Subject: EMC efficiency/acceptance
Posted by StefanoSpataro on Thu, 21 Jun 2007 17:36:48 GMT
View Forum Message <> Reply to Message

Hello,
I generated around 6000 primary particles with the box generator, uniform in phi, theta (not cos(theta)) and p [0., 3] [GeV/c].

The following plots will show distributions for electrons (left) and pi- (right). The black line corresponds to the generated particles, the blue for the ones that produced a signal in the calorimeter above threshold, and the red are all the particles that did not produce signal at all in the EMC. All the detectors were put inside, so pipe microvertex tpc magnet dirc bla bla bla, and the magnetic field was on.

Theta distribution

You can see that the space in between the barrel EMC and the backward endcup is evident. But if we look well we can see that in the endcup regions the efficiency is lower, there are less reconstructed particles with respect to the barrel, with an efficiency close to 50%.

The following distribution is in function of the momentum

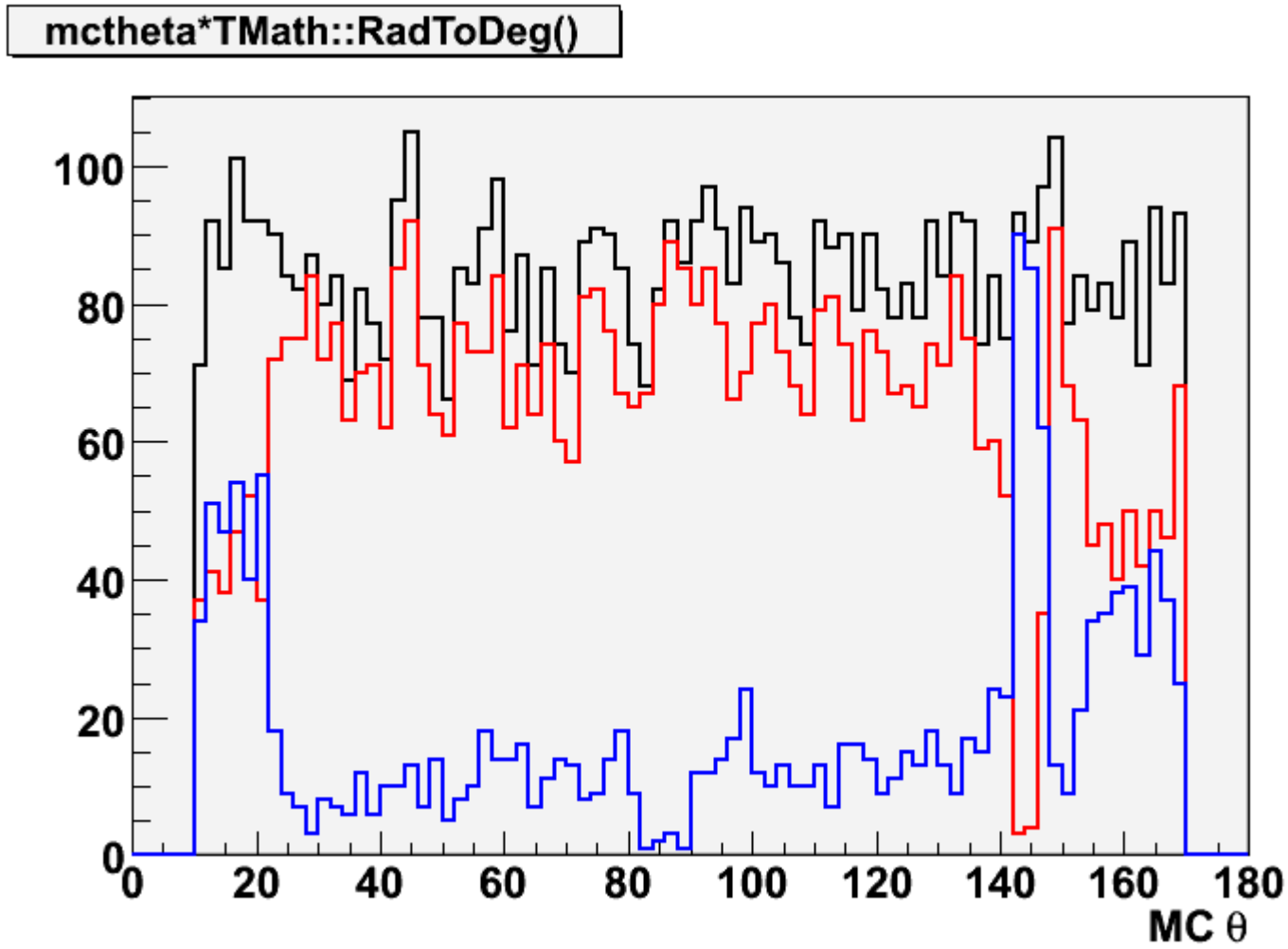
We can see that at low moment it goes down, but I crosschecked and the drop in the endcupts does not depend on the momentum.

