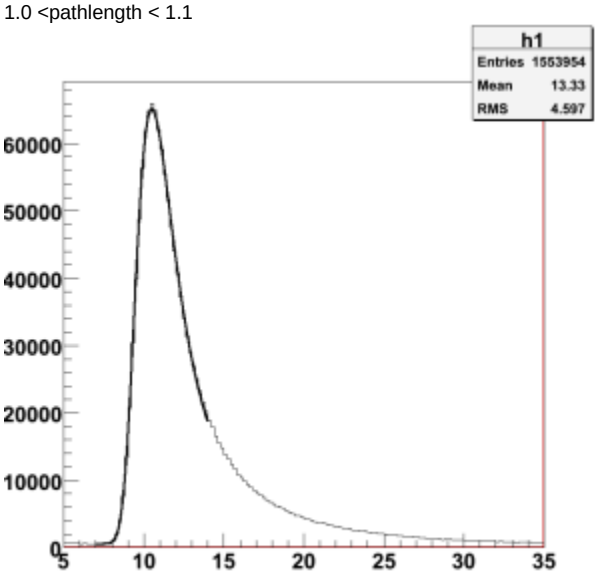
proton peak position shift with pathlength

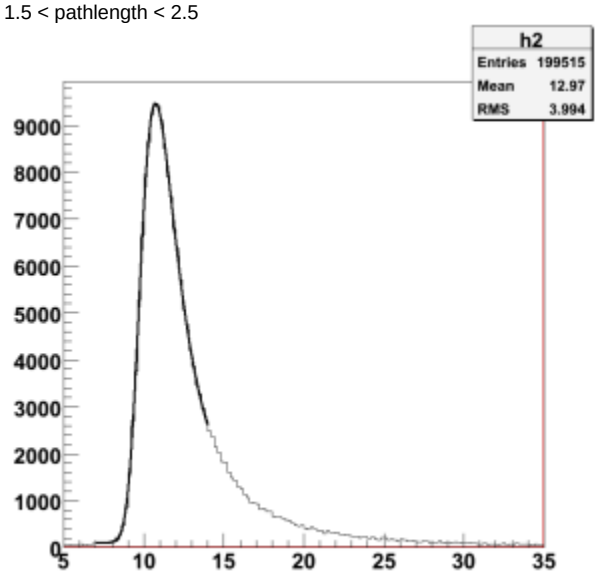
One of the possibilities to verify the absence of nonlinearity in cal calibration is comparison of MIP peak positioins at different incident angles and thus with different pathlength.

The histograms made for on-orbit proton data show the change of peak position as well as peak shape.

