Saturation in V-calib LED scans

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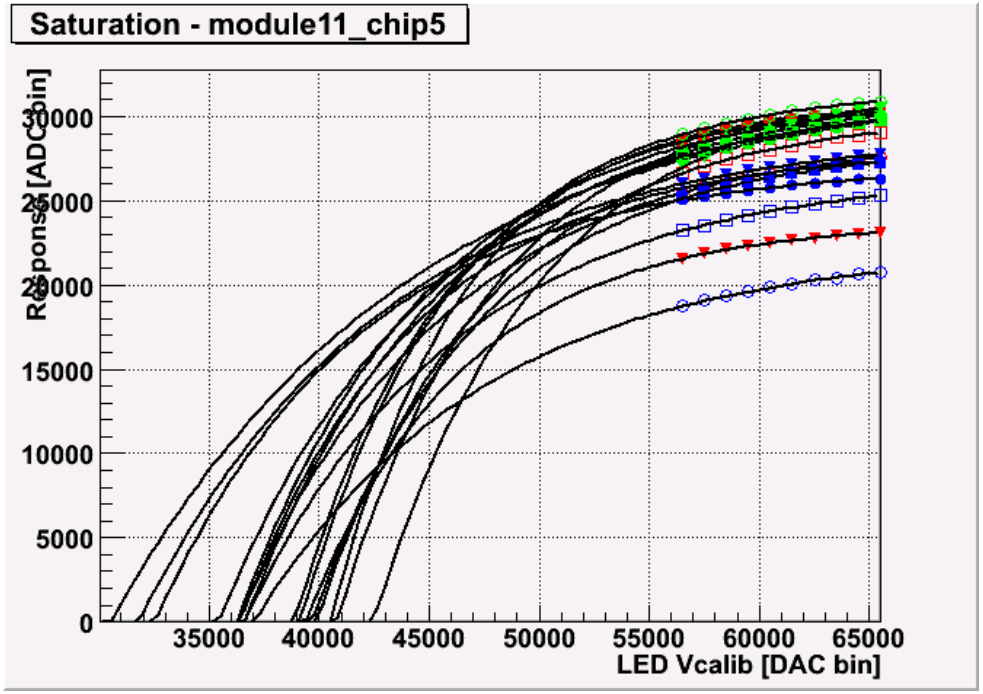
- analysis still in progress
- but gives global results
- FNAL & CERN Vcalib data
- Temperature corrected results

LED V_calib scan



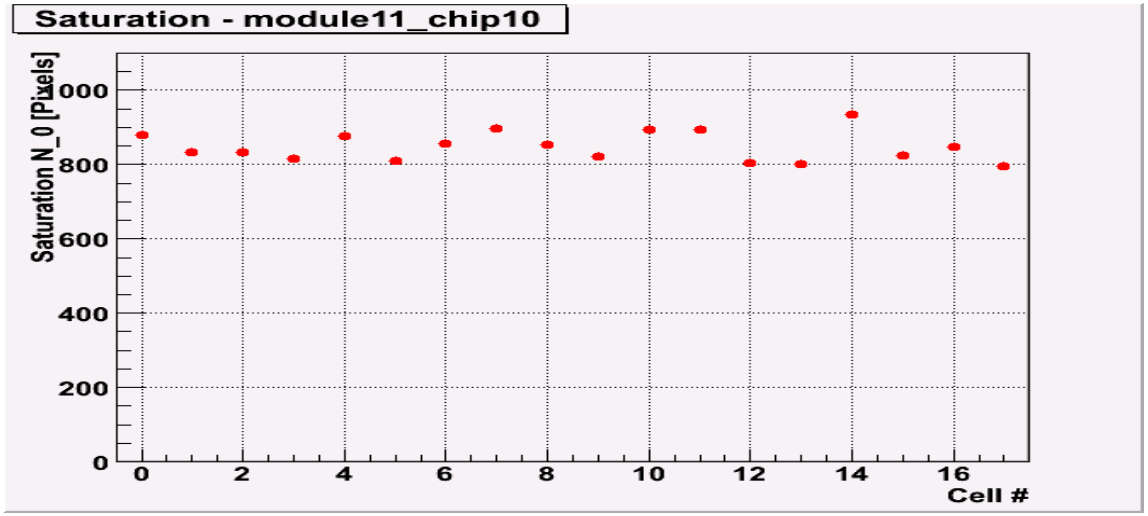
Runs:
AhcPmLedVcalibScan

FNAL 2008 & 2009
CERN 2007 periods

Fitted 10 last points

- Simple Exponential formula for saturation:
- F(ADCbins) = N_0 * [1- Exp(-(X+C)*B)] X in Vcalib bins
- Parameter N_0 -> 'Saturation'

Calibration in pixels



- Simple calibration formula: Sat(px) = Sat(ADC bins) * IC(run) / Gain(run)
- CorrGainT = GainConst[Module-1][Chip][Channel] + dG
- dG = GainSlope[Module-1][Chip][Channel] * dT
- dT = RunTemp[Module-1] - TempGain [Module-1][Chip][Channel]

- Calibration constants (GainConst+GainSlope) and Temperaturs taken form DB with tool “dumpCalib”

