

This procedure tested within cmsim and MC tracks gave promising results - improved jet resolution

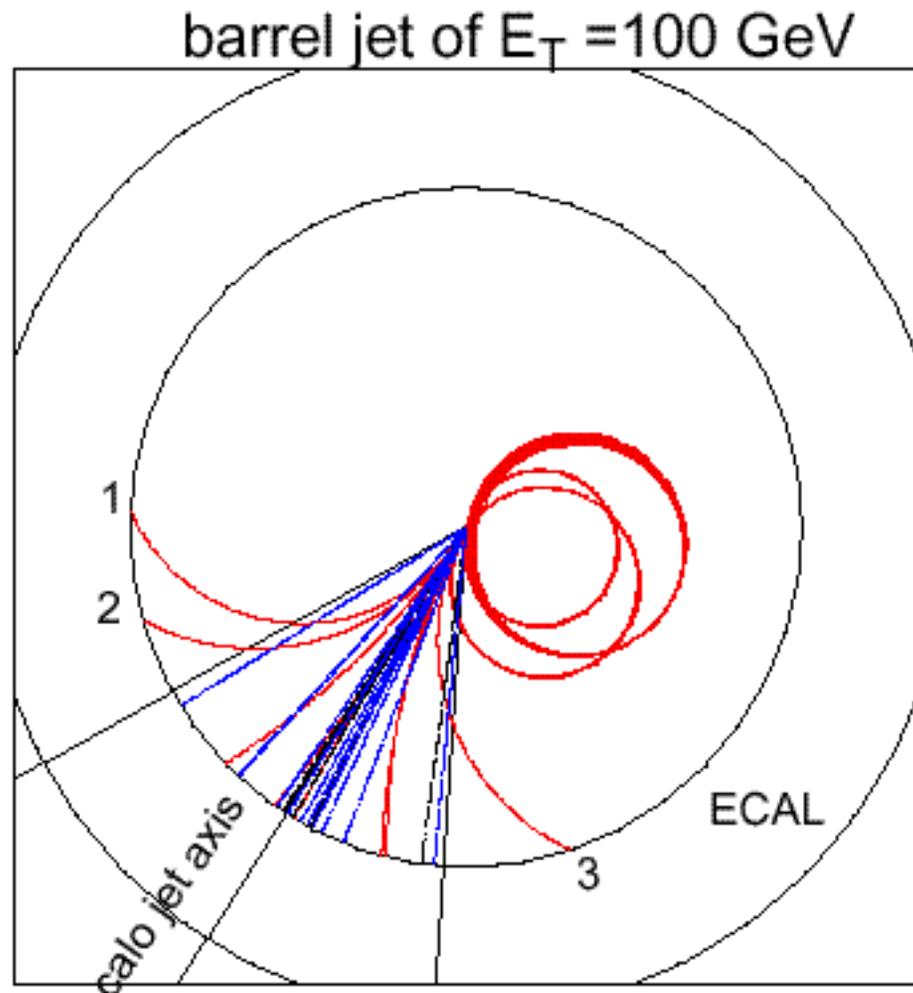


**Step 1 : use tracks of the jet with impact in calo out of the reco cone (due to 4T field)**

$$E_{T \text{ jet}} = E_{T \text{ jet}}^{\text{calo}} + p_{T}^{\text{trks}},$$

where  $p_{T}^{\text{trks}}$  is a sum  $p_{T}$  of tracks of the jet with impact in ecal out of the reconstruction cone due to deflection in 4T field

in fig. it is tracks 1,2 & 3.

