Subject: Energy loss in MVD
Posted by StefanoSpataro on Fri, 12 Feb 2010 19:10:58 GMT
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Dear all,
Laura has fixed the calculation of the reconstructed dE/dx in PndPidCorrelator class. You can try to run macro/pid macros and to plot the dE/dx from PidCandidate.

If I shoot the detector with 1GeV/c muons, I have the following dE/dx distribution:

(unity: GeV/cm).
Just fitting the distribution with a landau (as it should be), we obtain the following values:

MPV: 2.83 MeV/cm
sig: 0.23 MeV/cm

If we consider the silicon density rho = 2.33 g/cm^3
-> dE/dx ~ 1.21 [MeV cm^2 / g]

I would like to ask to MVD experts how much is the "theoretical value", I would suppose you have already some tables with the correct values.
We have also compared the reconstructed dE/dx with the MonteCarlo value, and the results seem in agreement, but I would like to know what is coming from "physics" before believing blindly in simulation.

Thanks in advance.

File Attachments
1) mvd_dedx.gif, downloaded 705 times

Subject: Re: Energy loss in MVD
Posted by Ralf Kliemt on Thu, 18 Feb 2010 14:19:52 GMT
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Hi Laura, hi Stefano.

I found in the PDG book 2008 (p. 300f) on silicon semiconductor detectos a typical example:
At room temperature you produce a electron per 3.67eV energyloss. For a minimum-ionizing particle in 300um silicon this is about 22000 electrons as most probable value.
With your MPV I get 23100 electrons in such 300um Si. This is compatible.

In the same book on p. 270 there is a plot for dE/dx for muons in silicon. I use the dashed line for the Landau/Vavilov/Bichsel description at the thickness of 320um and find it close to 1.2 MeVcm^2/g for 1GeV muons. This is compatible, too.

Kind regards, Ralf.