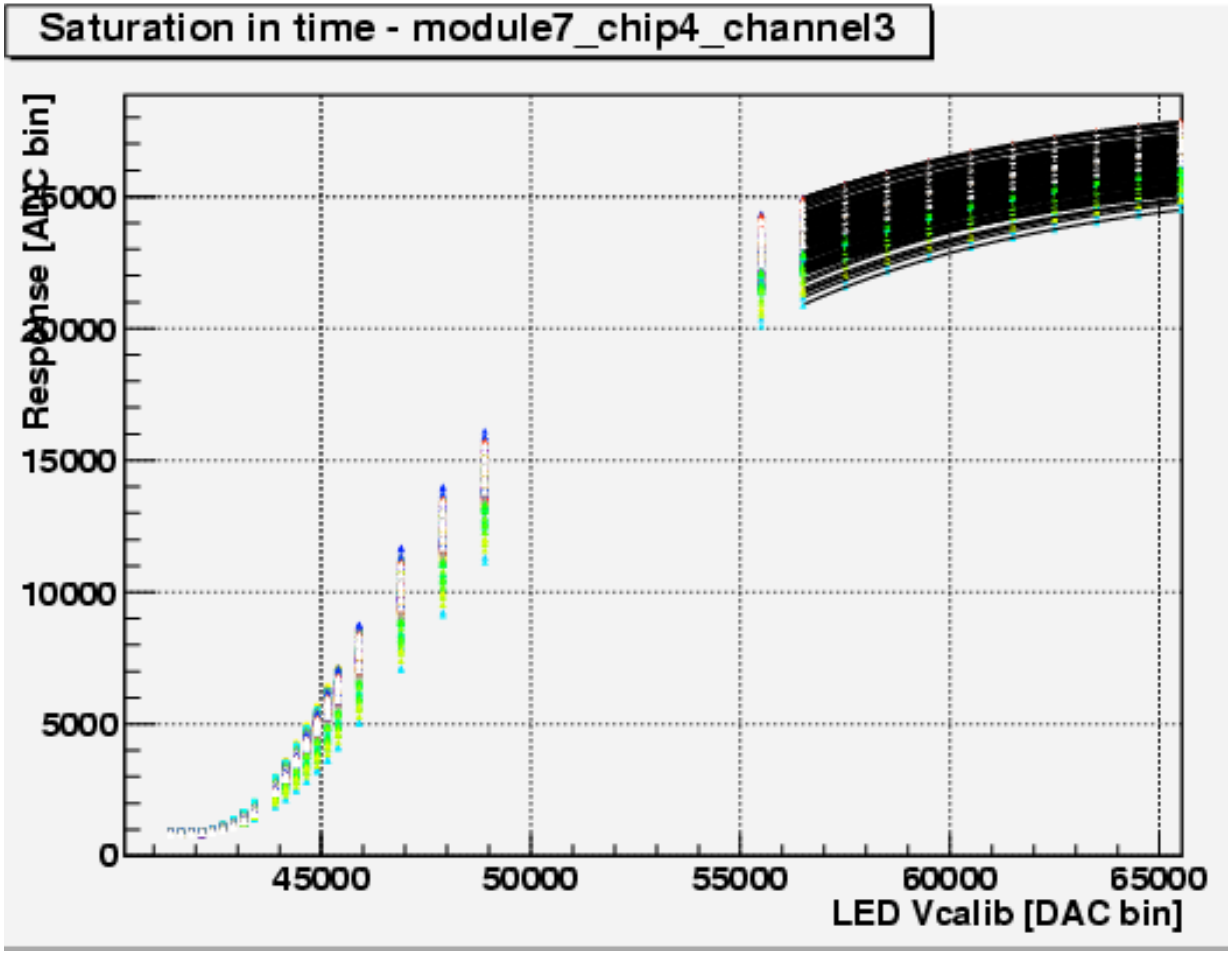
Procedure

- Good runs: FNAL 144, CERN 66 (full Vcalib range)
- Good events - curves:
  - Tags: graph, fit function, Chi2(Ndf !=0)
  - Calibration constants, slopes & Temperatures exist in DB
  - No saturated curves: no ADC saturation + smooth increasing fce
  - Fit parameters lay in (wide) ranges: saturation, shift, slope, error
  - At least one good fitted curve among run in the groups

➢ FNAL: 6361 & CERN: 6211 channels

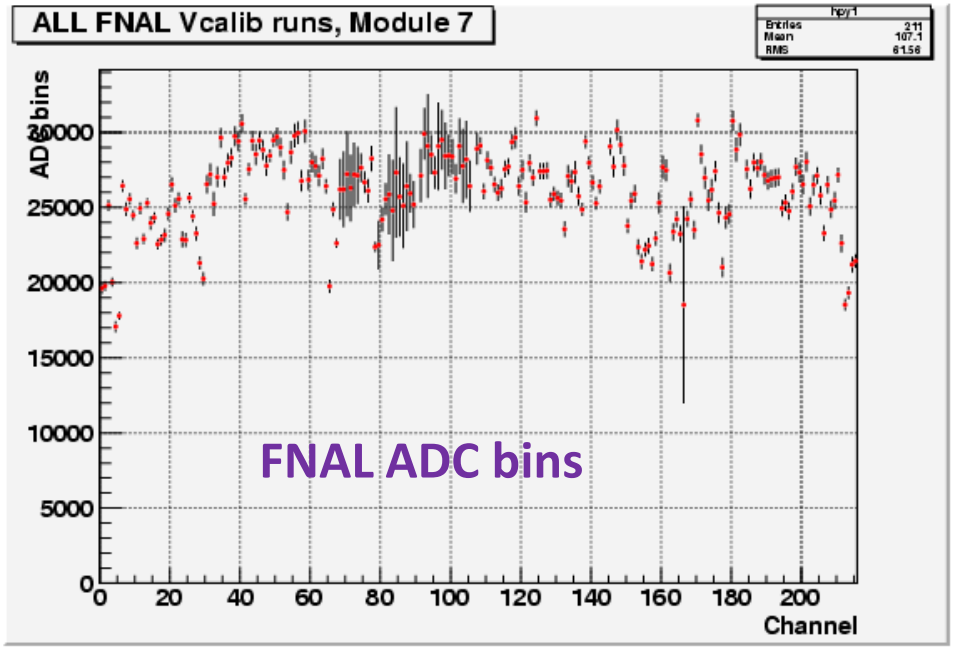
- sample runs #500722, #330710: 3783 & 3512 ch.