What can I guess?
a) The code is somewhere wrong for the endcups, maybe the EmcStructure is giving some problems
b) The digitization parameters are not so good for endcups, maybe connected to the different crystal size
c) Some material is deflecting/absorbing the particles, so that they do not reach the emc
d) ... who knows?

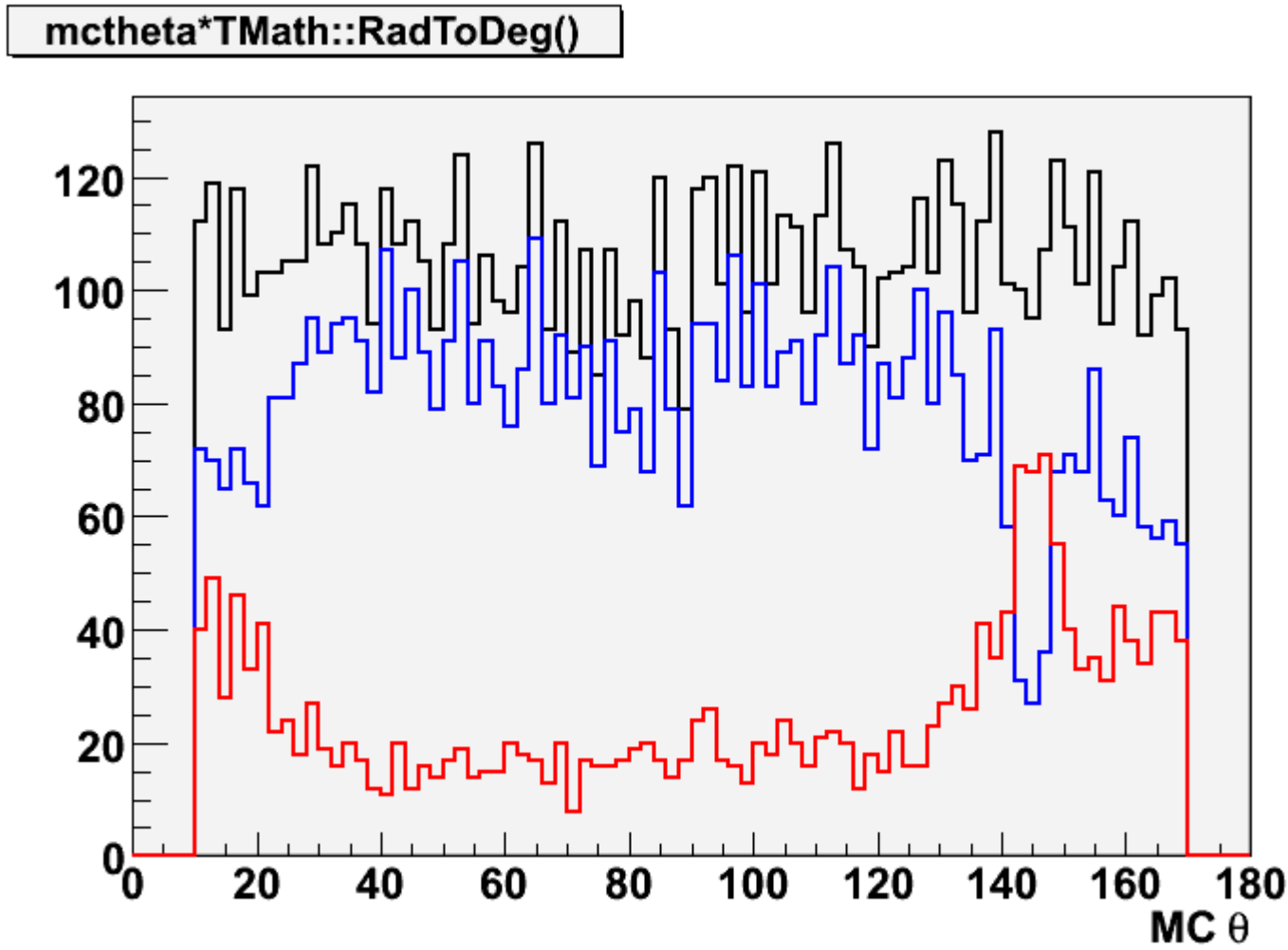
I think we should find some time to investigate this behaviour.

