HF PMT's @ CRAFT and at 4 Tesla

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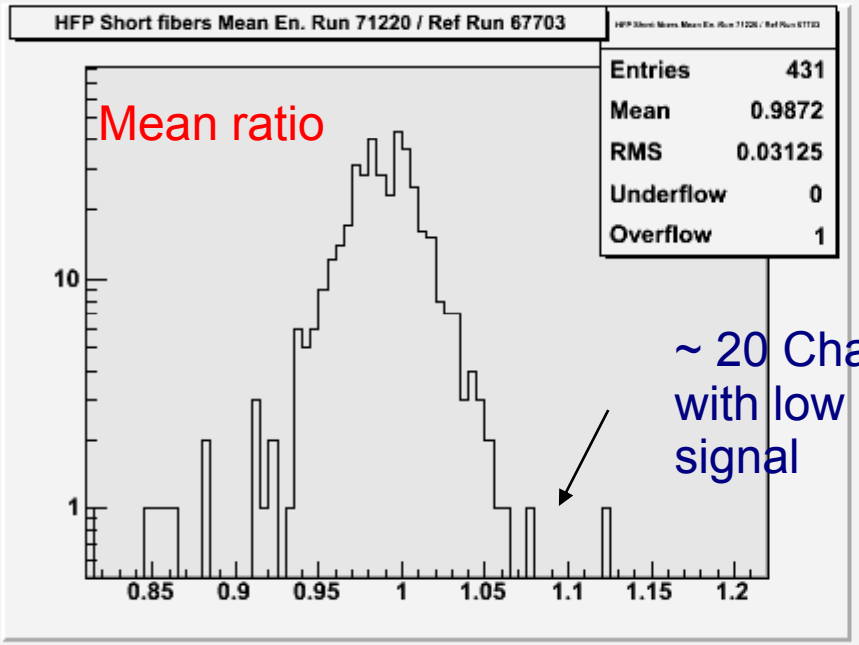
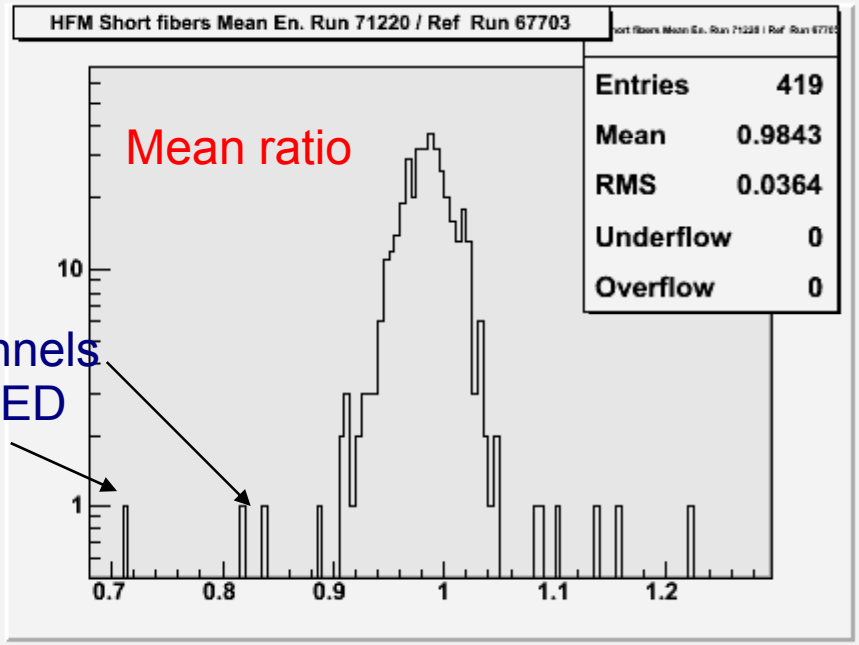
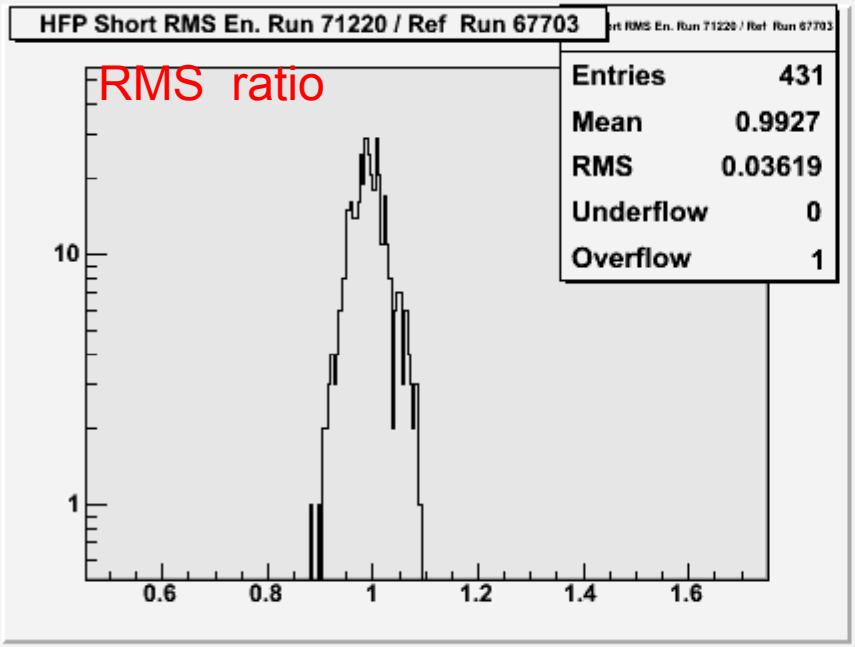
HCAL DPG Meeting 17 Nov. 2008

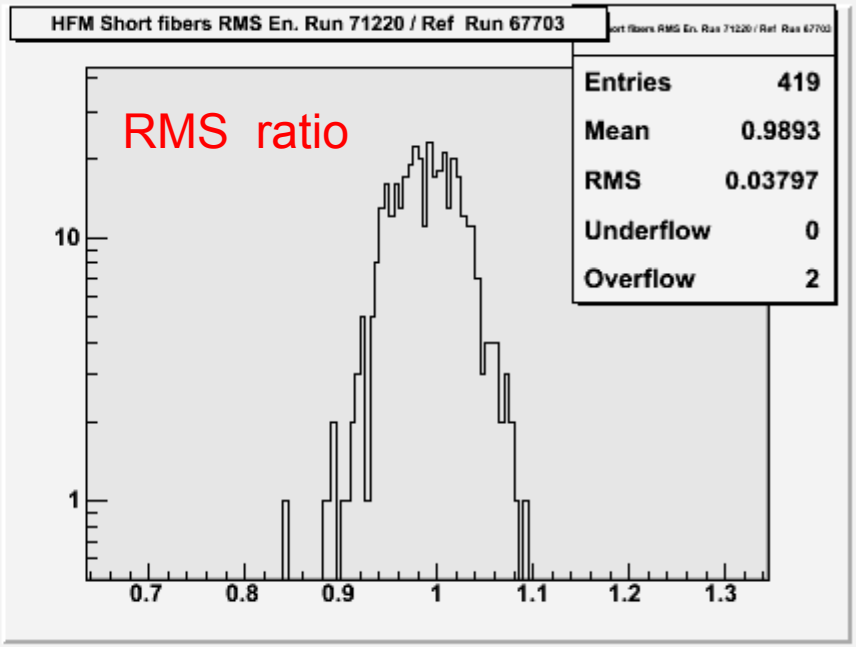
LED signals from Short fibers
run 71220 (4 Tesla) / 67703 (0 Tesla)



