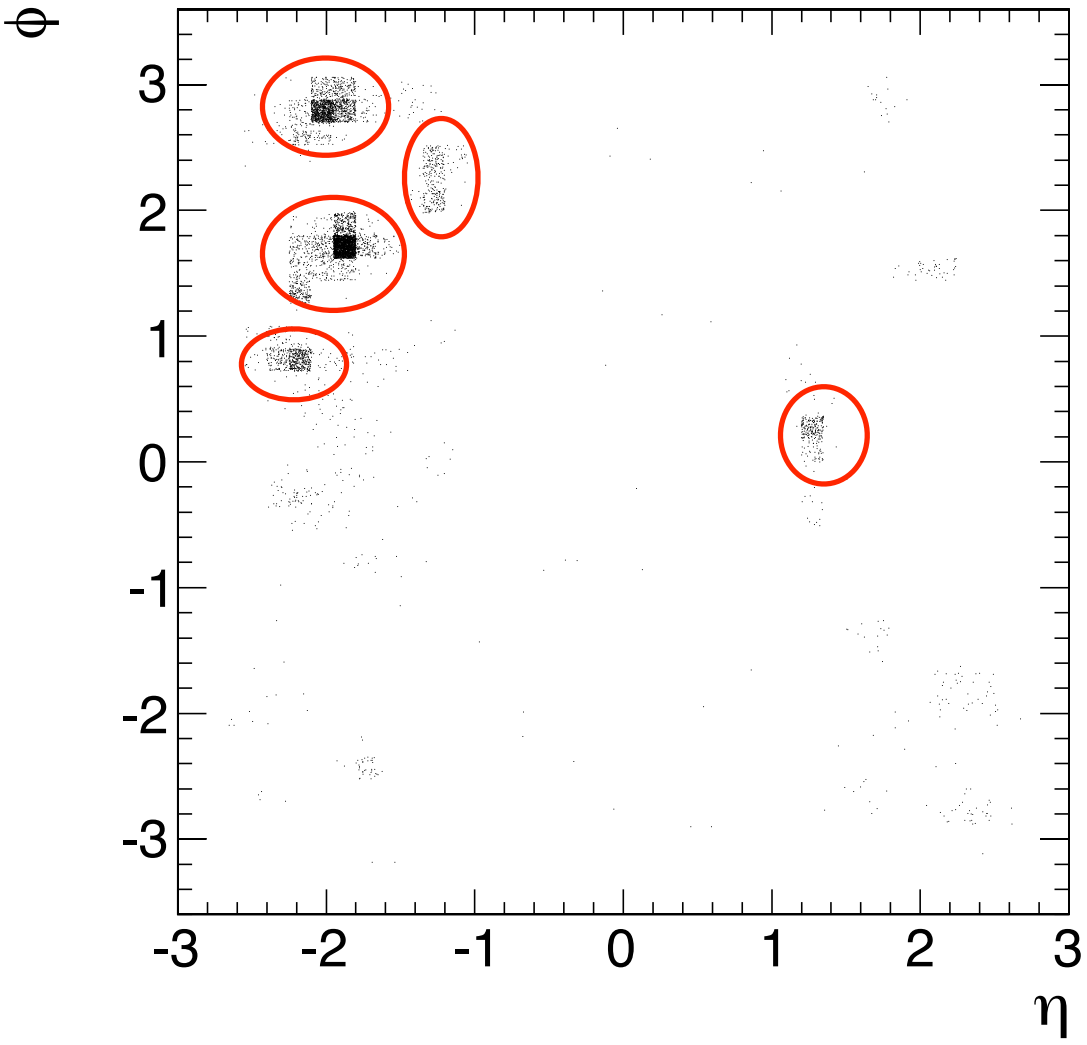




Almost all the surviving events are in the endcaps (most around η= -2).
Also, a large number of events are near ϕ = π.