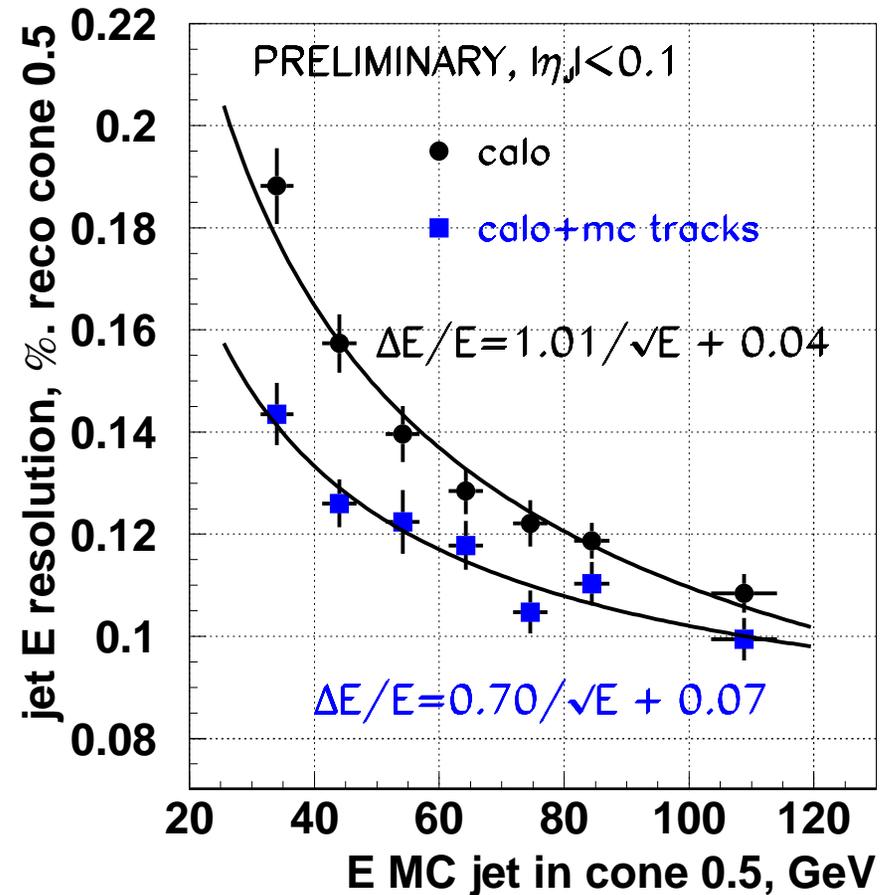


This time it's tested with ORCA and reco tracks

# “ideal world” of the previous simulation

- no reco tracks
- no HCAL noise
- no FSR, no pile up

just isolated bunch of particles  
(from 2-jet events) selected in cone  
0.5 around the leading track is passed  
through cmsim ; no tracks coming  
outside the cone to the calo reco cone



Since in the “ideal world” results were good (see plot)  
we move towards “realistic world” of ORCA

# “realistic world” of ORCA

- qcd\_50\_80 bin at  $L=2 \times 10^{32} \text{cm}^{-2}\text{s}^{-1}$  fully digitized (tracker from cms120)

1. reconstruct calo jets with iterative cone 0.5 and take one highest  $E_t$  jet
2. define MC jet as MC stable particles in cone 0.5 around jet axis

$$E_{tJ}^{\text{MC}} = E_J^{\text{MC}} \sin(\theta_J), \text{ where } E_J^{\text{MC}} = \sum E_p^i$$

$$\sin(\theta_J) = \text{sqrt}((\sum p_x^i)^2 + (\sum p_y^i)^2) / |p_J|.$$

3. reconstruct all “pixel lines” and vertices and define signal vertex (SV) as vertex with max  $\sum |p_t|$  (see right plot).