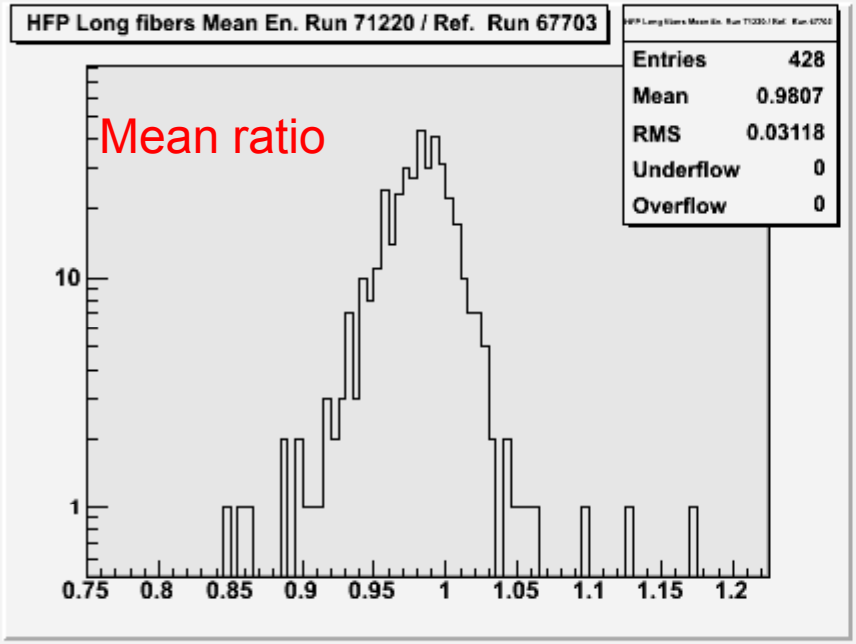


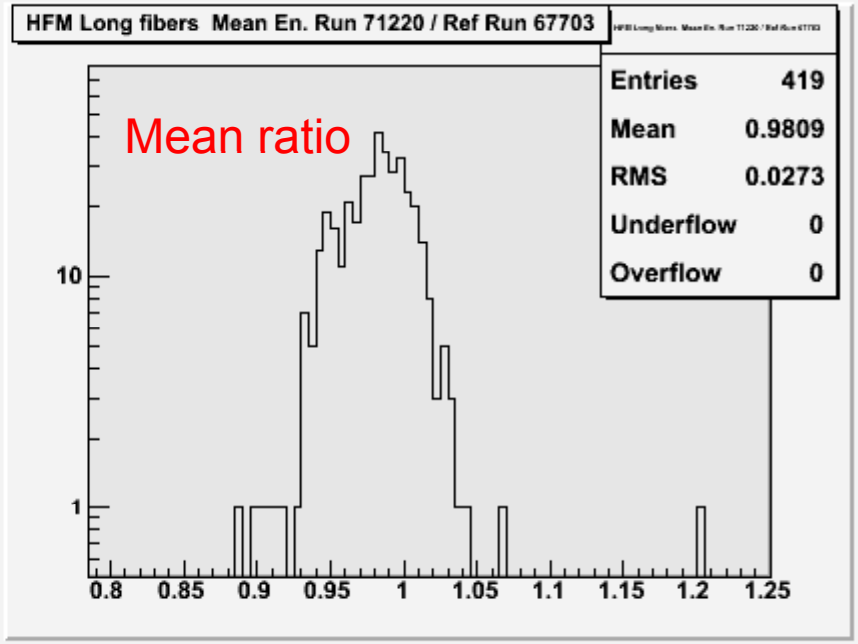
~ 20 Channels with low LED signal

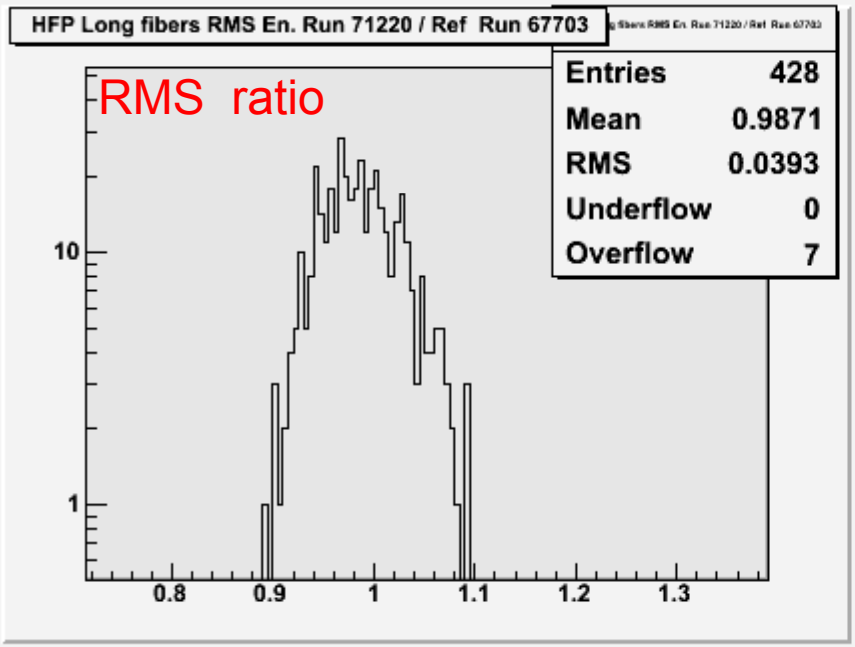


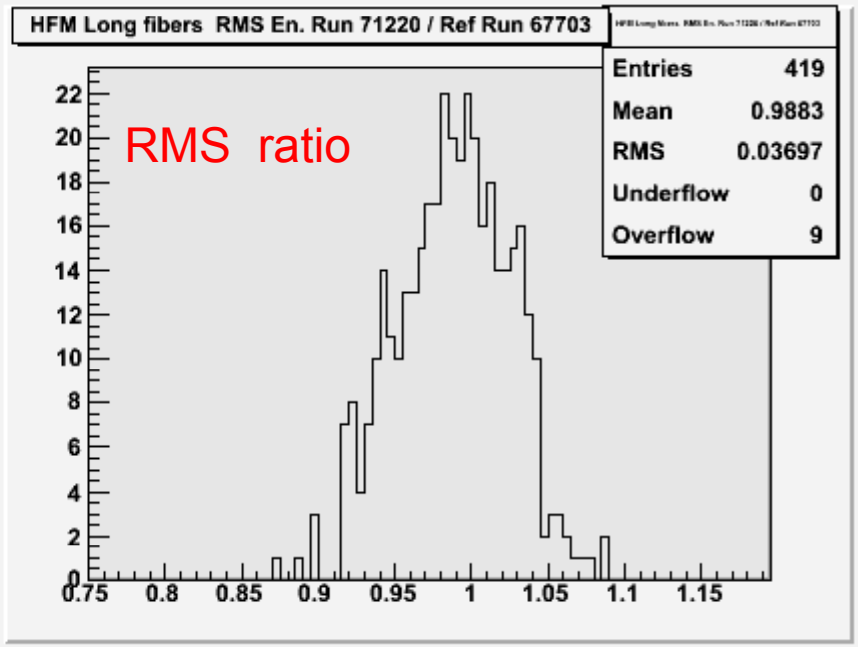


LED signals from Long fibers
ratio of the channels: run 71220 (4 T esla) / 67703 (0 Tesla)



