

Saturation in V-calib LED scans

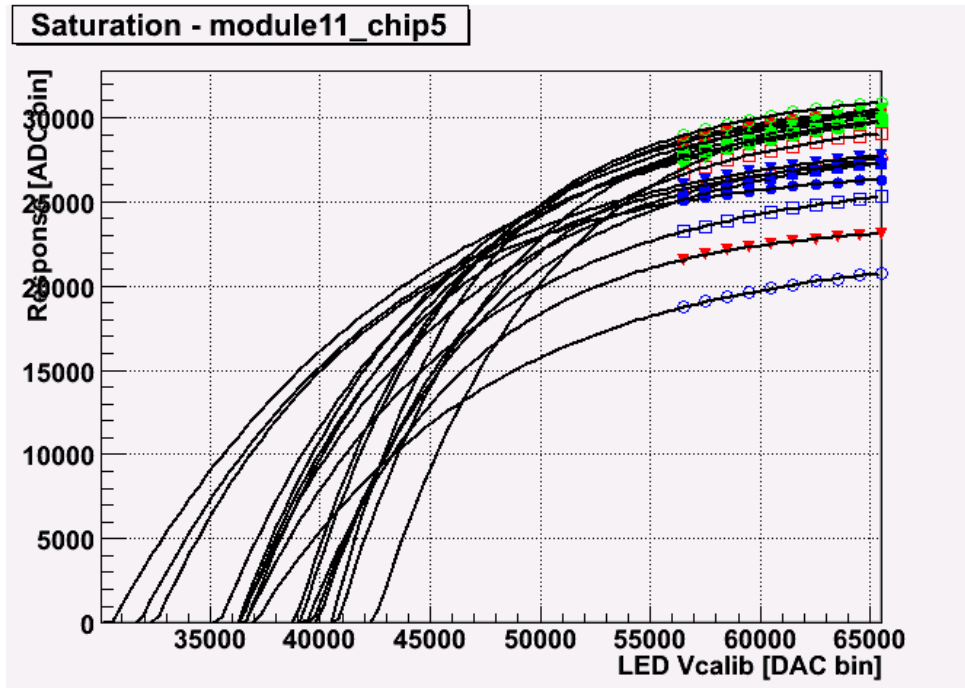
(preliminary results)

AHCAL weekly meeting 2010/02/04

Jara Zalesak

- fitting procedure
- calibration
- classification of results
- run-time dependence

