Subject: Re: Separation of photon and electron
Posted by Bertram Kopf on Mon, 11 May 2009 12:43:57 GMT

View Forum Message <> Reply to Message

Dear Donghee,
Quote
I have a question about the PID of photon and electron with EMC.
I found a good article for electron PID based on the EMC information in the panda physics report.
but there are only electron, hadrons and muon separation with MLP training and Zernike moments.

the particle identification of electrons and photons are in principle two different things. Namely, before one should start with the EMC specific particle identification the matching of charged particle tracks with the EMC clusters/bumps has to be done. Those clusters which can be associated with charged tracks are assumed to be originated either from electrons, from charged hadrons or from muons. The EMC PID is discribed in the Panda PB exactly for this scenario. BTW: The most important info is E/p (the energy deposit of the cluster over the momentum of the charged particle).

For our PB studies we have assumed that all non-matched clusters are originated from a photons. And this was sufficient for our benchmark studies. But in priciple you are right that a proper photon identification is needed. Such clusters can also originated from neutrons, pi0's, electromagetic or hadronic split-offs. The shower shape informations are also here helpful properties for the distinctions between these (faked) particles.

Quote
E1/E9 or E9/E25 should be important variables for this purpose.
Could you teach me which values are relevant for photon PID or electron PID case?

There is a correlation between the Zernike-moments and E1/E9 and E9/E25. We trained the MLP with 10 different input properties. The advantage of using such a neural network is that it's not necessary to know how the properties are correlated.

Quote
Is there a global tracking class for photon or electron using only EMC?

For the PB studies we have defined a EmcCand object which has a reference to the cluster/bump object and to the track object (for the matched scenario). The PID has been done with PID specific packages.

Best regards,
Bertram.