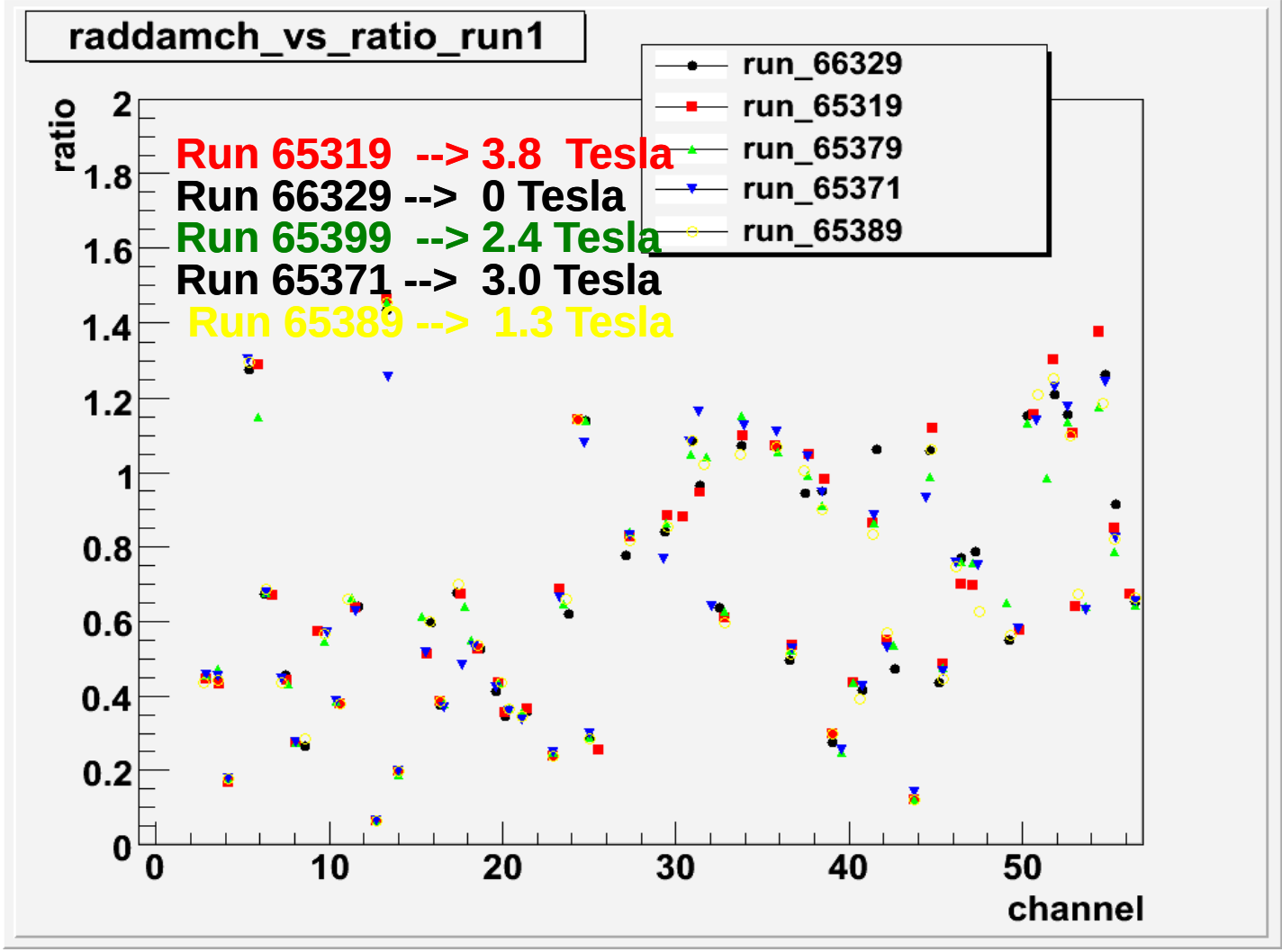


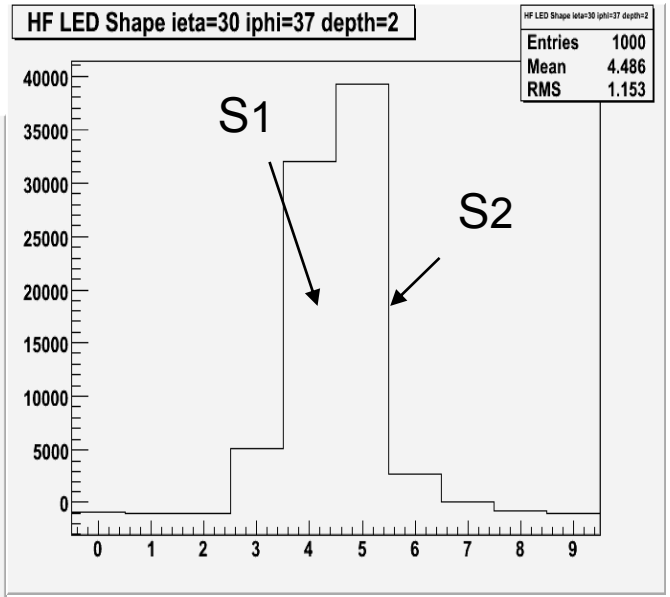


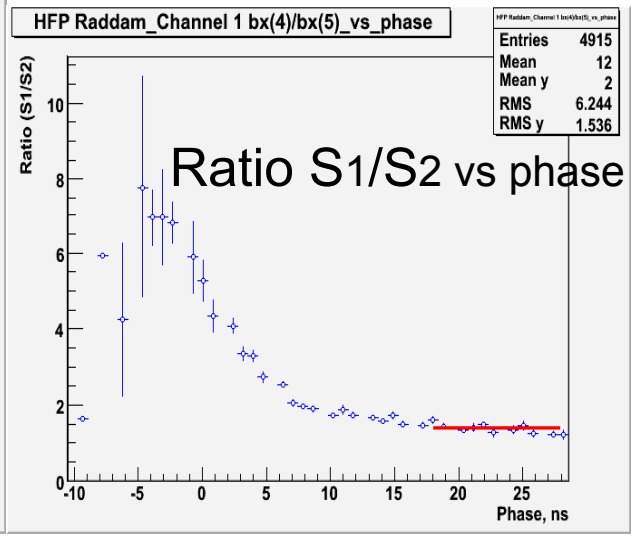


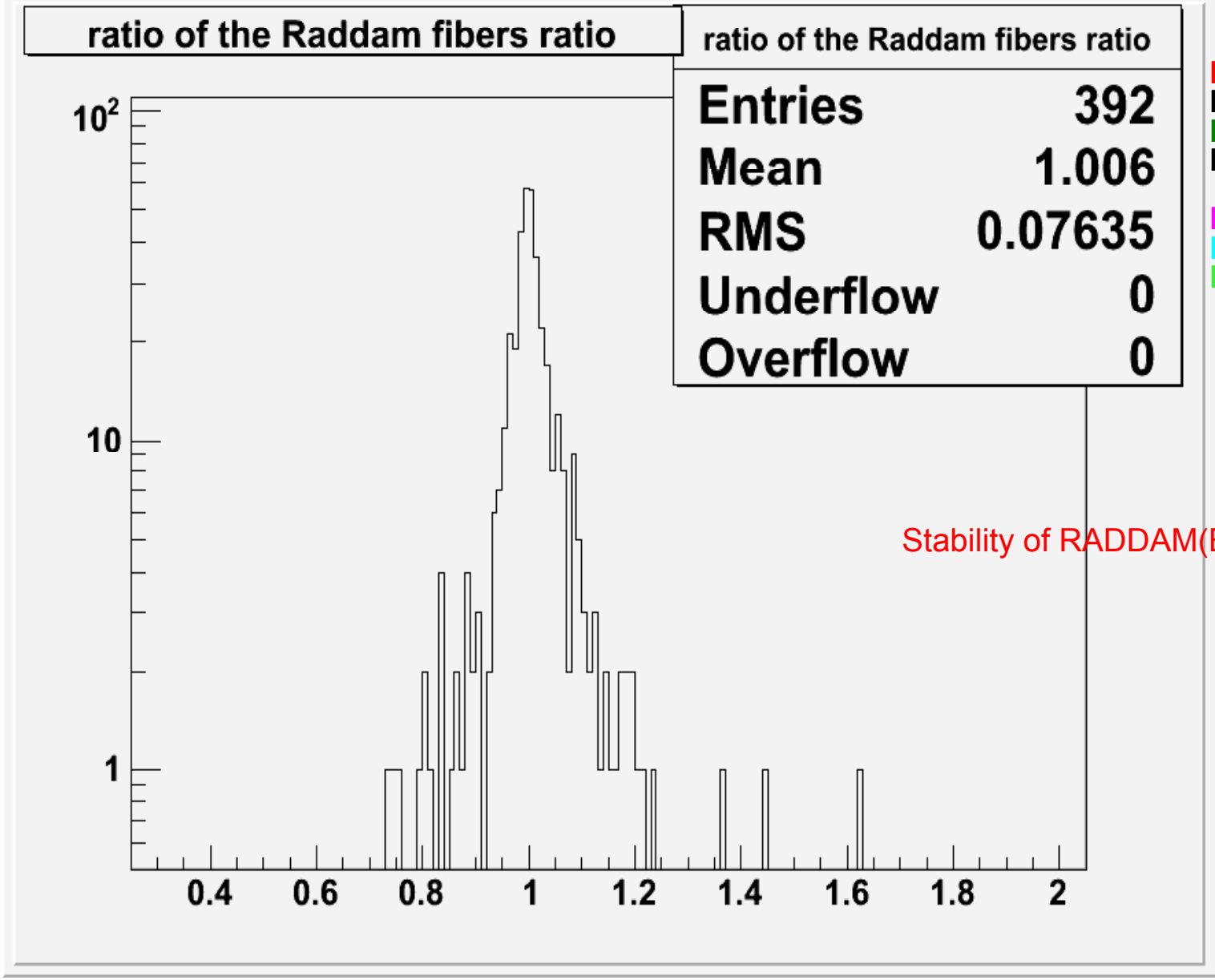
HF Raddam Channels at 3.8 Tesla

Ratio S1/S2 (vs phase) per Raddam Channel





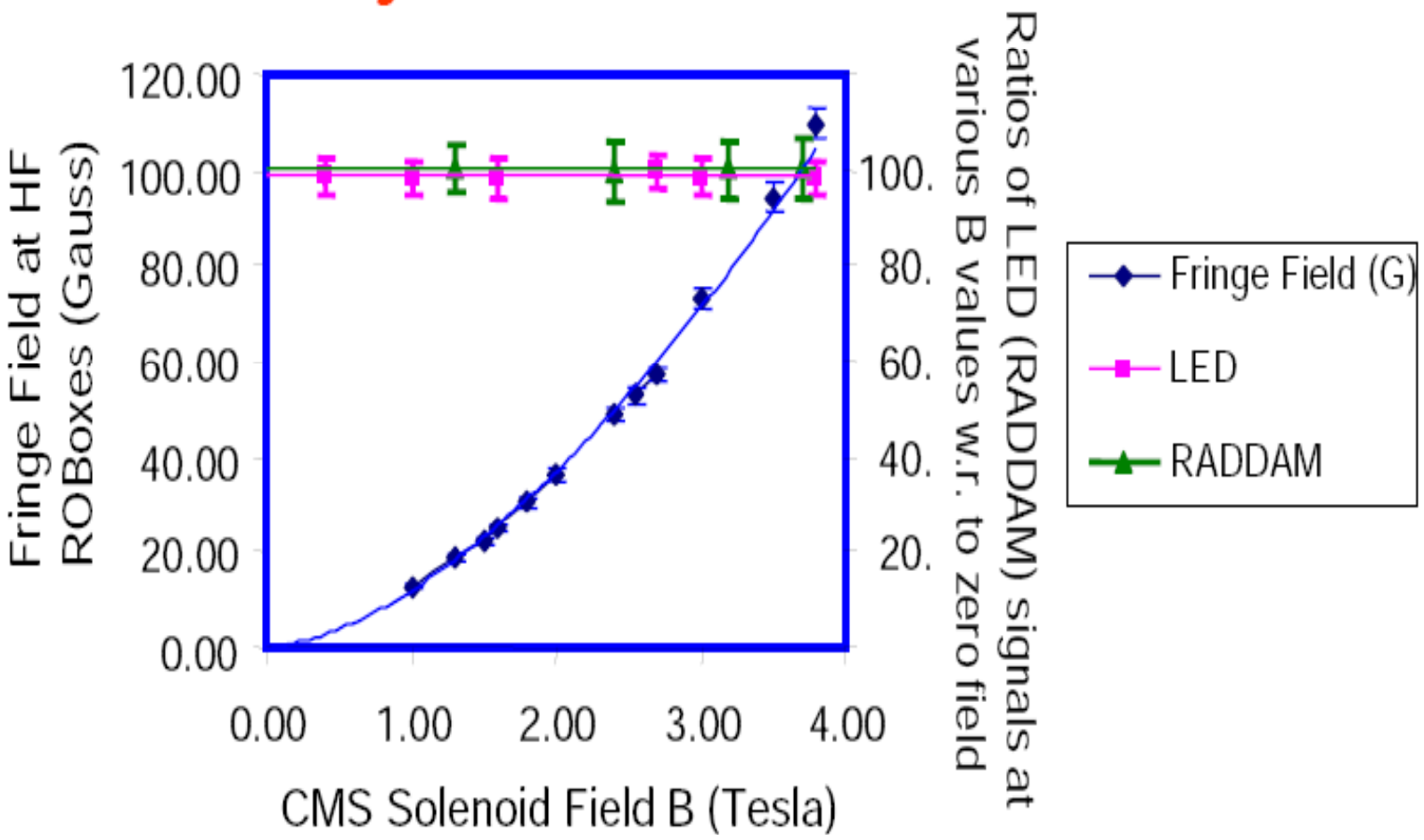




Run 65319 --> 3.8 Tesla
Run 663299 --> 0 Tesla
Run 65379 --> 2.4 Tesla
Run 65371 --> 3.0 Tesla
Run 65389 --> 1.3 Tesla
Run 66905 --> 3.8 Tesla
Run 6607 --> 3.2 T
Run 66926 --> 0 Tesla