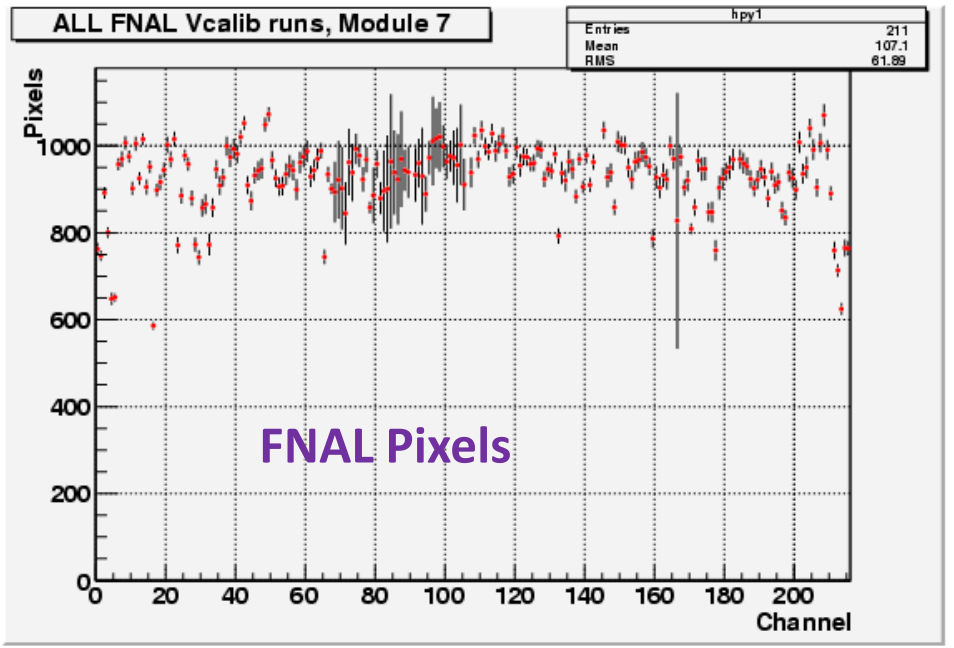
Performance & Stability

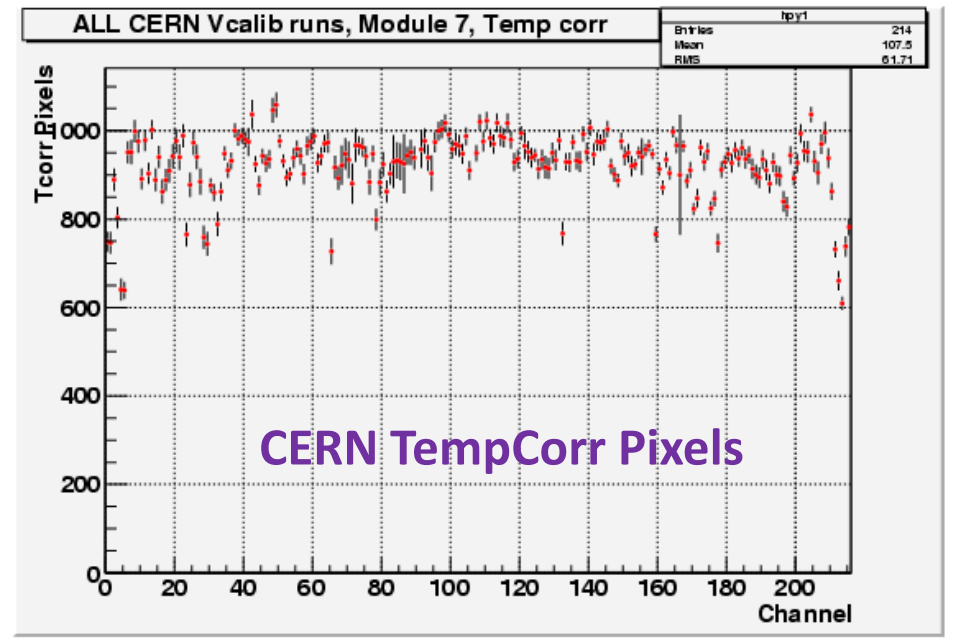


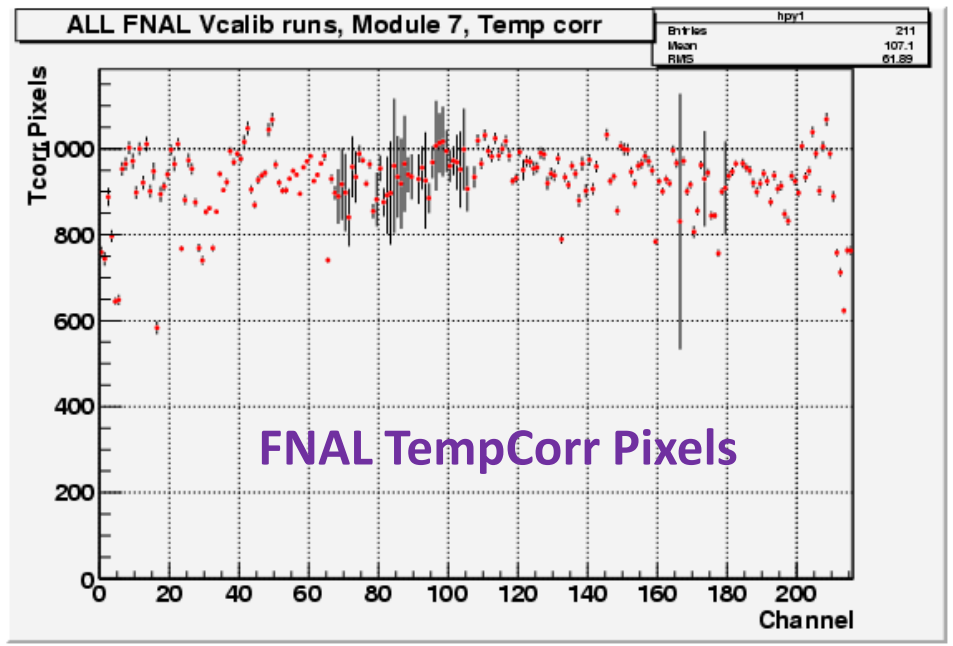
144 fits (FNAL)