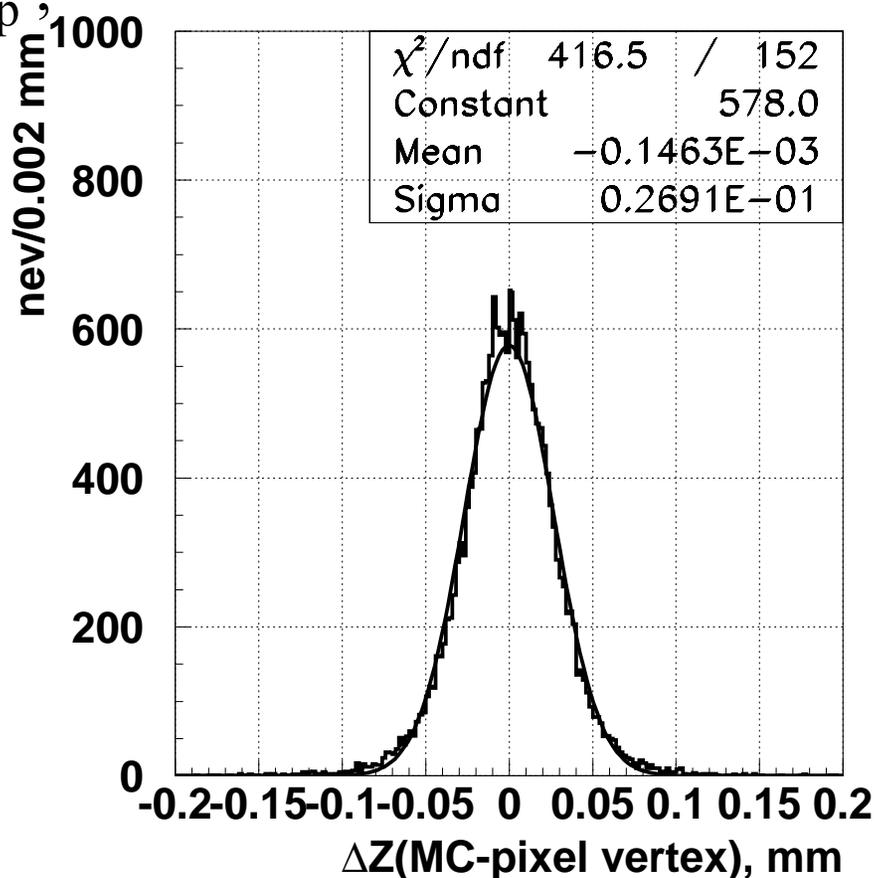
Algorithm by D. Kotlinski. very fast !

We can use it at L2 for jet direction.

4. use “pixel lines” from SV and within cone 0.5 around jet direction as a seeds for track finder

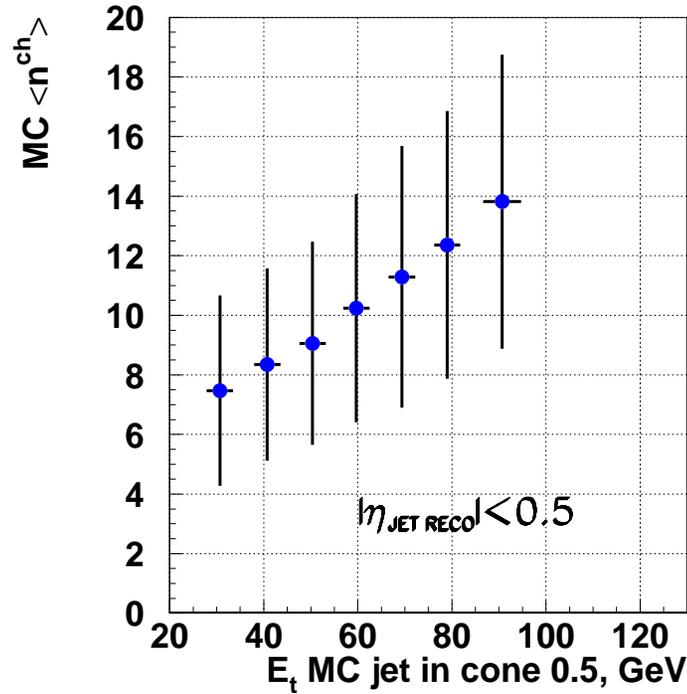
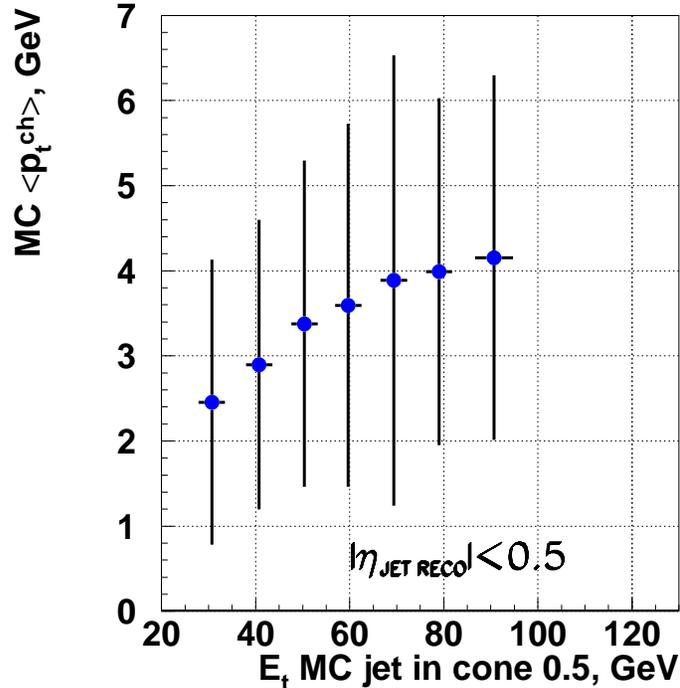
5. add to jet energy the momenta of reco tracks with impacts outside reco cone