Stability of RADDAM(B)/RADDAM(0) (≈ 1)

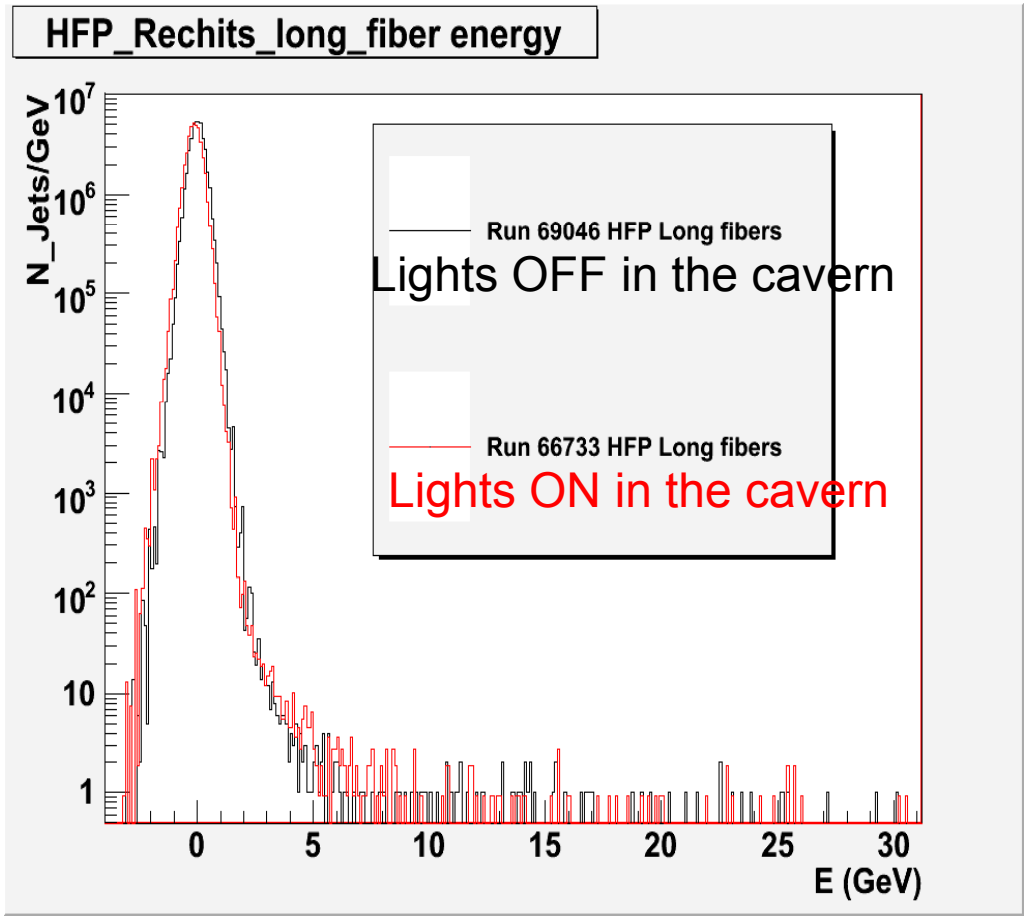
Summary Plot of HF *vs* B

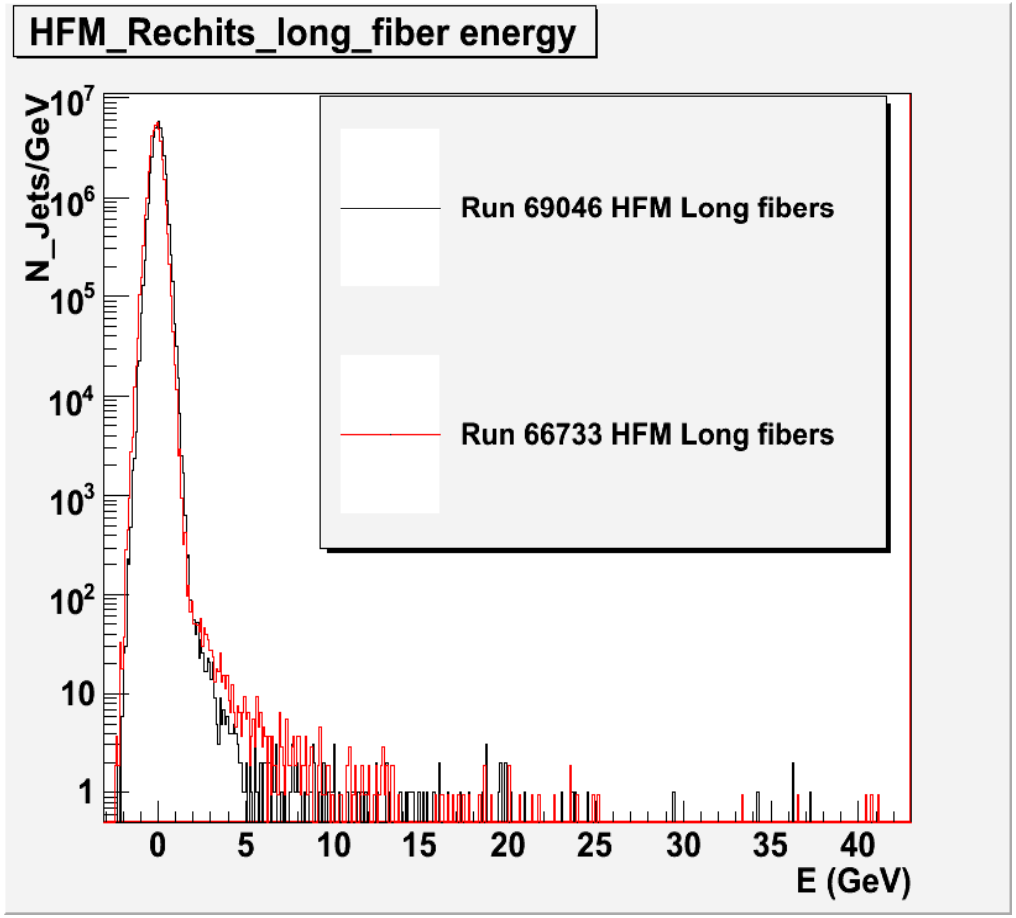


Conclusions:

- Fringe field at HF ROBoxes in excess to 100 Gauss
- Stability of LED(B)/LED(0) (≈ 1) → PMT shielding GOOD
- Stability of RADDAM(B)/RADDAM(0) (≈ 1) → RADDAM Fibers not damaged through B field ramp-up/down (despite alarming noises) [hopefully all other HF Fibers OK also; need source data to confirm!]