Results I: bins,pixels…

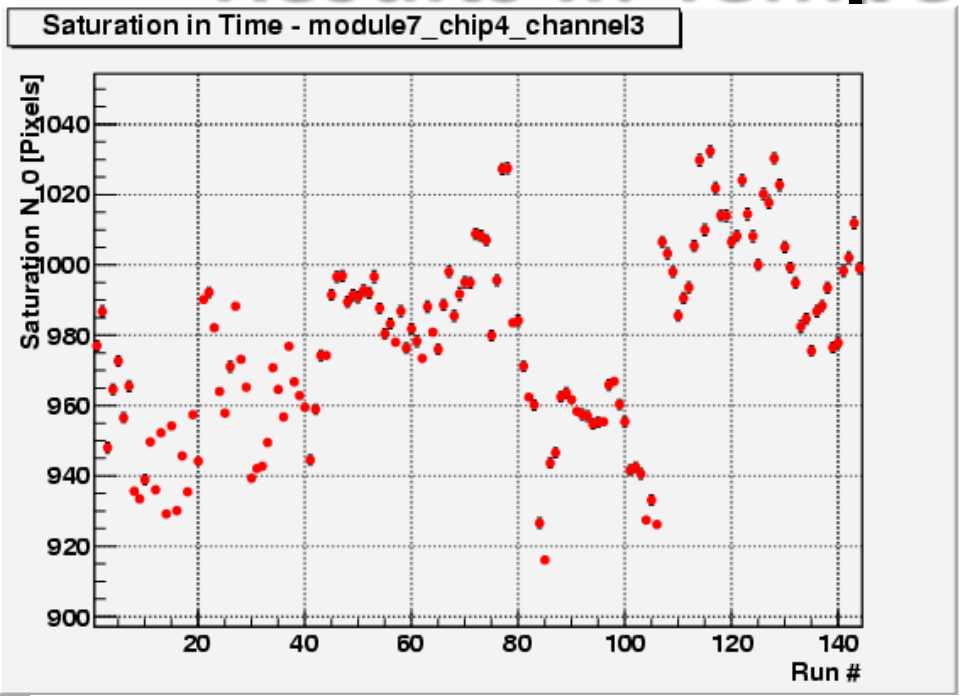


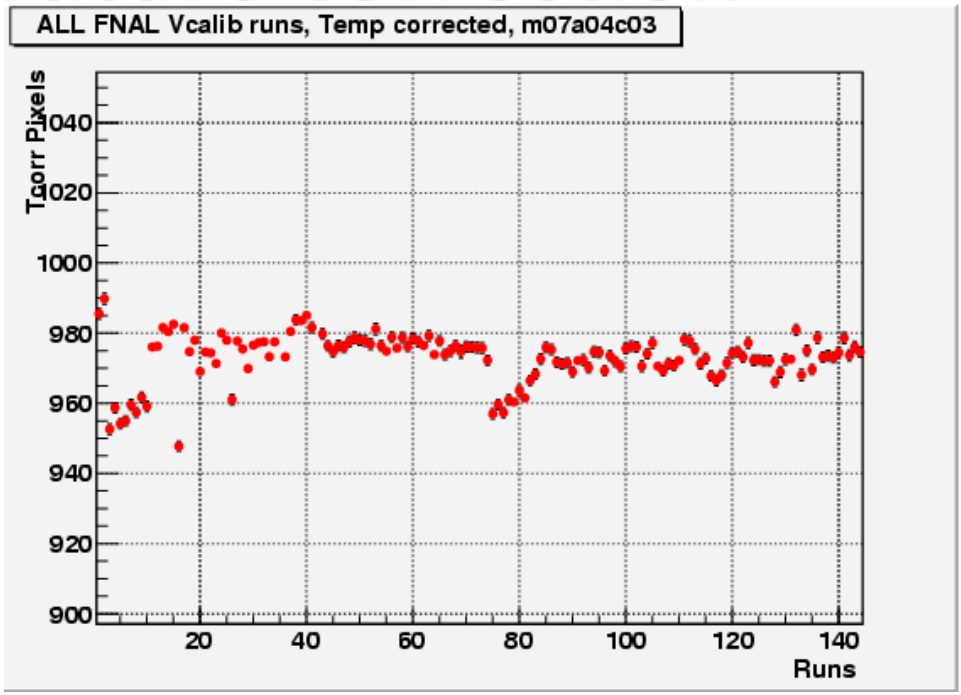


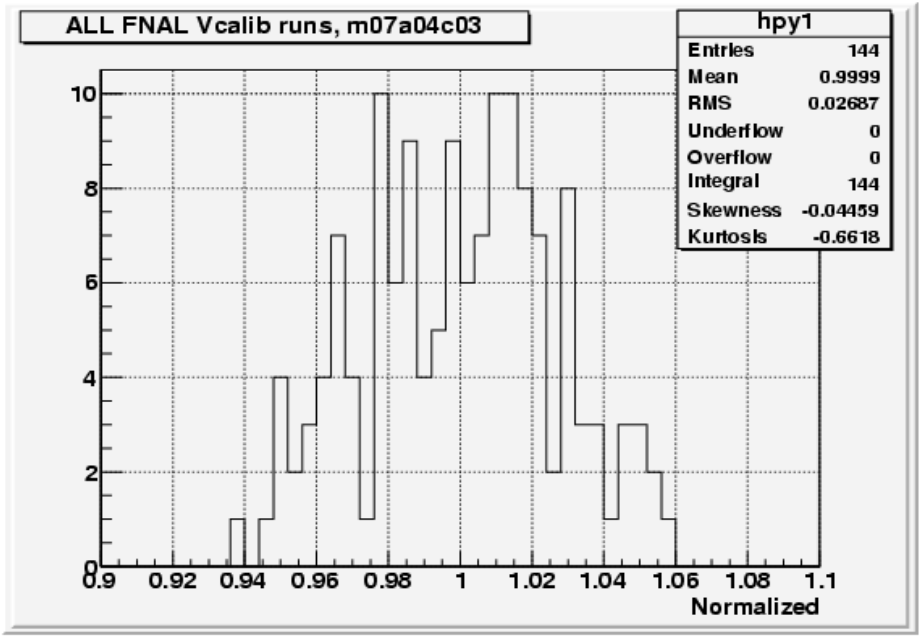


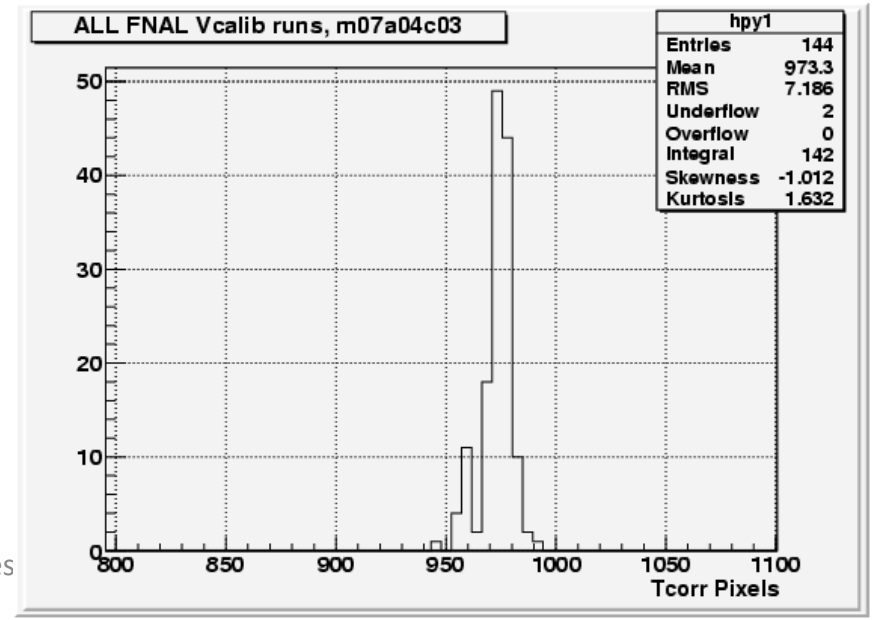


Results II: Temperature correction

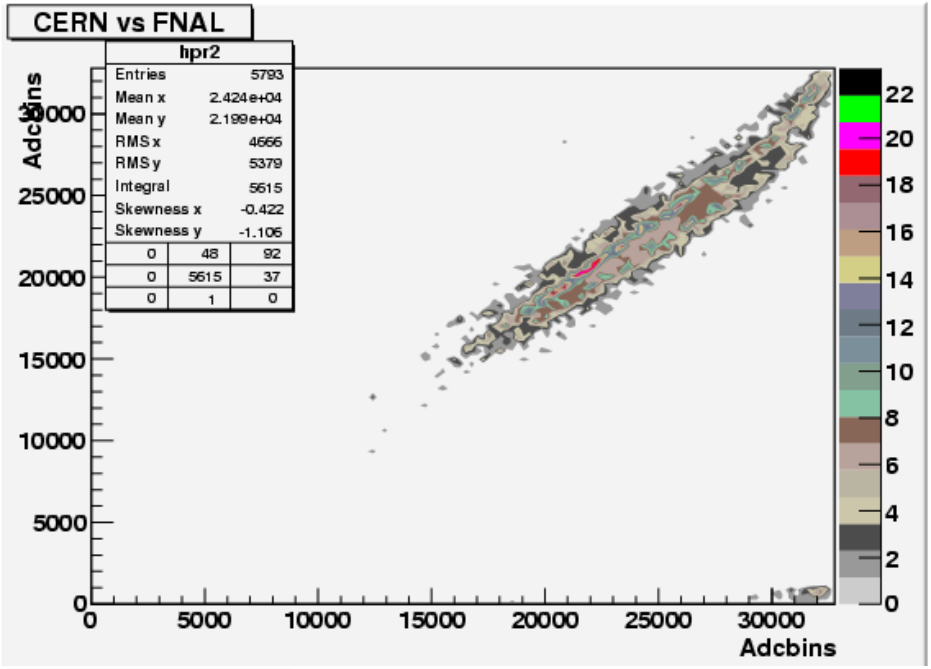