6. recalculate  $E_t^J$  from new  $E^{\text{calo+trk} J}$  and  $\theta_J$  from  $E_{x,y,z}^{\text{calo} J}$  and  $p_{x,y,z}^{\text{reco trk}}$

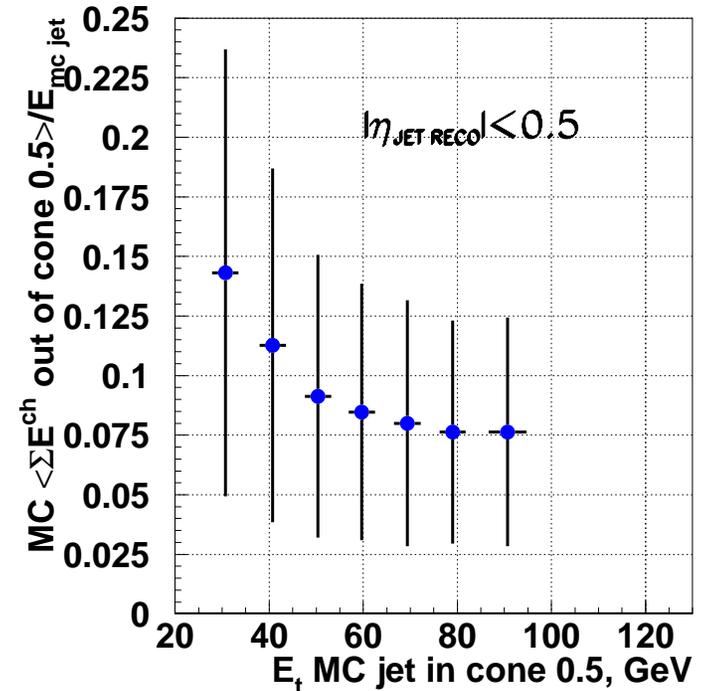


# MC particles inside jet reco cone (MC jet particles)

$\langle p_t^{ch} \rangle$



**energy fraction of  
charged particles with  
impacts in calo outside  
of reco cone 0.5**

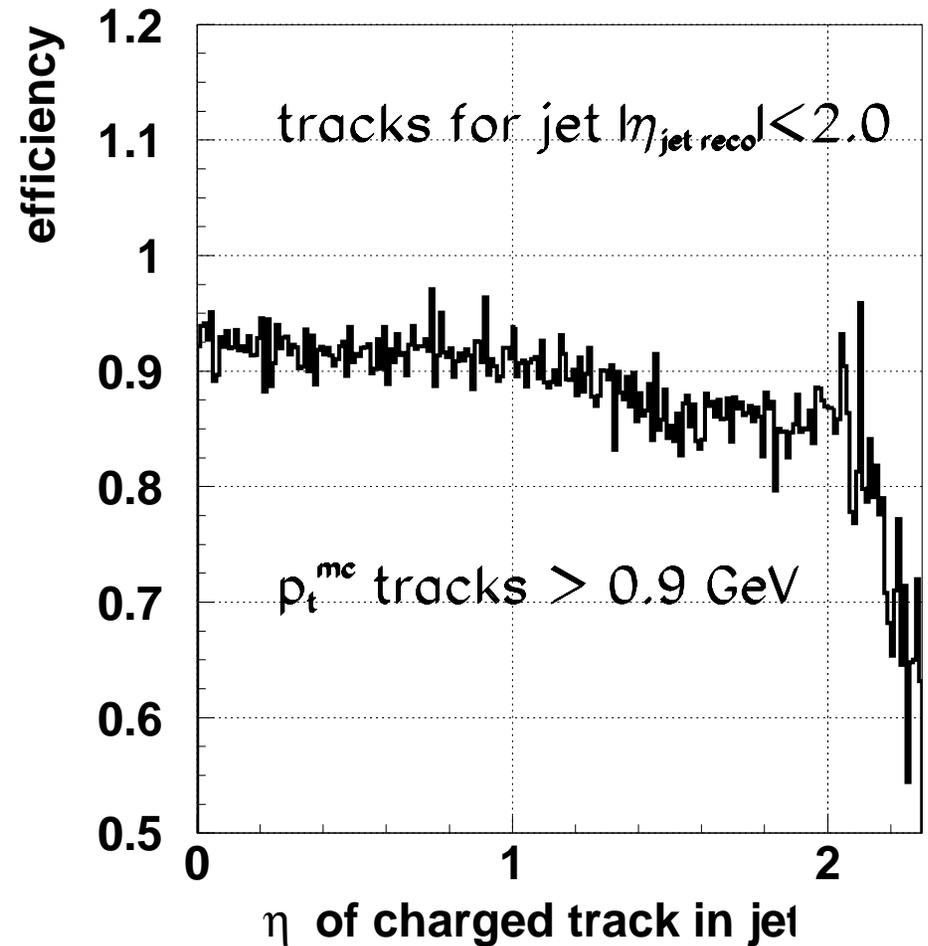
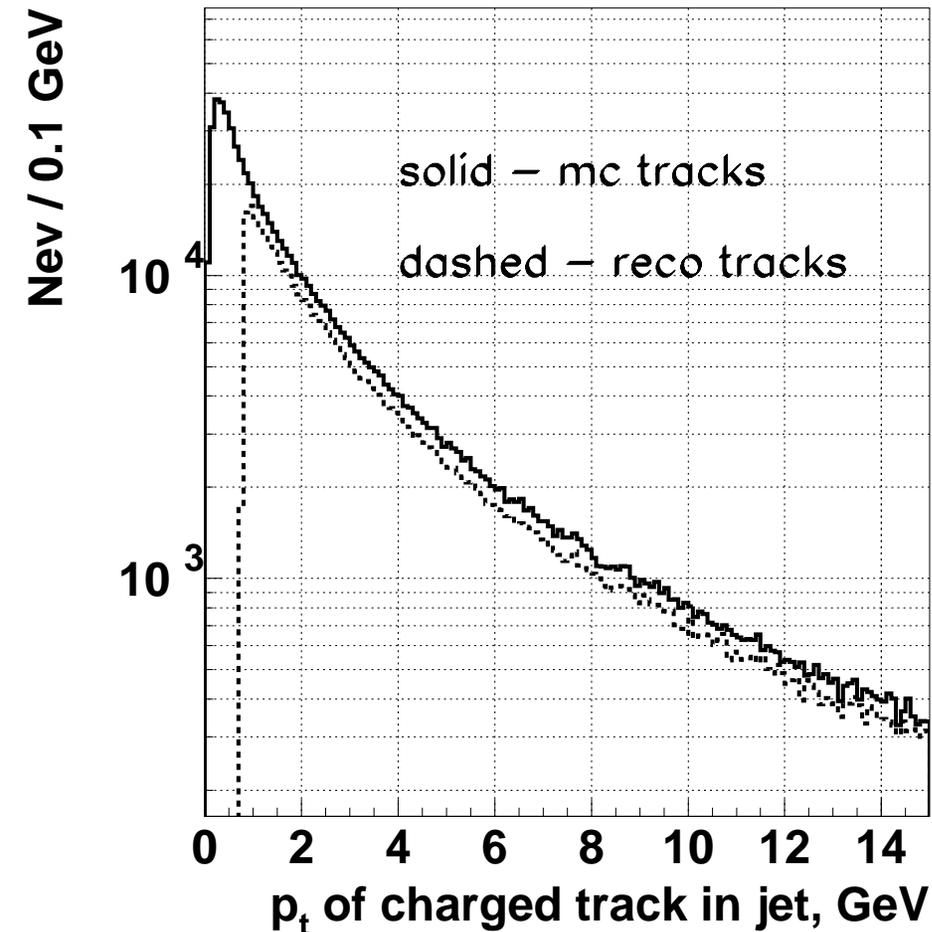