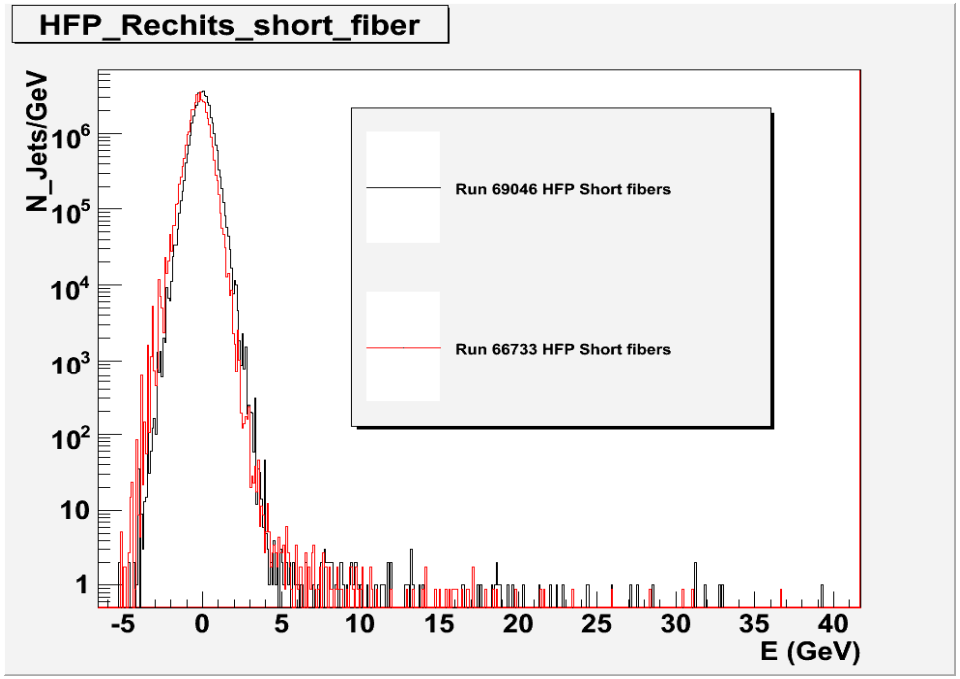
Performance of HF at CRAFT

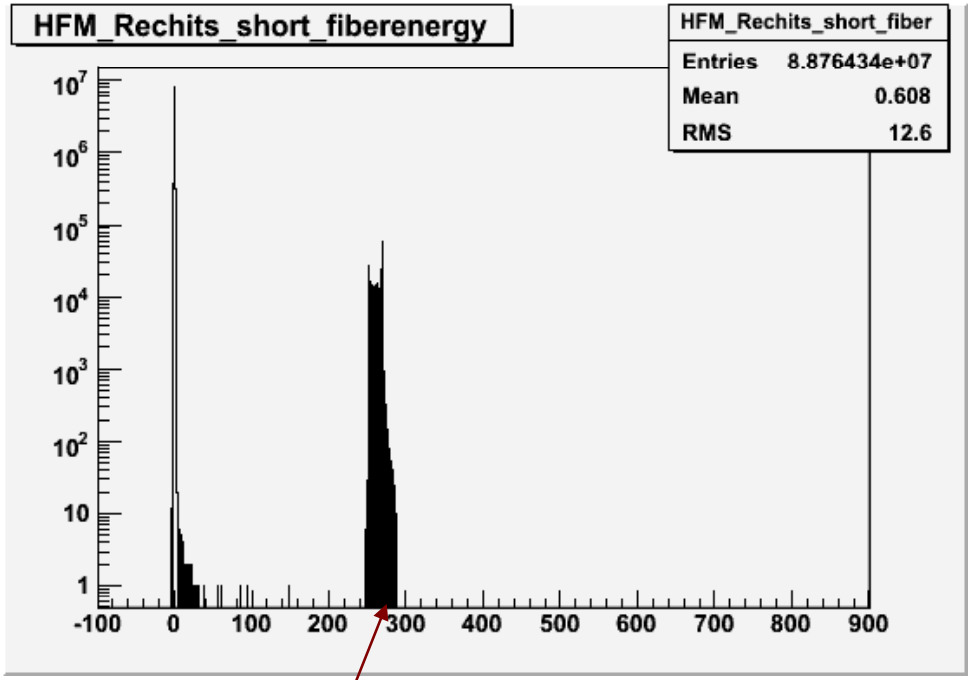


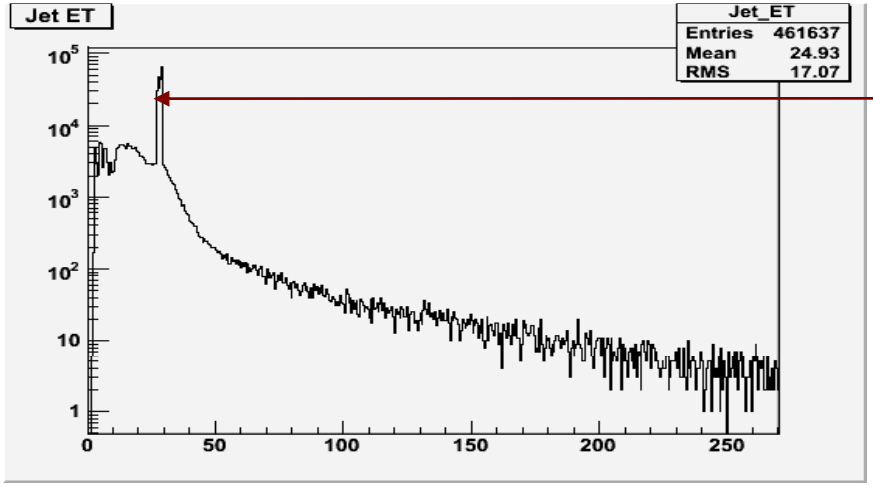


Not a clear indication of a possible Light leak; investigations continues continue

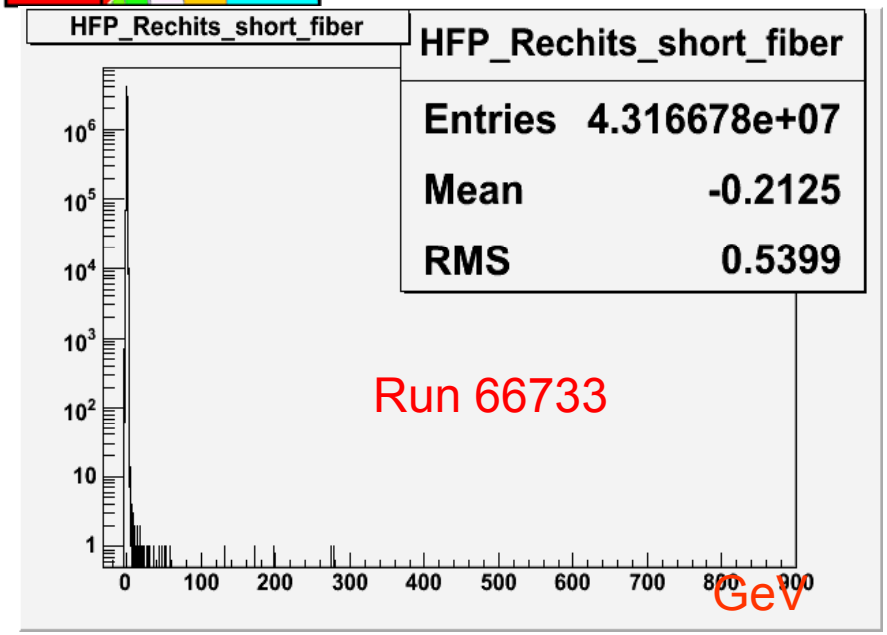
Hot channel is fixed (after CRAFT)



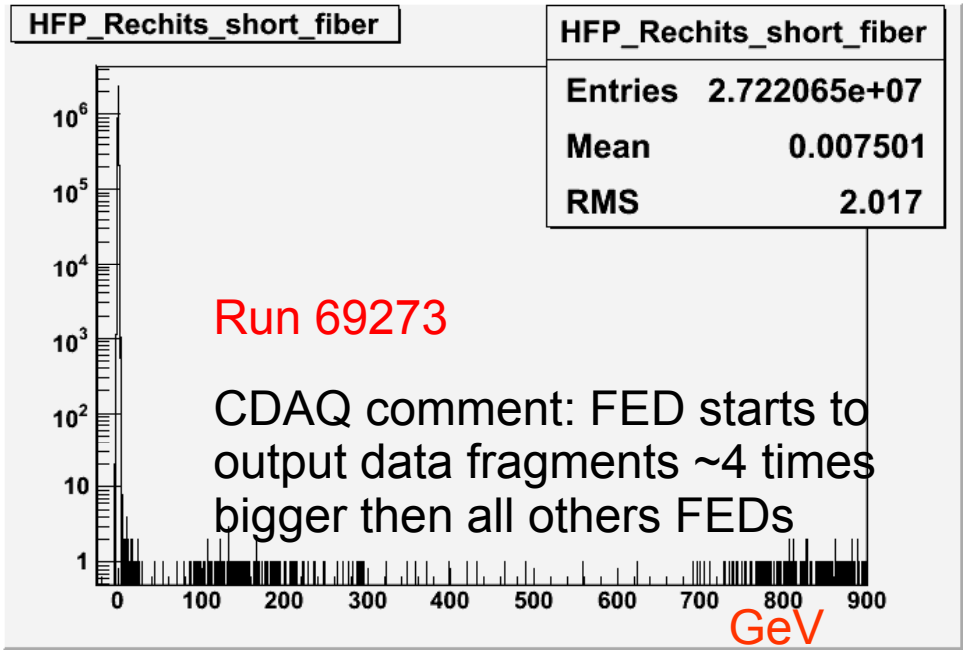




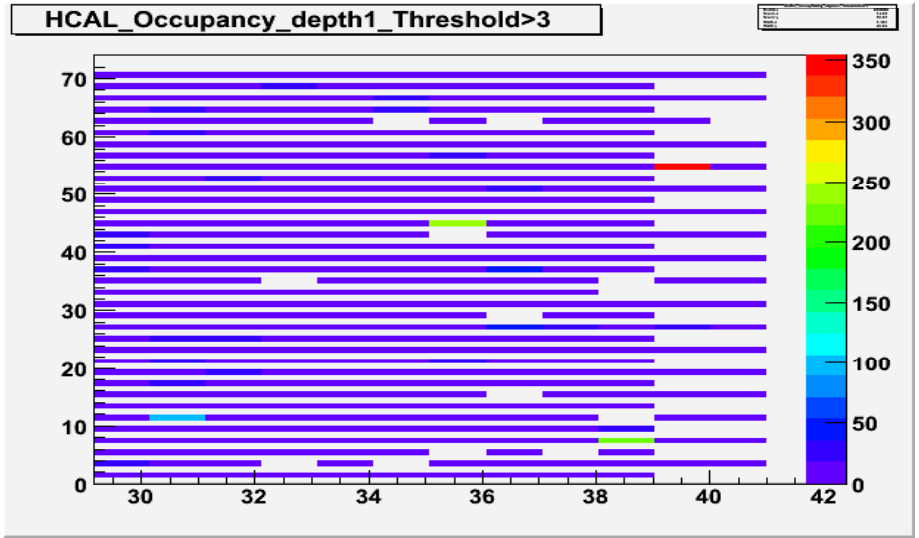
(ieta=-32, iPhi=45, depth=2). A pin inside the black signal cable between RBX's and QIE's were damaged (at the RBX's side).