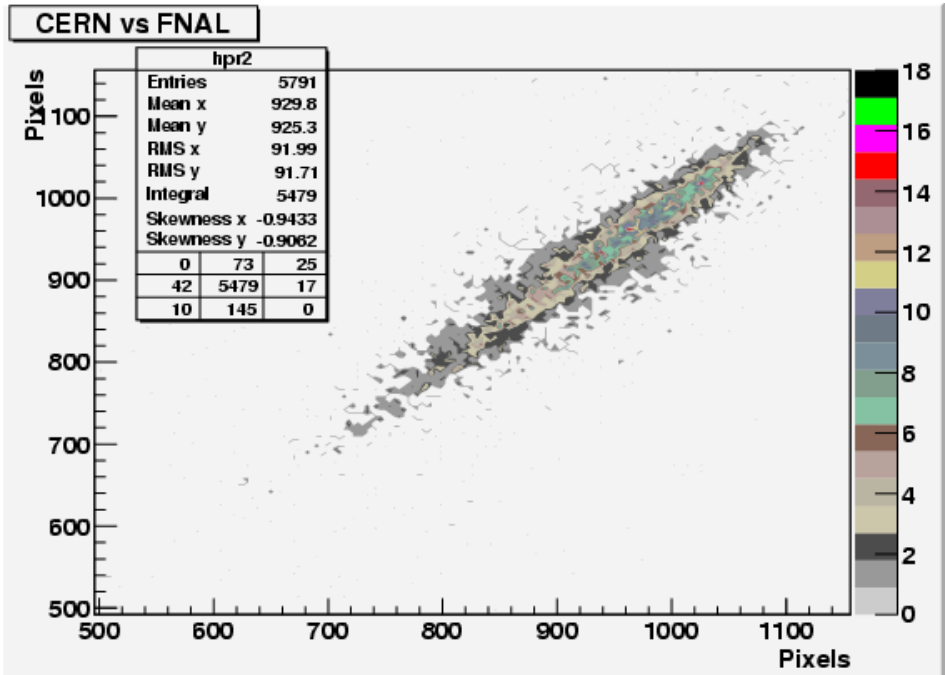


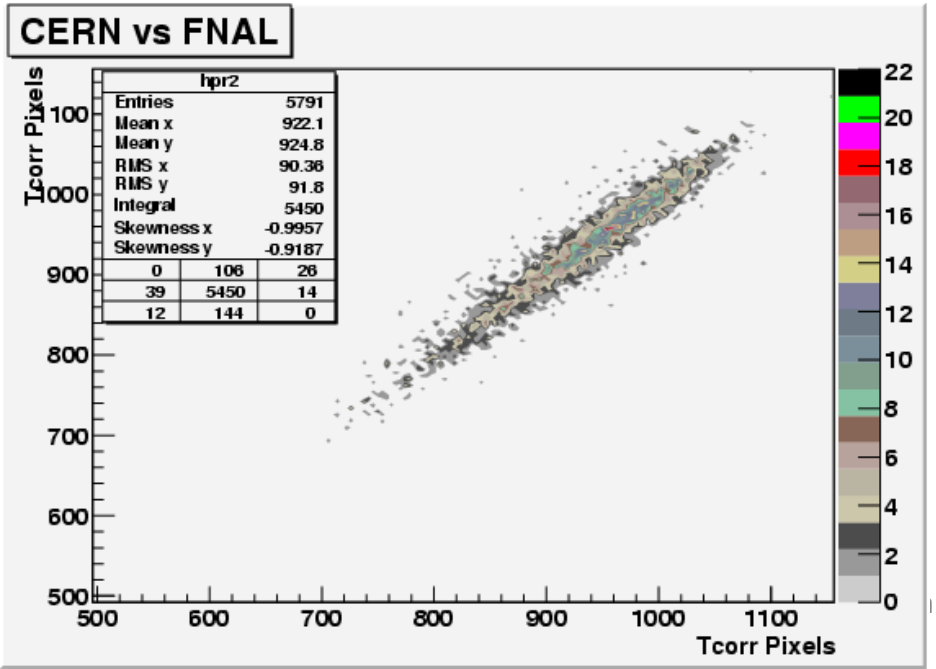


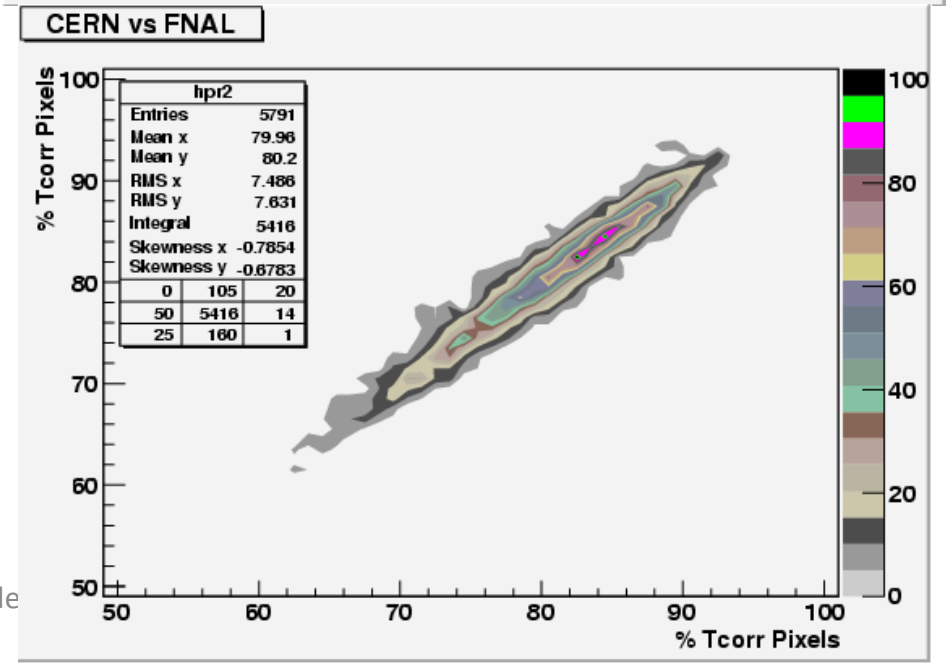


Comparison I: FNAL versus CERN - 2D





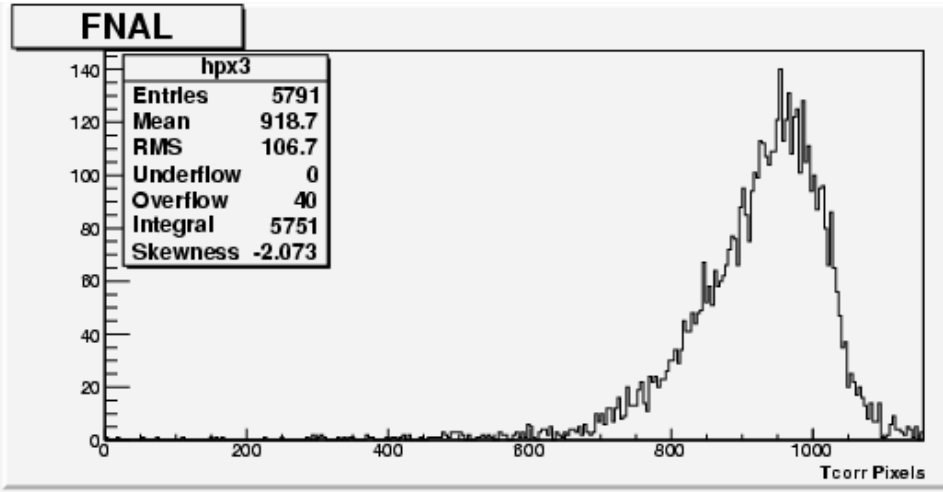




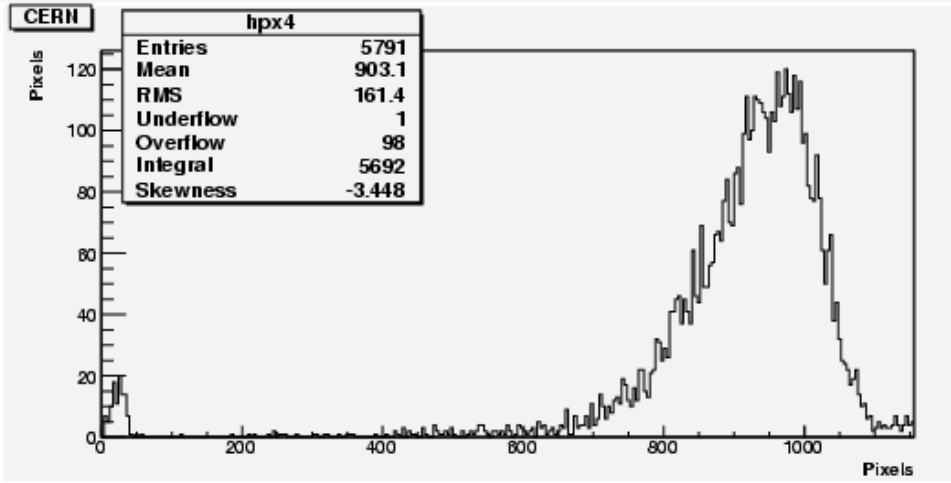