LED V_calib scan



Runs:
AhcPmLedVcalibScan

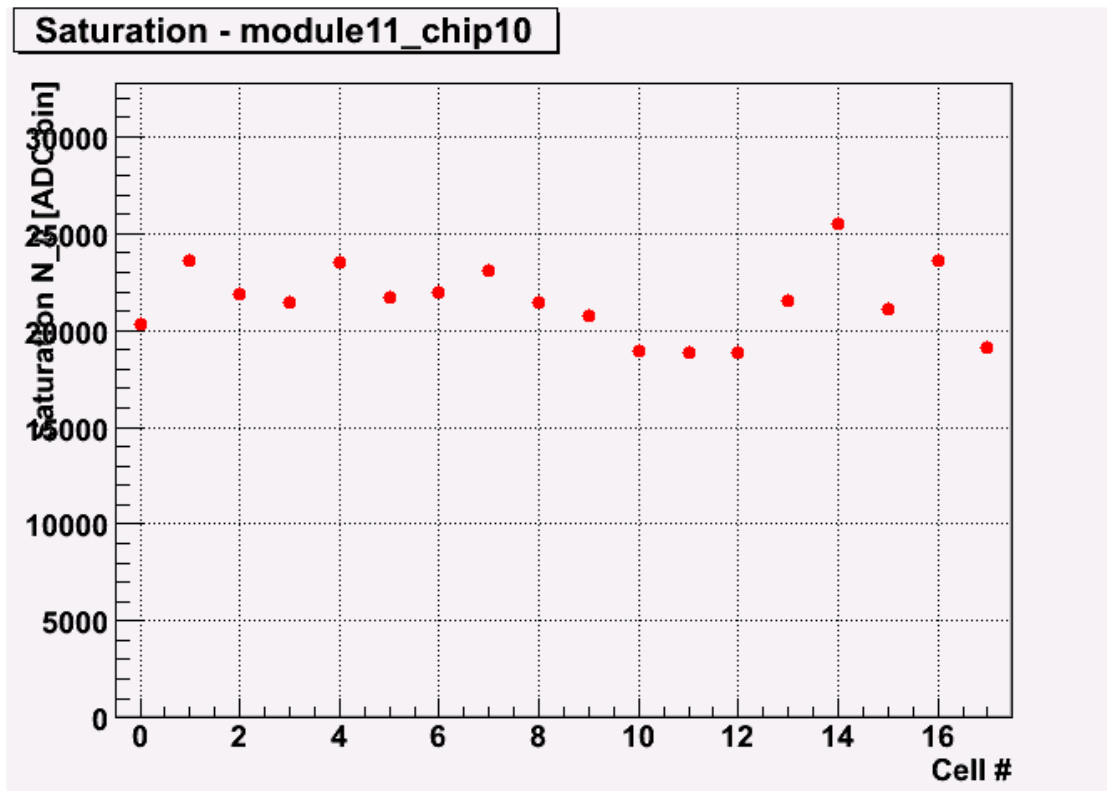
FNAL (sub)period:
F08-4: 2 weeks in Jun

Fitted 10 last points

Simple Exponential formula for saturation:

$$F(\text{ADCbins}) = N_0 * [1 - \text{Exp}(-(X+C)*B)] \quad X \text{ in Vcalib bins}$$

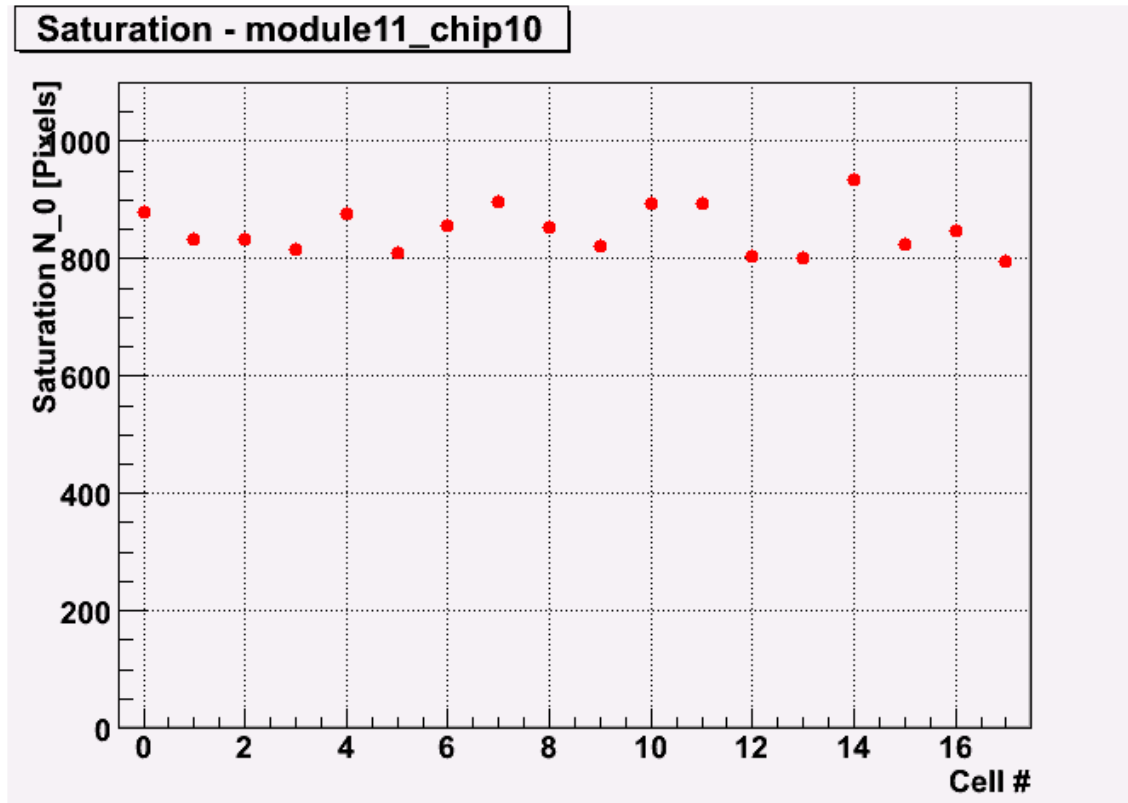
Saturation N_0



Note: Scan results saturated by ADC range $2^{**}15-1$
1462 (19%) channels at max Vcalib @ last bin
Many of them more than 5 last Vcalib values at the limit