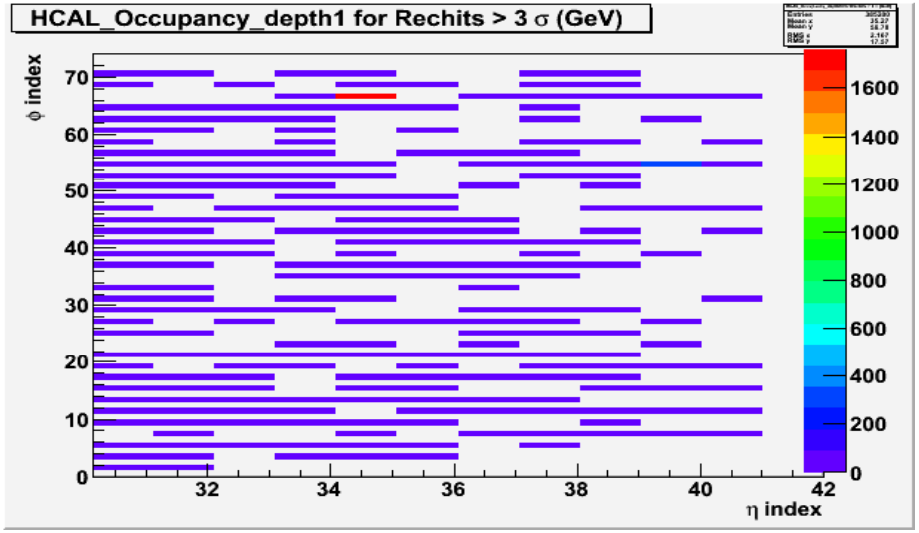


A typical HF Rechit distribution



Not muons...or light leaks..

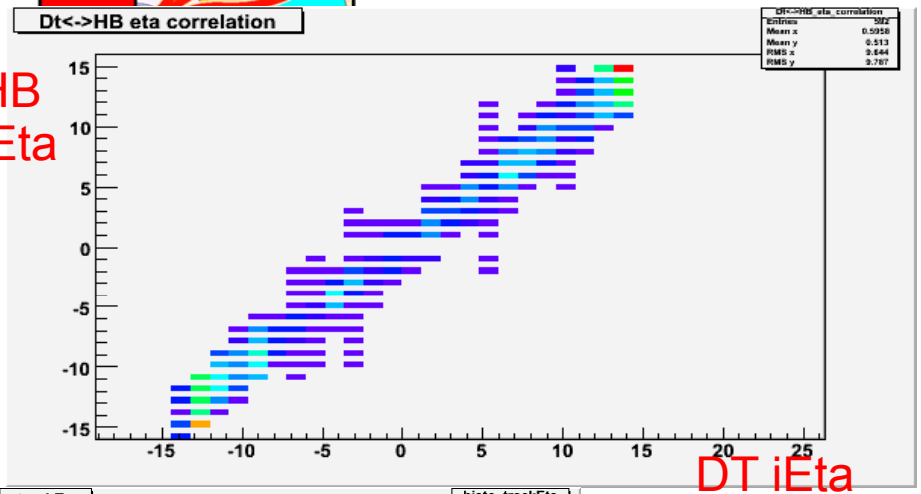




Search for a correlation between muons and HF Rechits

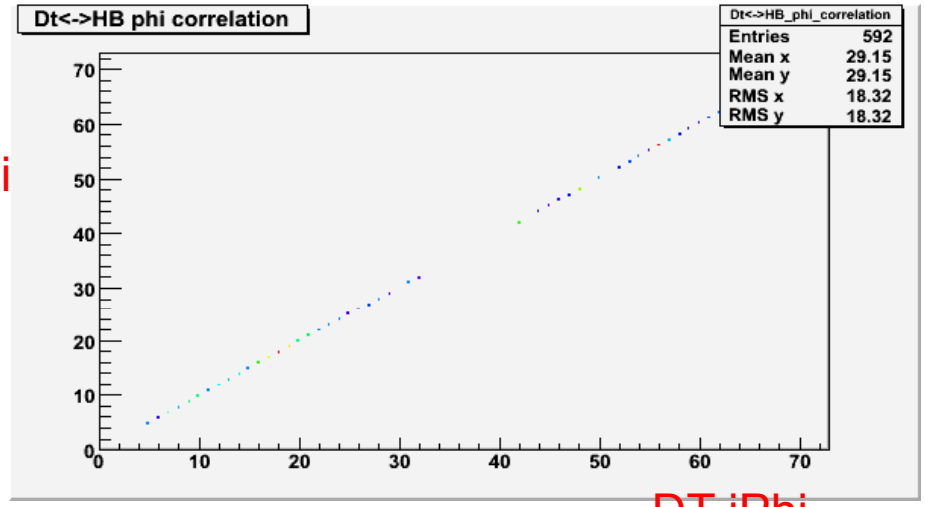
We have good correlation between DT and HB (or HO) but not so easy for HF