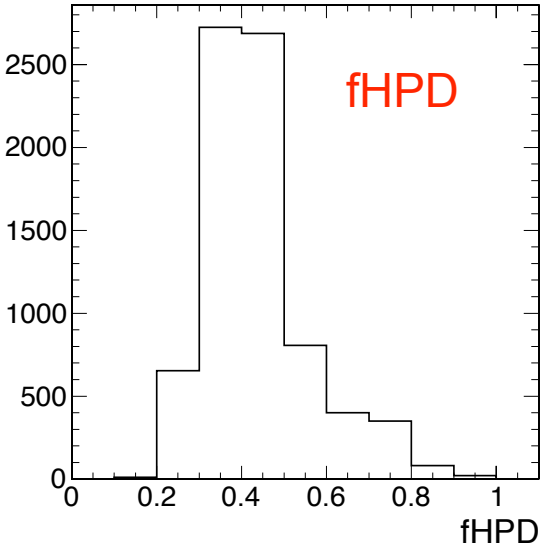
η−ϕ scatter plot of the surviving events

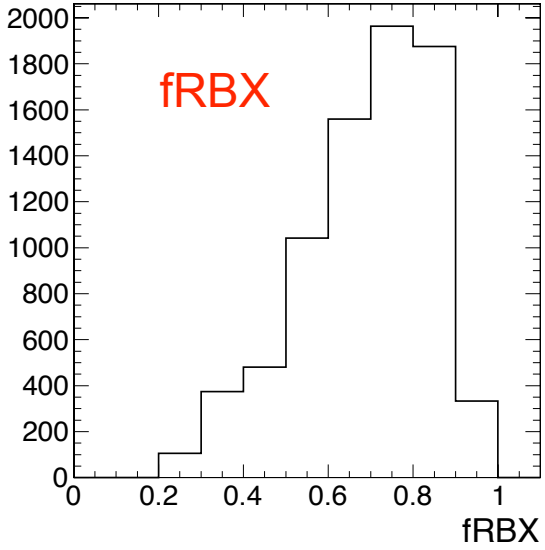
after EMF and nTracks cuts

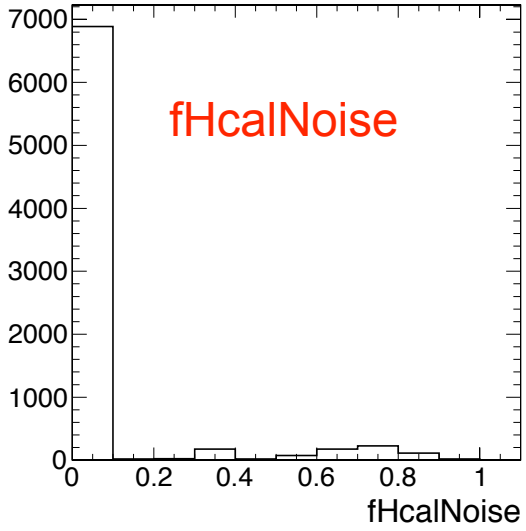


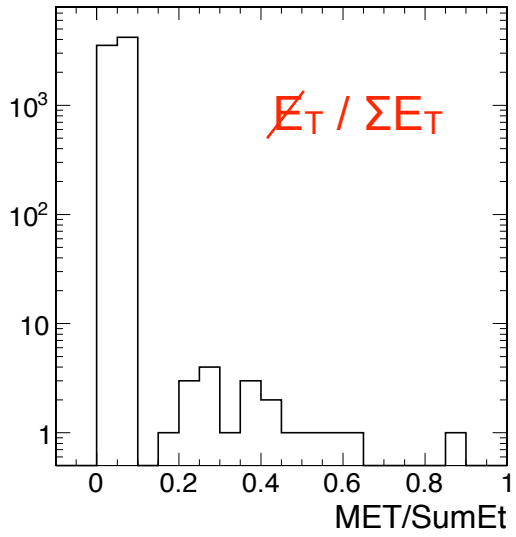
So, the noise is indeed mostly localized .... indicating "hot channels" in some places !