module number: 1 68
module number: 2 170
module number: 3 0
module number: 4 1
module number: 5 58
module number: 6 81
module number: 7 0
module number: 8 0
module number: 9 1
module number: 10 0
module number: 11 0
module number: 12 0
module number: 13 0
module number: 14 0
module number: 15 0
module number: 16 3
module number: 17 12
module number: 18 0
module number: 19 4
module number: 20 18
module number: 21 55
module number: 22 48
module number: 23 0
module number: 24 6
module number: 25 6
module number: 26 10
module number: 27 8
module number: 28 25
module number: 29 123
module number: 30 104
module number: 31 99
module number: 32 135
module number: 33 48
module number: 34 0
module number: 35 124
module number: 36 121
module number: 37 94
module number: 38 40

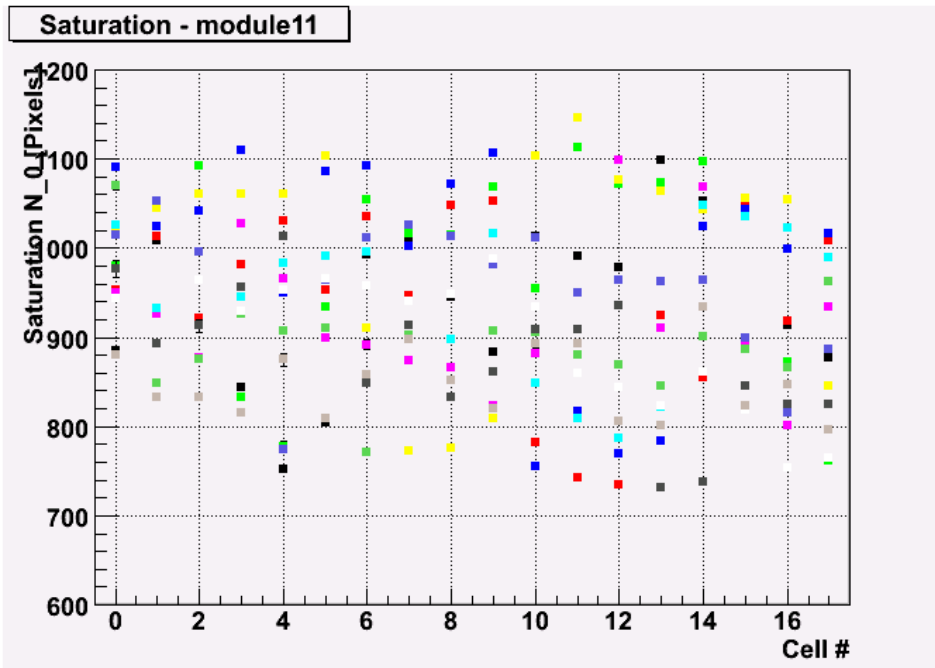
Saturation in pixels



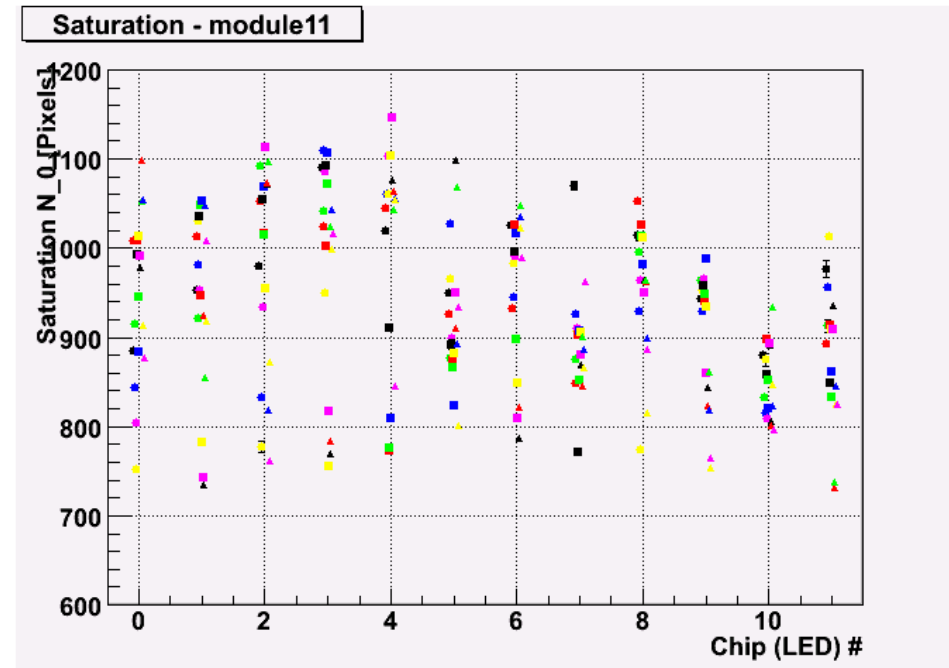
Simple calibration formula: $\text{Sat(px)} = \text{Sat(ADC bins)} * \text{IC(run)} / \text{Gain(run)}$

Calibration constants taken from DB with (nice) tool "dumpCalib" (thanx Beni, Nils!) (and applied at the end of result chain as simple plain file)