HB iEta

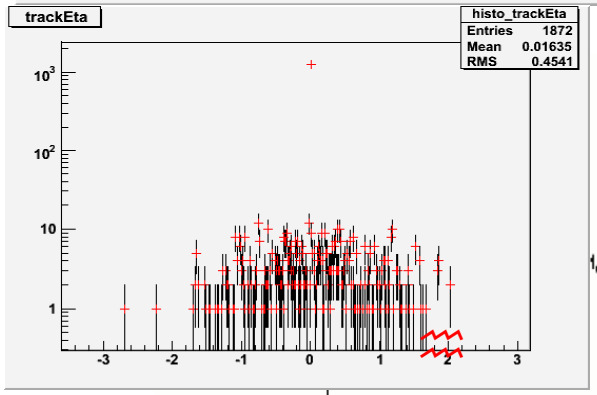


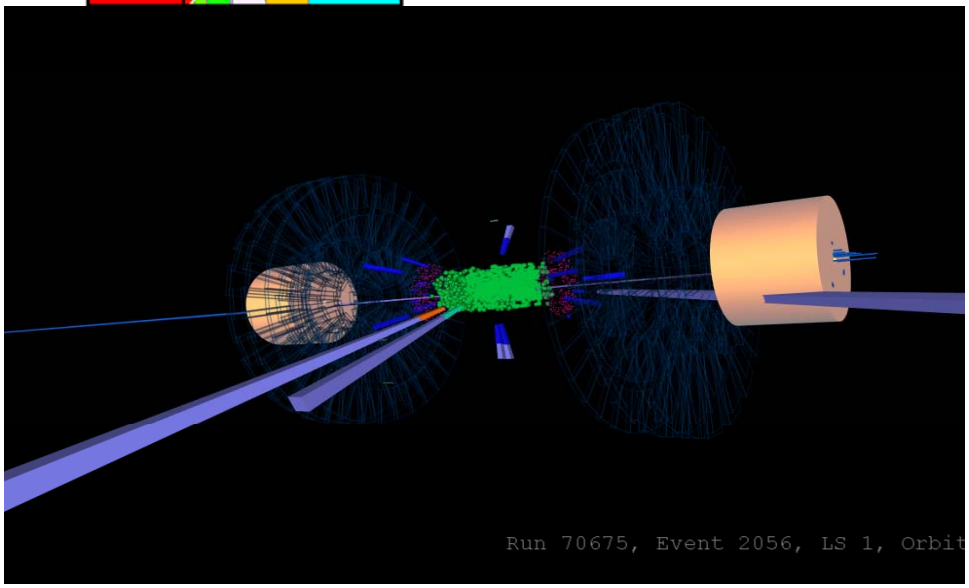
DT iEta

HB iPhi

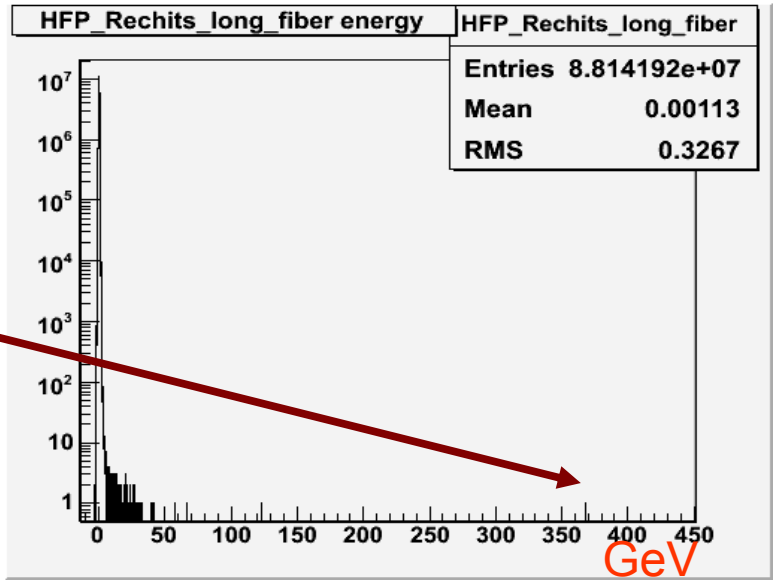


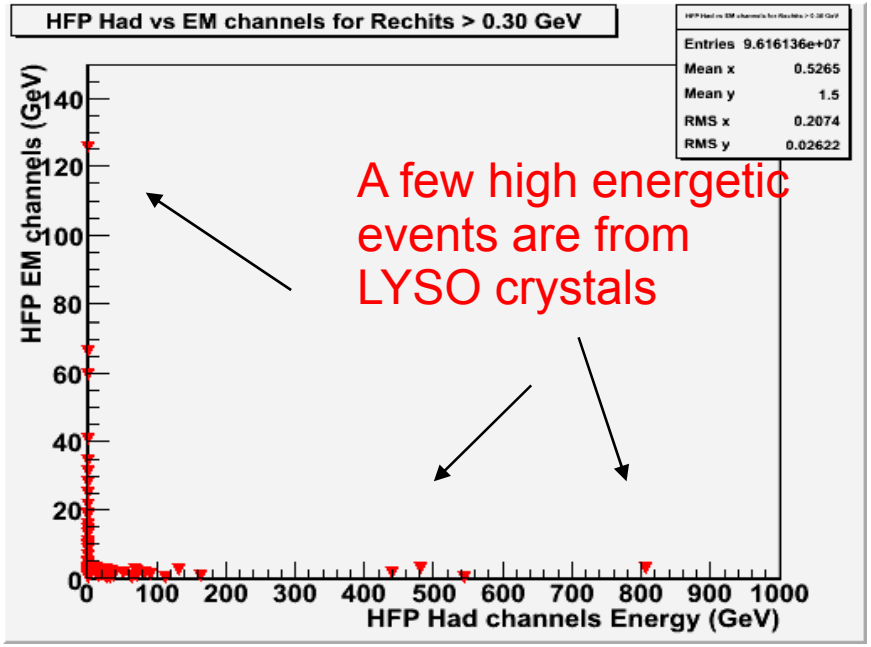
DT iPhi

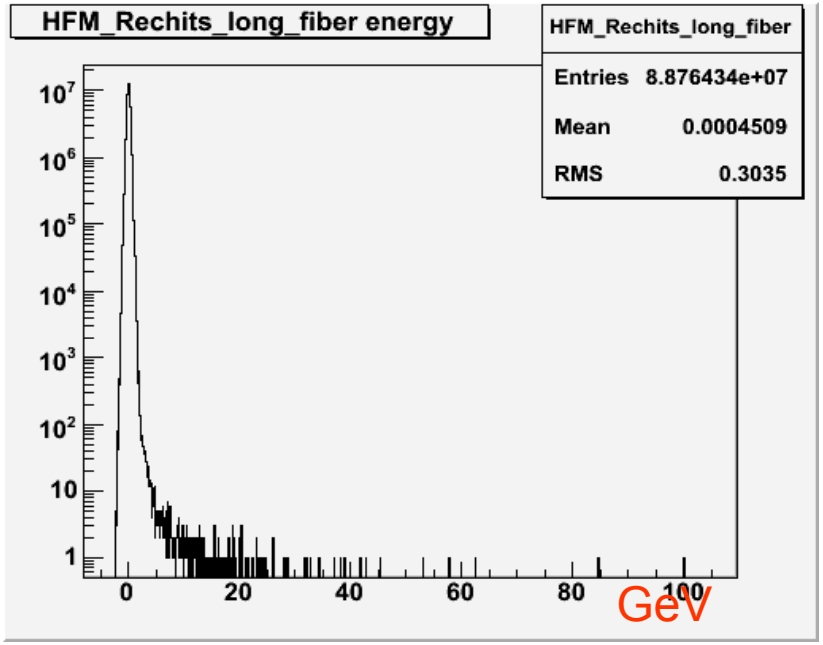



Run 70675, Event 2056, LS 1, Orbit

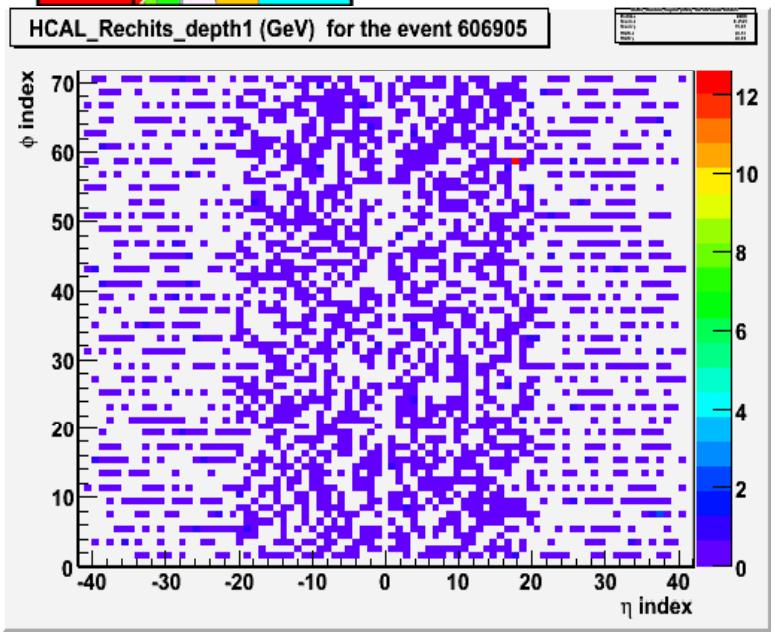
μ

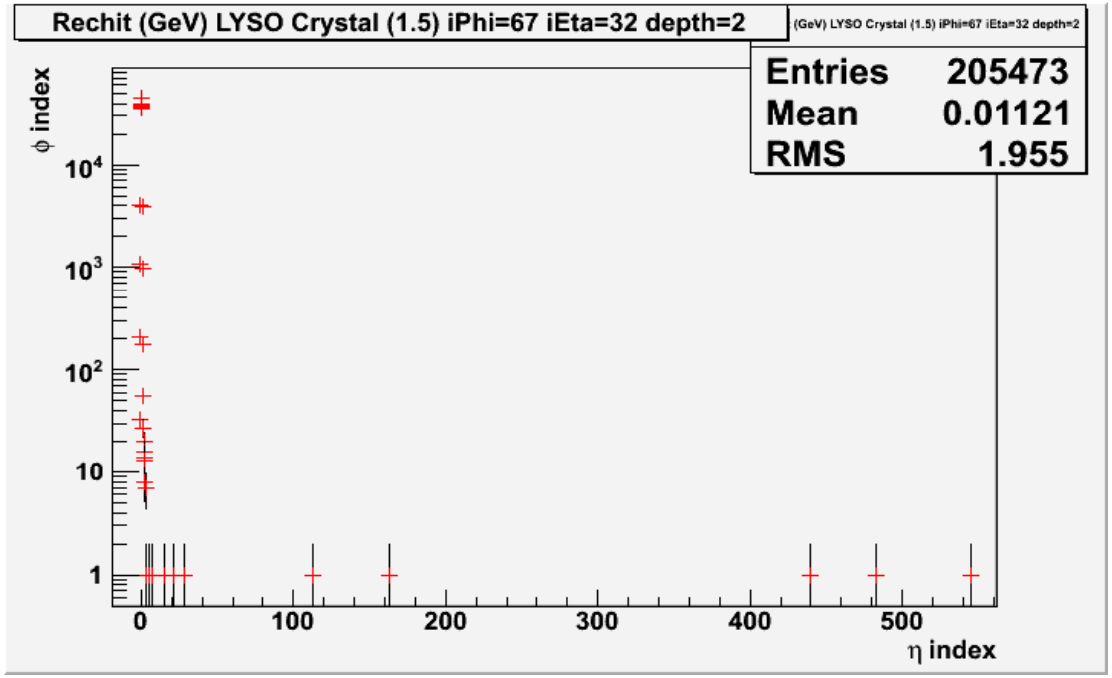

HFP_Rechits_long_fiber energy
HFP_Rechits_long_fiber
Entries 8.814192e+07
Mean 0.00113
RMS 0.3267
GeV

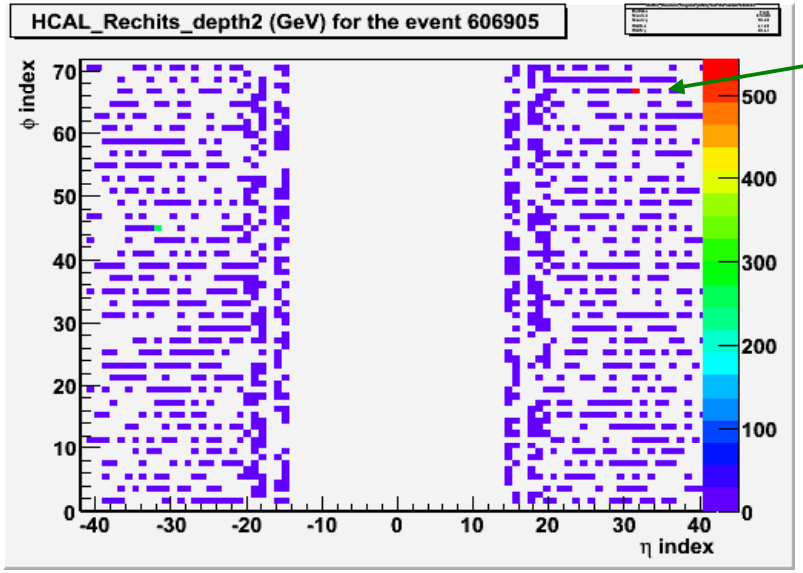

HFP Had vs EM channels for Rechits > 0.30 GeV
Entries 9.616136e+07
Mean x 0.5265
Mean y 1.5
RMS x 0.2074
RMS y 0.02622
HFP EM channels (GeV)
HFP Had channels Energy (GeV)
A few high energetic events are from LYSO crystals