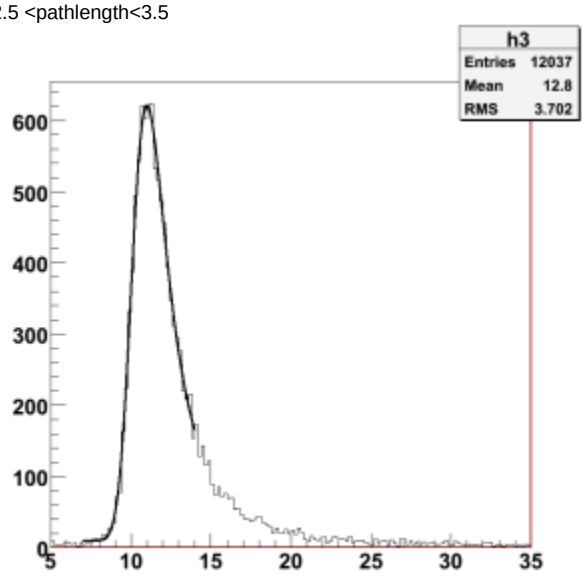
1.0 <pathlength < 1.1



1.5 < pathlength < 2.5

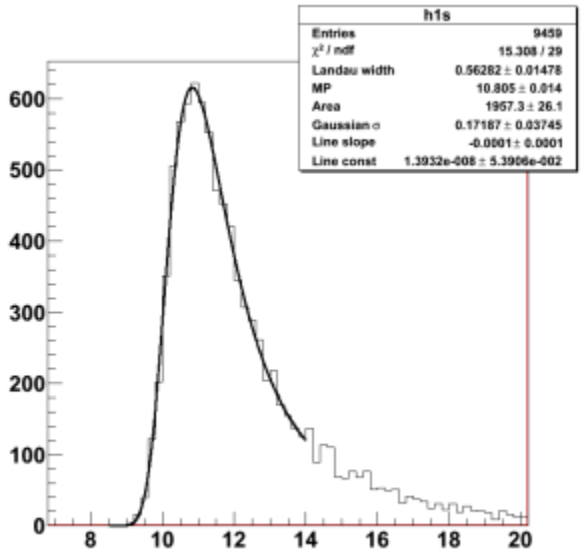


2.5 <pathlength<3.5

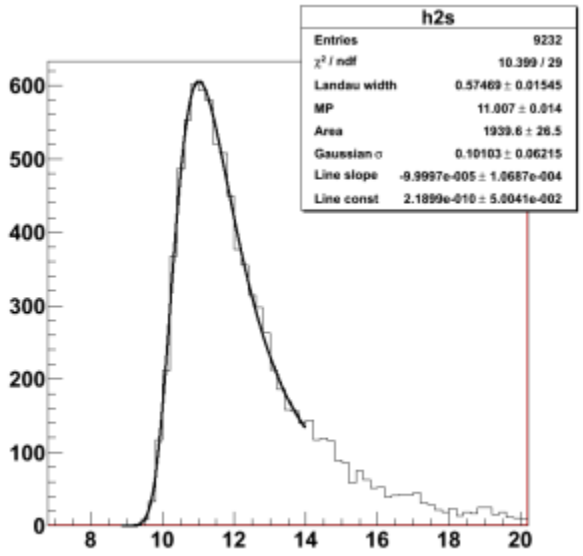


SImilar peaks behaviour was obtained for simulated protons (Johan):

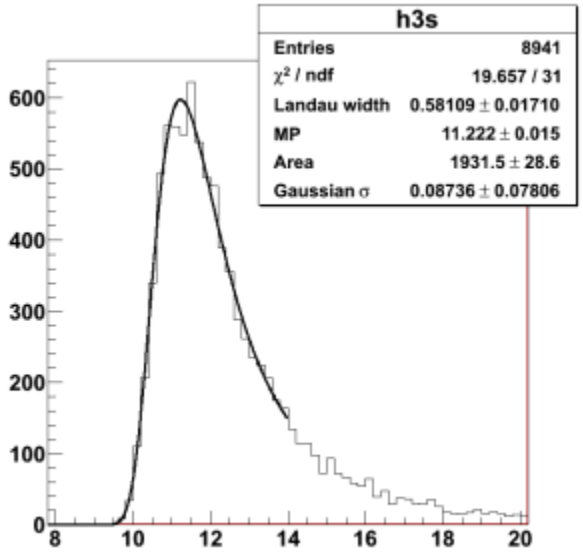
theta=0



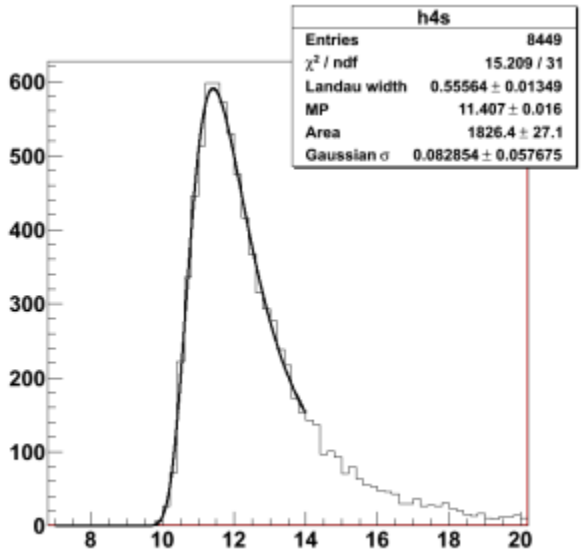
theta=45 deg



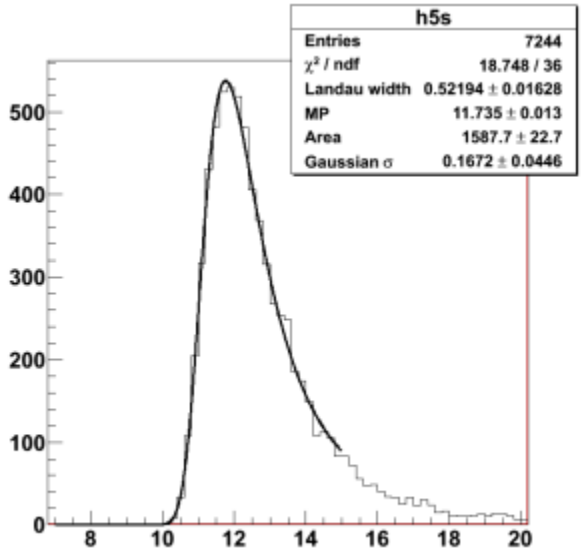
theta=60 deg



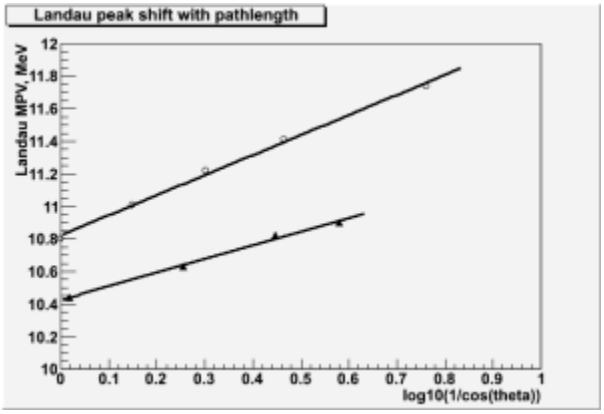
theta=70 deg



theta=80 deg



The next plot shows the variation of fit position of landau MPV value versus log10(pathlength) for data and simulation:



The difference in the absolute value could be understood because simulation was done for one fixed energy (10 GeV), while data contain real spectrum. But the difference in the slope is not clear. May be it is related to the fact that proton peak for data has bigger width.