Comparison II: FNAL versus CERN - 1D

Pixels FNAL

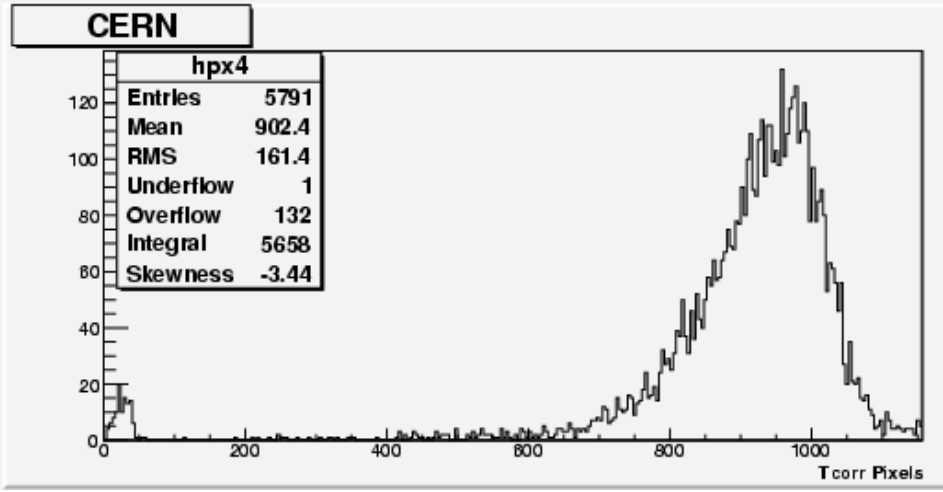
Pixels Tcorr FNAL



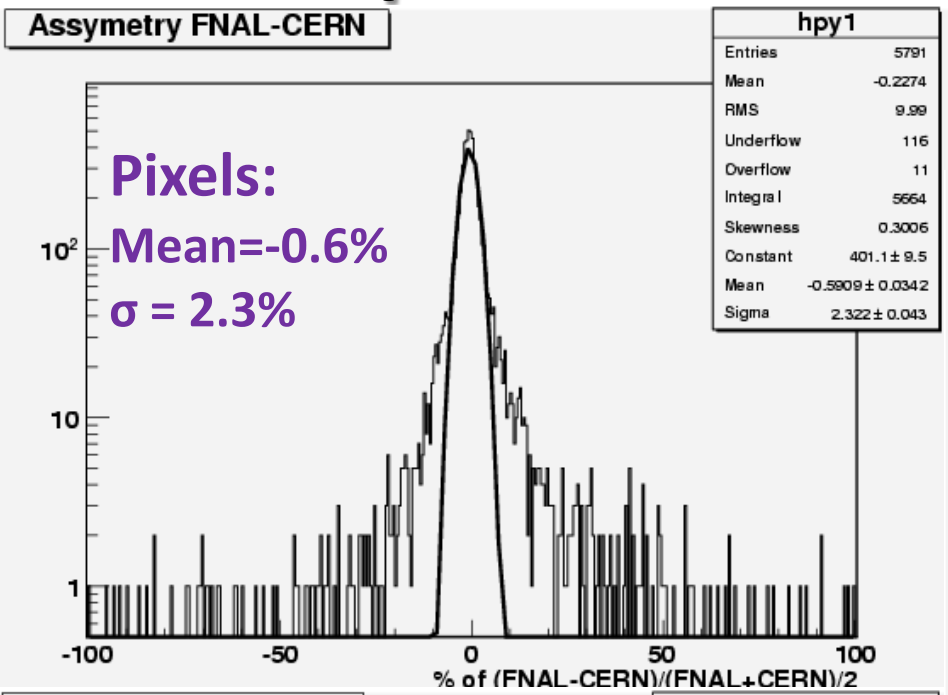
Pixels CERN



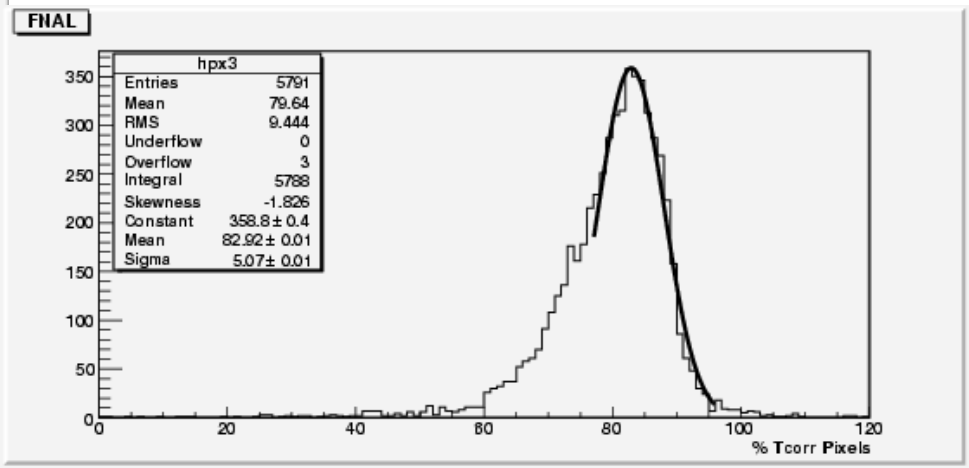
Pixels Tcorr CERN