Results: Run # 500722 module-wise



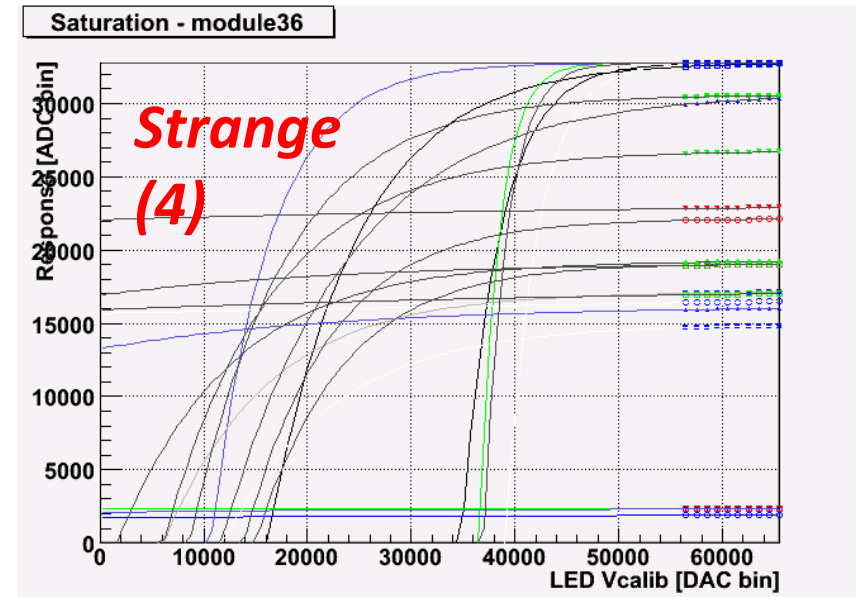
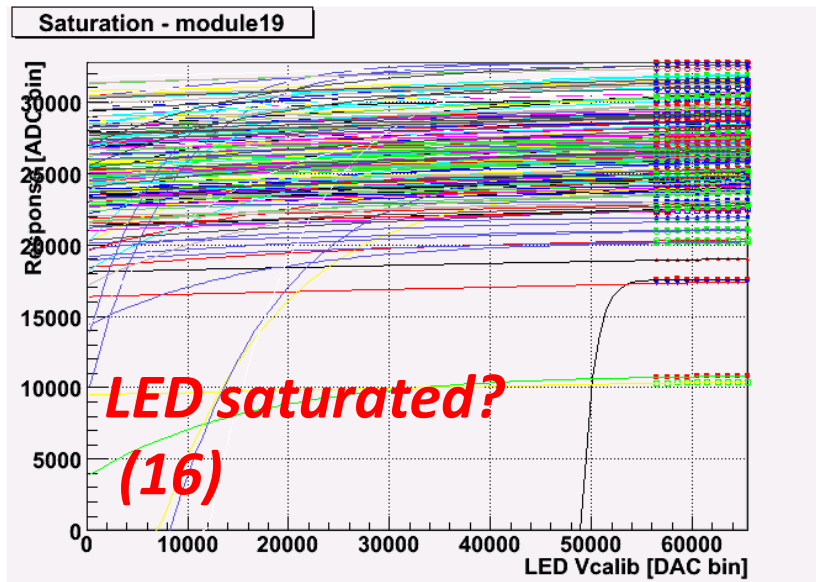
