Subject: EMC WorkPackages
Posted by Dima Melnychuk on Thu, 04 Feb 2010 11:10:55 GMT
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Dear everybody interested in EMC software,

I have prepared working packages for EMC according to what was discussed at the last EVO meeting.

http://panda-wiki.gsi.de/cgi-bin/view/Computing/PandaRootWorkPackages

Everybody can look, write comments here or, since WorkPackages are in the Wiki, you can make your corrections directly there.

I put to description of tasks what I think about it, and for some of task my ideas are limited and for many things general approach should be first developed, such as Event Mixing, Alignnment etc.

One technical question what names to put in the table column as Coordinator? Since for some of tasks name of person doing this task can be assigned I would propose to put this names in this column.

And one question needs additional discussion in my opinion. And it is connected with WorkPackages "Cluster-Track matching", "Candidate (analysis interface)" and to some extent to "Energy and position correction".

At the moment Cluster-Track matching is implemented in PndPidCorrelator, where tracks are matched with EmcCluster/EmcBump and PndPidCandidate are produced taking information from both and PndPidCandidate are later read by PndEventReader. However information on EmcCluster correlated/non-correlated with tracks can be used in emc software to apply energy and position correction, since position correction can be different for photons and electrons. Disentangling cluster-track matching from PndPidCorrelator would make it also easier to implement alternative algorithms for such a matching. So here PndEmcCandidate can be introduced, which will contain information on cluster-track association and later it can be whether converted into PndPidCandidate or used directly in PID algorithms.

However I do not have any detailed proposal for this point, I just think that it should be further discussed.

Best regards,

Dima

Subject: Re: EMC WorkPackages
Posted by StefanoSpataro on Thu, 04 Feb 2010 12:38:36 GMT
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The track-emc correlation can be easily taken out from the PndPidCorrelator. My idea was to have "friend" classes (i.e. PndPidEmcGeaneCorr) based on the Correlator, so that it is possible to have different kind of correlators musing the same TCA defined in the correlator.

Then, there should be another class retrieving Emc info, i.e. PndPidEmcInfo.
At the moment both the functionalities are hardcoded in the correlator, but they can be easily decoupled (we are starting here to do something on this sense for the MVD).

About the energy calibration and so on, maybe this could run after the correlator, in the PndPidEmc part. In this case one could use not only the track-emc correlation, but also eventual correlation to DIRC/TOF/whatever, in order to improve emc energy resolution. If you a EmcCandidate isolated from the other detectors, this could be more difficult.

About the Bump splitting, I am wondering if maybe this task should be done as pid. A bump splitting algorythm for pid could be able, in theory, to provide a probability that a neutral candidate is a pi0 or a foton. In this case the algorythm should become a PidClassifier, filling likelihood/proabilities instead of giving just saying "one photon/two photon".
The latter is just a proposal to keep busy your minds I have seen a thesis using TMVA to do pi0 identification from the shower shape, and I am wondering if this could be used by us. In this case it becomes also easier to handle with different bump splitting algorythms -> different classifiers filling different PndPidProbability TCA.
Moreover, probably we do not need bump splitting for charged candidates, but I am not expert on this field then maybe somebody could comment.

Subject: Re: EMC WorkPackages
Posted by Johan Messchendorp on Thu, 04 Feb 2010 20:36:58 GMT

Concerning the pion-gamma identification, which Stefano mentions: he is indeed right, one could also do an identification extremely well by studying the shower shape of the cluster as alternative to the bump splitting. Just look at the bachelor work from Elwin Dijck (see the previous thread in this forum). I guess that Stefano is referring to this work (actually it is not done with root's TMVA, but with the software written by Mohammad Babai, which can handle more than two classes). With only a few parameters, a very good separation can be achieved. From this perspectives, I would support to implement the pion/gamma identification in the PID part in the same line as the identification of the other charged particle species.

Johan.

Subject: Re: EMC WorkPackages
Posted by Dima Melnychuk on Thu, 04 Feb 2010 22:02:02 GMT

Hi Johan,

I have looked already to the bachelor work from Elwin Dijck and I agree with you that it does make sence to implement pion/gamma identification on the basis of shower shape.

However I wouldn't consider it as an alternative to bump splitting but rather as an addition, since bump splitting not only determine whether cluster was created by one or many particle but also gives the energy of each particle. And in principle single cluster can be created by two overlaping clusters from gammas not produced from single pi0 and bump splitting will give the

energy for each of them.

Dima

Subject: Re: EMC WorkPackages
Posted by Johan Messchendorp on Fri, 05 Feb 2010 09:45:35 GMT
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Hi Dima,

Yes, you are right. My wording was indeed a bit off, I actually meant "addition" in stead of "alternative"....

Best wishes,

Johan.