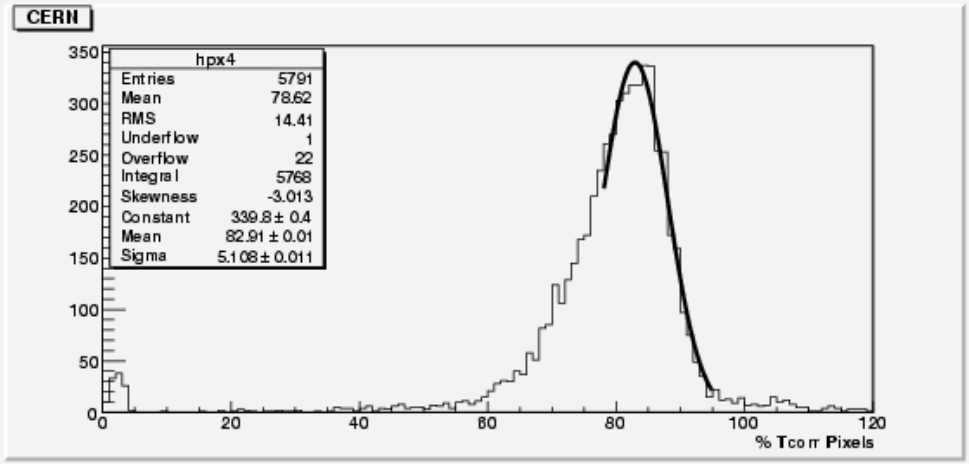


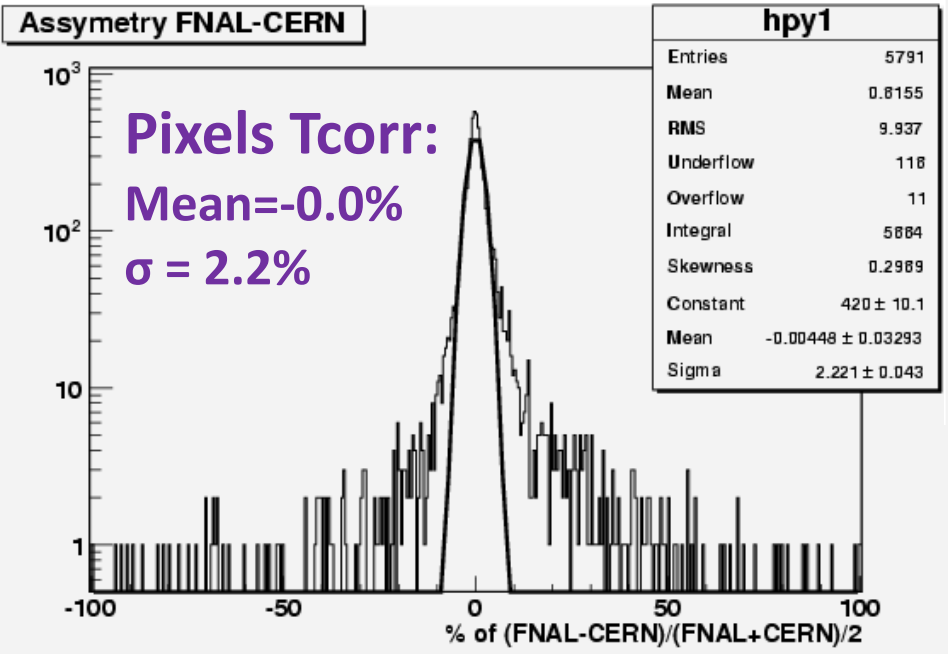
Comparison III: FNAL-CERN Assymetry



Peak 82.9%, σ=5%







Peak 82.9%, σ=5%

ToDo & issues

- get better fitting procedure?
- comparison with ITEP saturation curves
- better classification of ‘bad’ channels?
- applying results into energy data does give better results on distributions?

? LED Linear? Saturated? Pedestal shifted?

➢ Possible test at (W)PPT now?

Conclusion

Under construction …..

BACK UP

Simple classification of (problematic) modules