$\langle n^{ch} \rangle$



# Reconstructed tracks

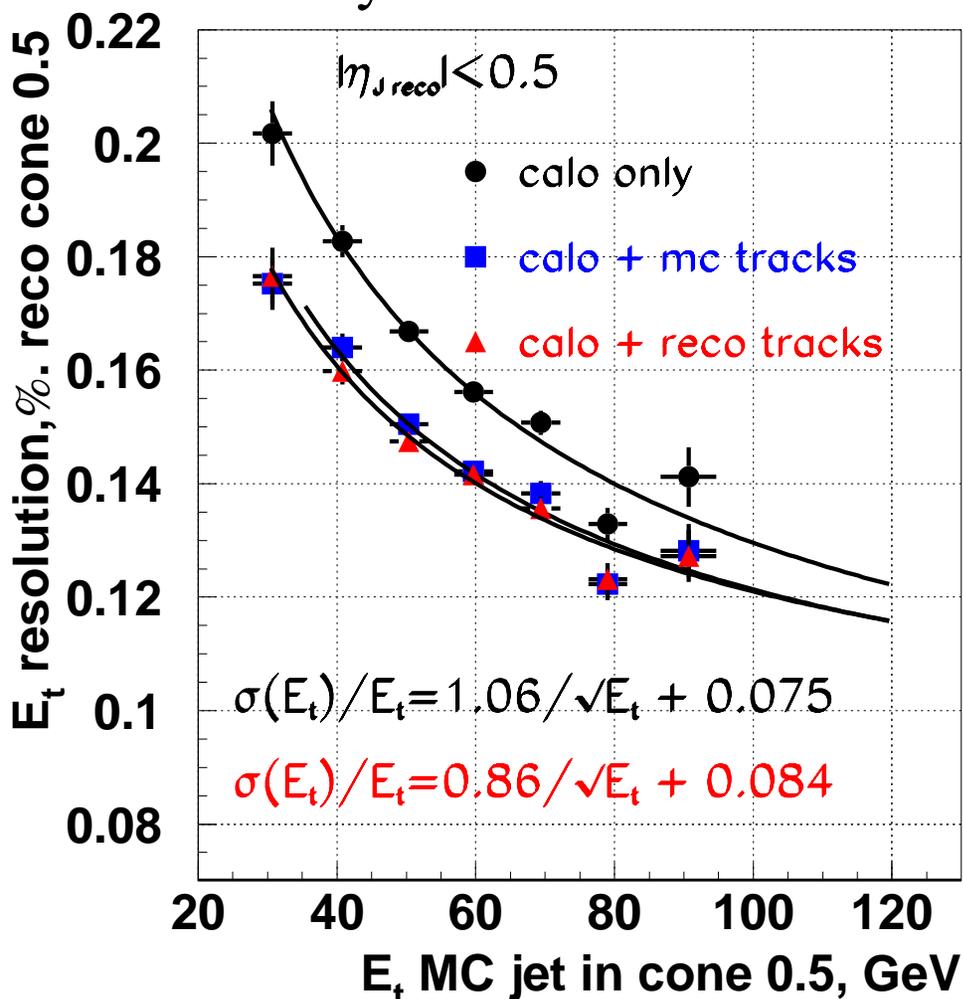
on next plot I show results for  $|\eta_{\text{Jet}}| < 0.5$