HFM_Rechits_long_fiber energy
HFM_Rechits_long_fiber
Entries 8.876434e+07
Mean 0.0004509
RMS 0.3035
GeV

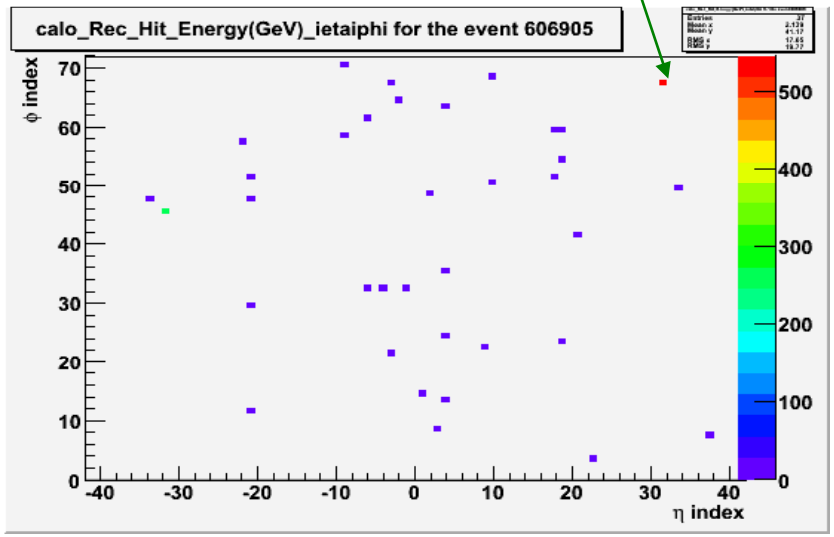
An example of the “Crystal event”



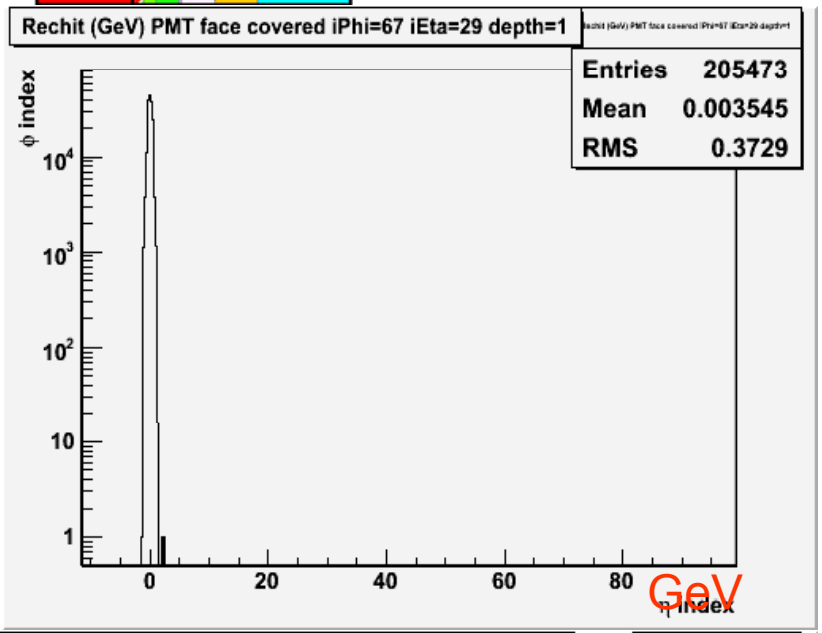


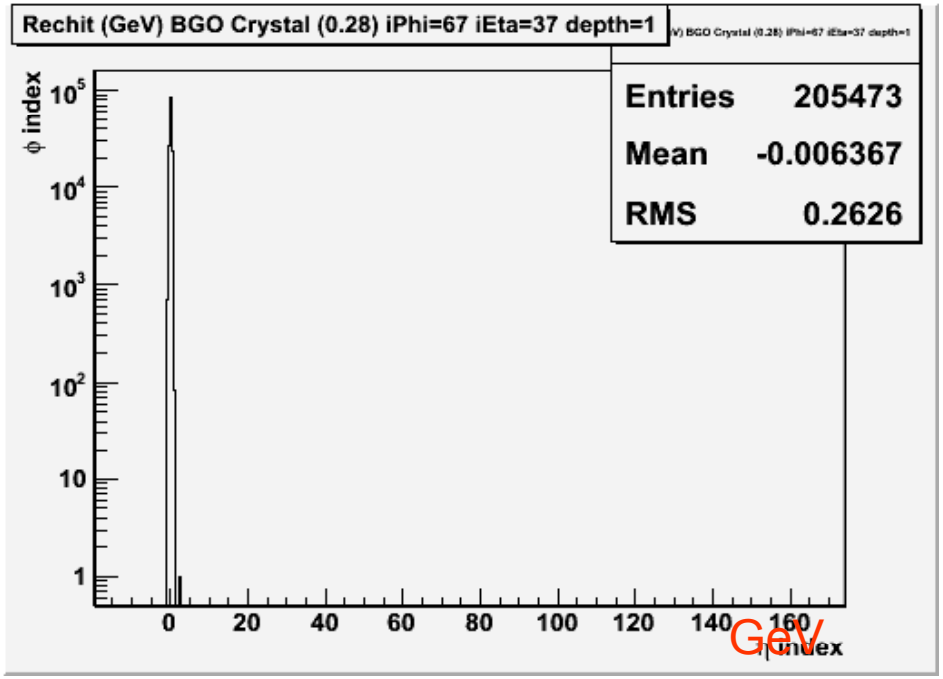


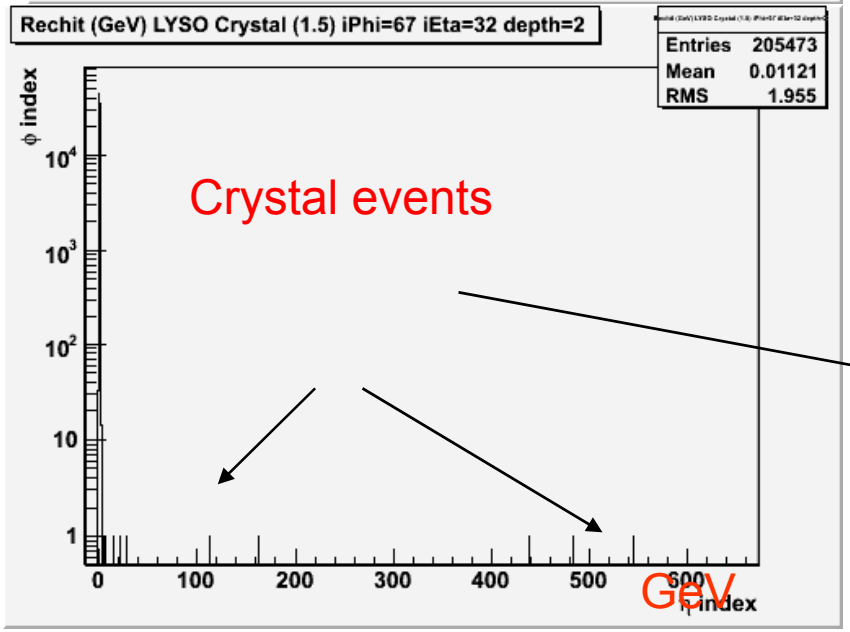
“Crystal events” are at the order of 10^-5;
mainly at LYSO crystals



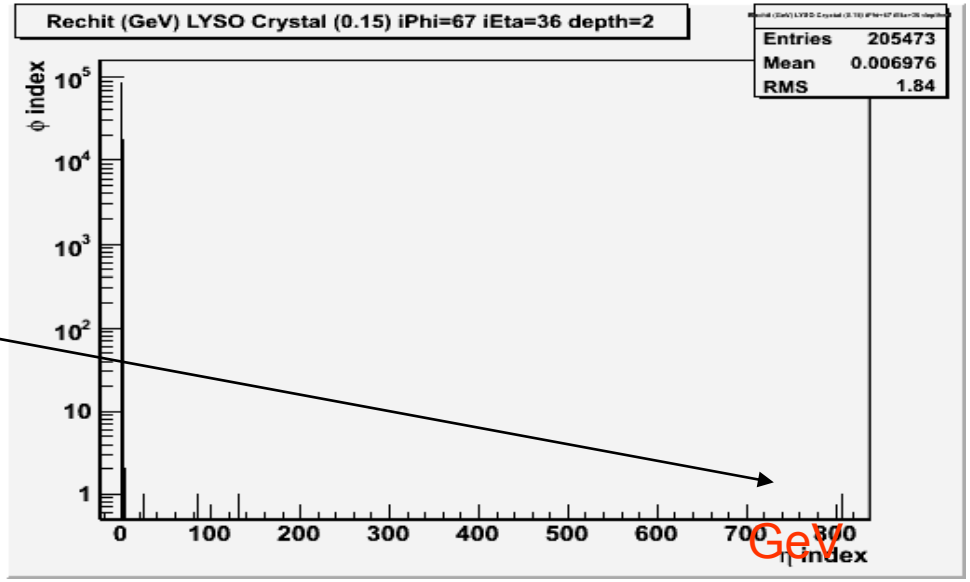
Typical signals from Crystal PMT's







Crystal events



Conclusions

- HF PMT's behave well under 3.8 Tesla

- Not a clear indication of light leaks in HF

- few Crystal events in HF (possibly due to muons hitting PMTS) ~ 10^-5

- investigations of Muons in HF continue