File Attachments

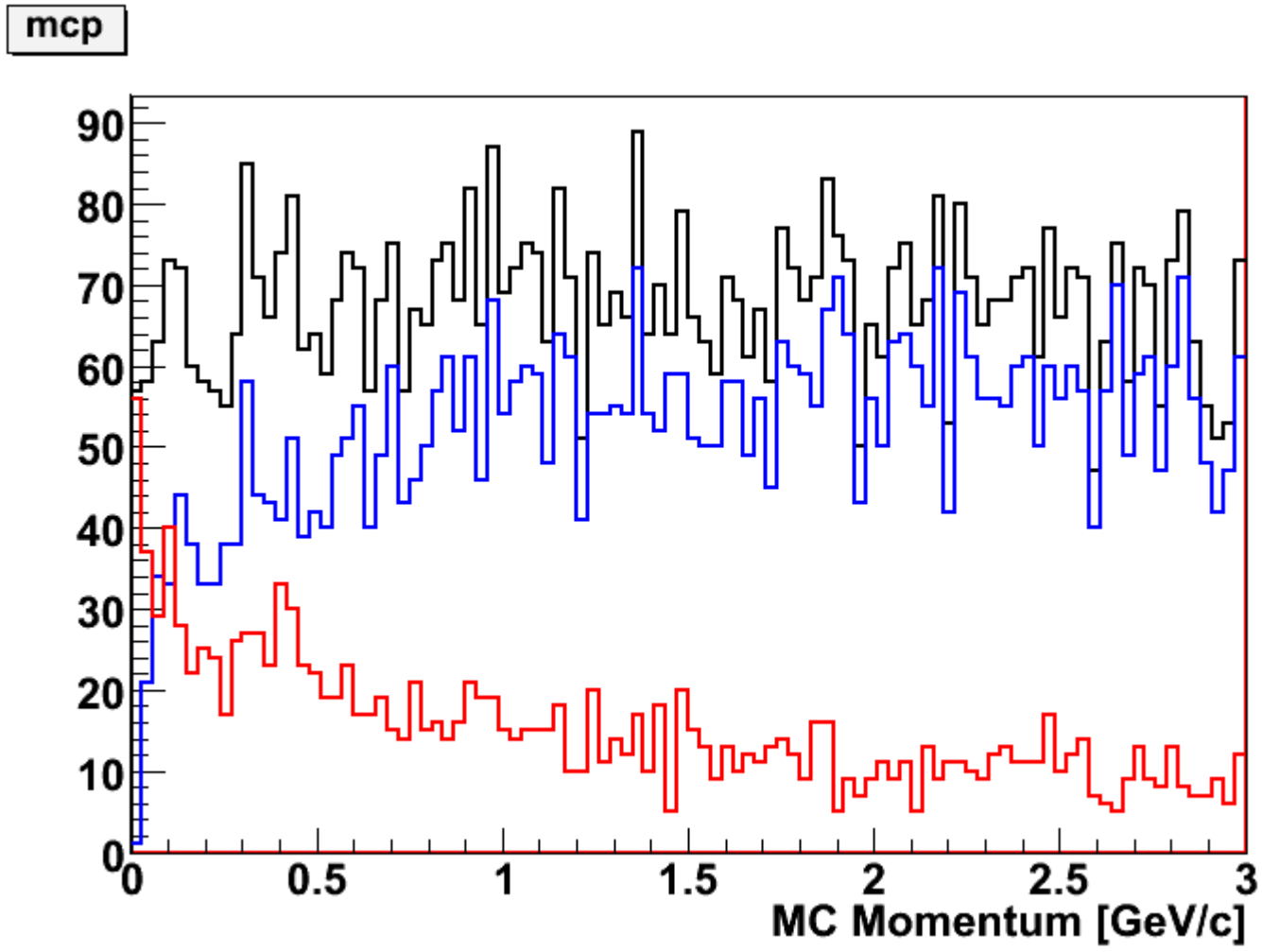
1) em_emc_thetacomp.gif, downloaded 1557 times