JetId / event variables after EMF+nTracks cuts

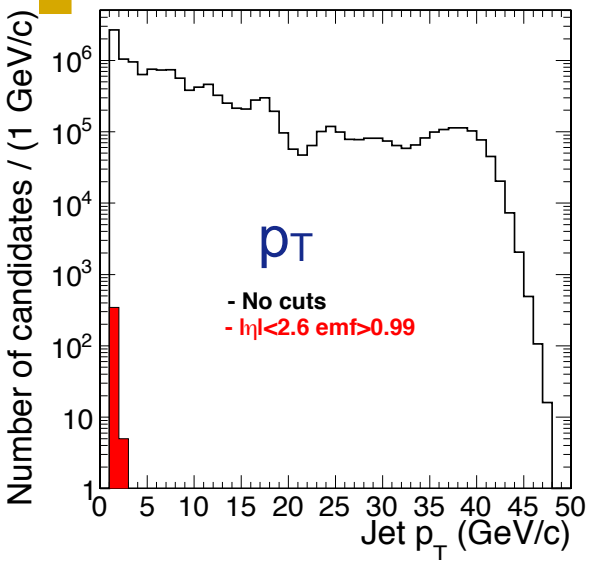


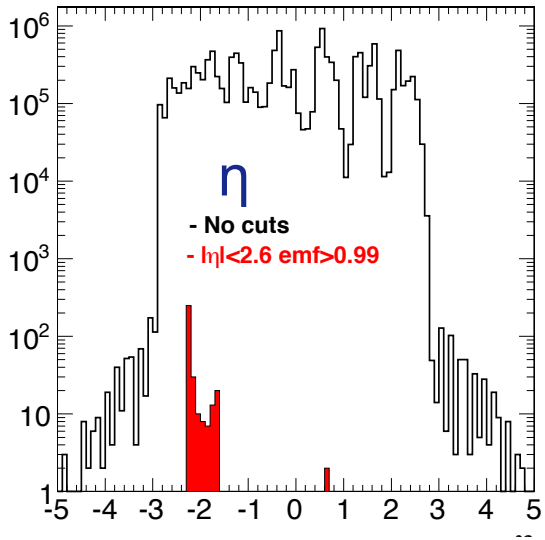


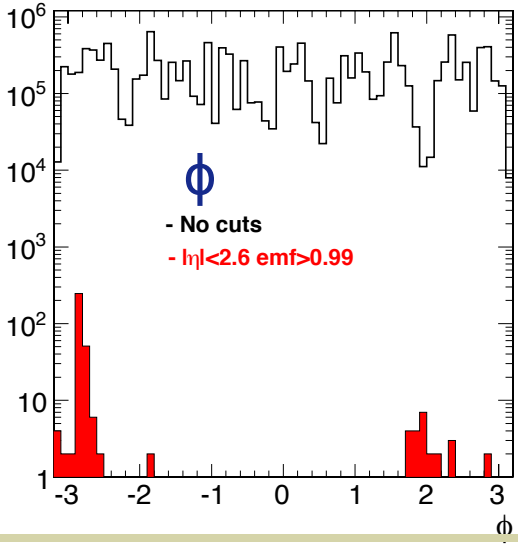


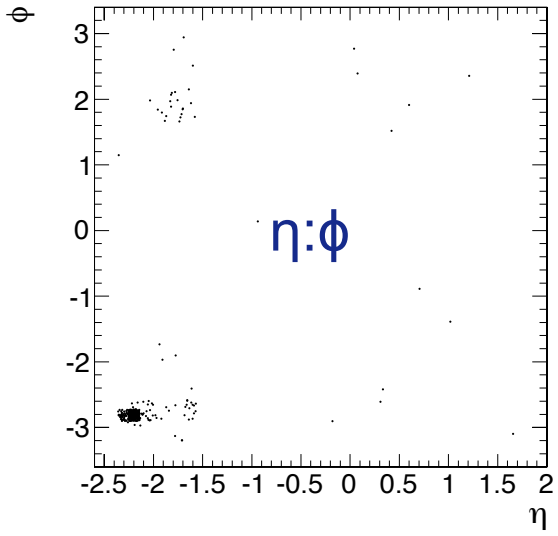


p_T, η, ϕ distributions of events with EMF=1









In addition, if we also require these events to have nTracks at calo >0, then only six events survive (see next slide).

Events with EMF=1, nTracks at calo face >0

evt No	pt	eta	phi	emf
2760611	1.1105	0.3061	-2.3989	1
3142973	1.3287	0.6965	-0.8514	1
1365107	1.1683	-0.9752	0.1999	1
2142994	1.1448	1.2396	2.3965	1
3482089	2.0277	0.6182	1.9037	1
1091769	1.1608	-2.3571	1.2882	1

==> 6 selected entries

So, out of 505 k events and 10 M noise jets, only about 6 events with EMF==1are left after requiring at least 1 track at calo face.
These six events have p_T <3 GeV, and therefore are not particularly harmful.
One potentially may not need to apply an upper EMF cut to suppress these kinds of noise.