Subject: Re: EMC resolution
Posted by binsong on Thu, 13 Feb 2014 14:16:08 GMT
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Dear all,

now the problem is clear. it is due to the nonuniformity.

To obtain a realistic resolution (validated by the PROTO60 results),
simulations must be done using following parameters in all.par:

Use_nonuniformity:1
Use-Shaped_noise 0

The first flag needs to be set to 1 to take into account the observed non linearity of the light yield
in the barrel EMC crystals as a function of the interaction depth. The effect is an increase of the sigma of a Nivosibirsk fit from
1.6 (Use_nonuniformity:0 ) to 2.5 % (with Use_nonuniformity:1) for photons at 1 GeV with a flat distribution in theta from 30 to
130 deg.

With the second flag set to 0, a more precise description of the electronic noise is obtained, while faster but less accurate results are
obtained with the flag set to 1. The effect is an increase of the sigma of a Novosibirsk fit from
2.2 (Use-Shaped_noise 1) to 2.5 % (Use-Shaped_noise 0) for a photon at 1 GeV

Before end of november 2013, the standard parameters were "Use_nonuniformity 0" and "Use-Shaped_noise 1", leading to a too optimistic resolution, by about a factor 2. Now, the standard setting is "Use_nonuniformity 1" and "Use-Shaped_noise 0")

The raw energy includes both effects of the non-uniformity and of the electronic noise. The cluster calibrated energy is deduced using calibration
parameters adjusted as a function of theta and energy to reproduce the pi0 mass.
By default, the calibration parameter file is the one corresponding to Use_nonuniformity:1 and "Use-Shaped_noise 0".

The two attached figures are the results for photon with the new version of pandaroot.