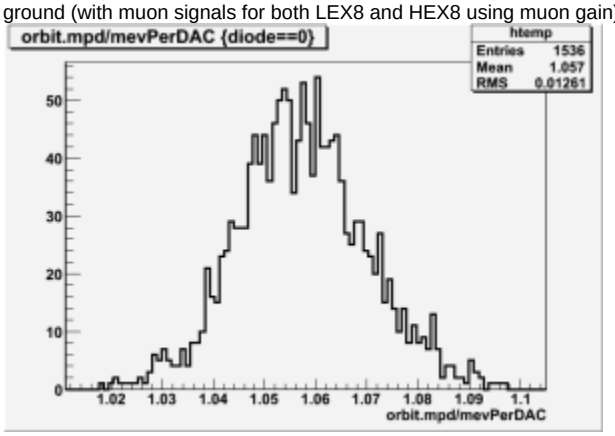
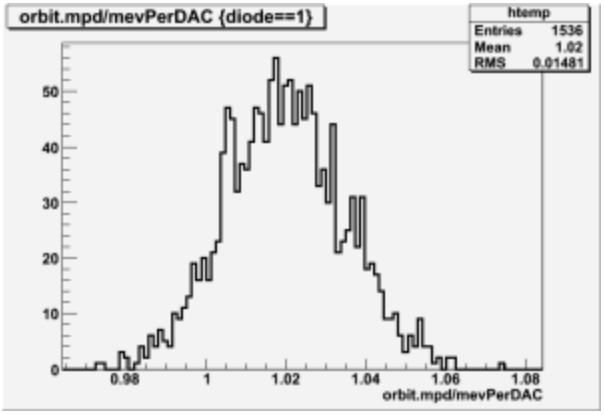
"Protons plus interrange" CAL energy scale calibration on orbit

The calibration of HEX8/LEX1 ratio has been done with nomSciOps runs (first light data collection), in addition to previously performed calibration of LEX8 range with proton signal. This allowed to generate MeVperDAC coefficients for all channels. The comparison of this coefficients with ones obtained on the ground (with muon signals for both LEX8 and HEX8 using muon gain) are show on the next two plots.



MeV per DAC defined from proton signal for big diodes is 6% bigger than one from muons on the ground. This is another presentation of the fact that MPV of proton signal is smaller than MPV of ground muon signal. I supposed here that both of them are 11.2 MeV, but real value for protons on orbit should be determined from simulation, by processing the simulated data by the same software (genMuonCalibTkr + fitMuonCalibTkr) - this will be done with next couple days.



Mev per DAC from small diodes is only 2% bigger than in ground calibration, this means that HEX8 /LEX1 ratio defined from muons @ muon gain and defined from 0.2-0.8 GeV energy deposition on orbit are different only by 4% - this reflects the precision of our understanding of the nonlinearity in HEX8 channel at muon gain and extremely low signal ~60 adc units corresponding to 6 DAC units. The ground HE diode calibration is just biased with respect to on-orbit one, without having additional spread, so our error in the HEX8 nonlinearity measurement is systematic and doesn't change from crystal to crtystal.

Next step is to redo the proton calibration using the new calibOps runs, which allow us to have 3-4 times more statistics (if adding up all calibOps runs, old and new). We have now in average ~500 good protons per crystal, so we expect to have ~2000. This processing will be done today or tomorrow.