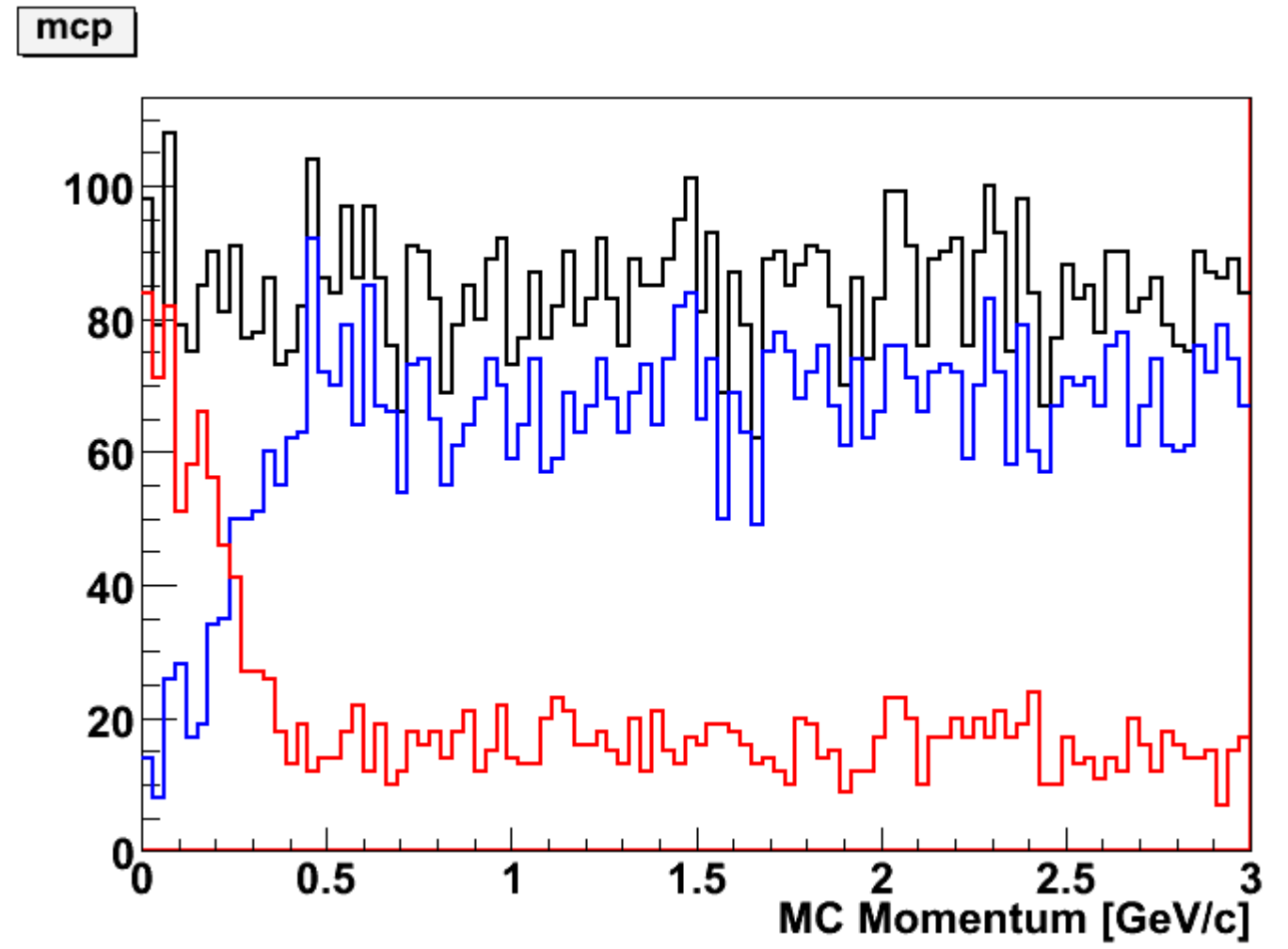
2) pi_emc_thetacomp.gif, downloaded 1463 times



3) em_emc_pcomp.gif, downloaded 1437 times



4) pi_emc_pcomp.gif, downloaded 1570 times


mcp
100
80
60
40
20
0
0
0.5
1
1.5
2
2.5
3
MC Momentum [GeV/c]