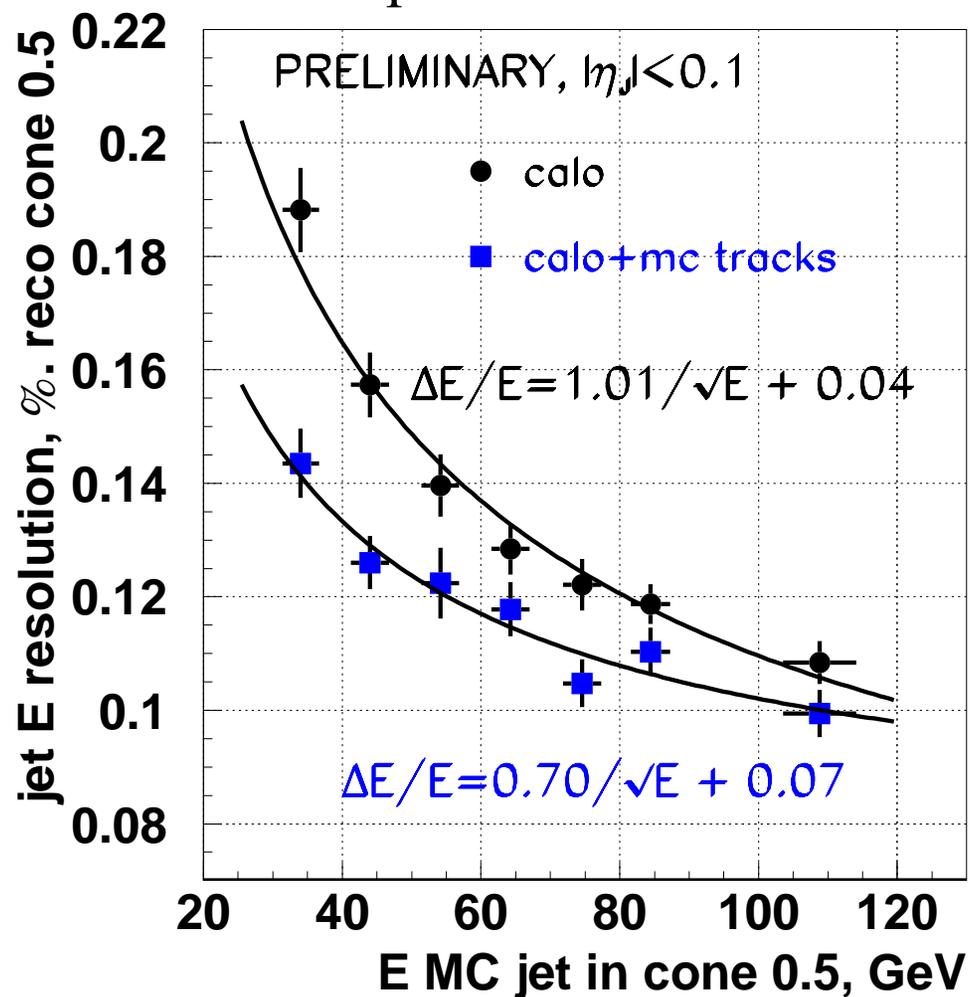
“real world” of ORCA v.s.

“ideal” world

today ORCA results



previous results



for the next : jet vertex with Pixles, endcap jets.