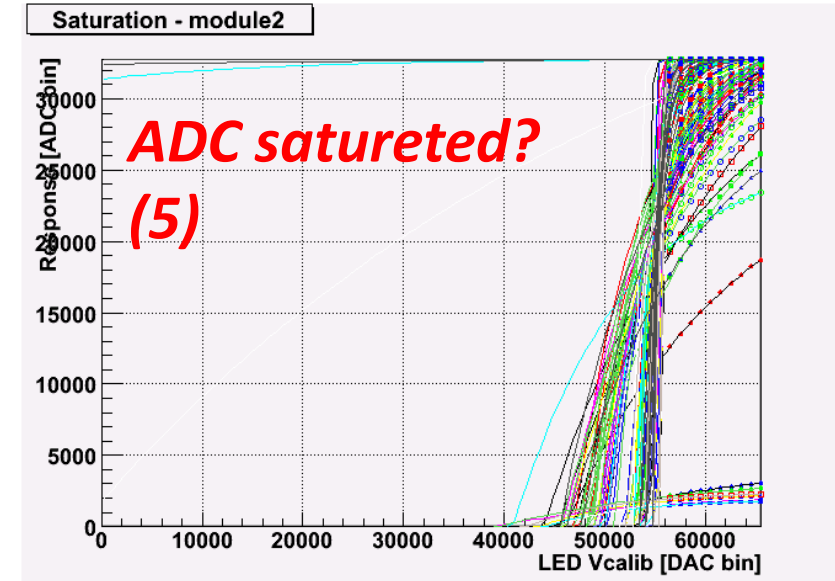
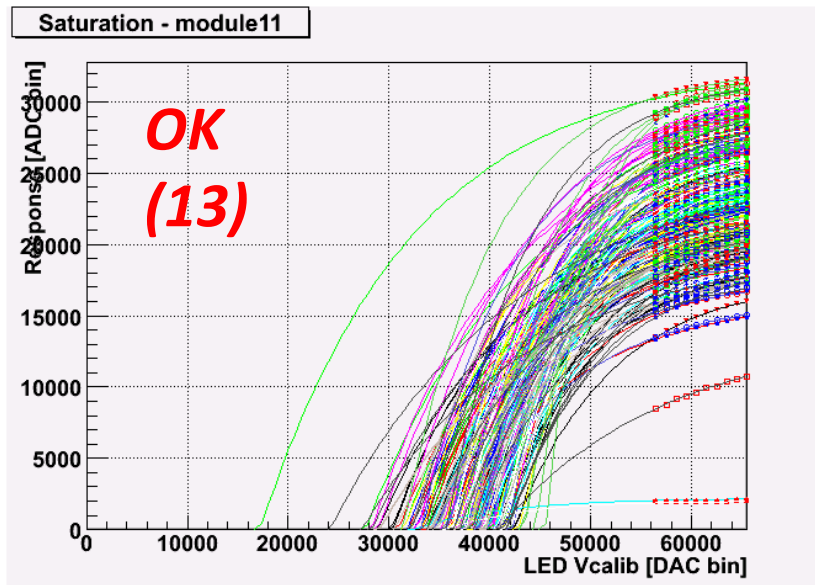
One color = one Chip
@ x 18 cells (channels)



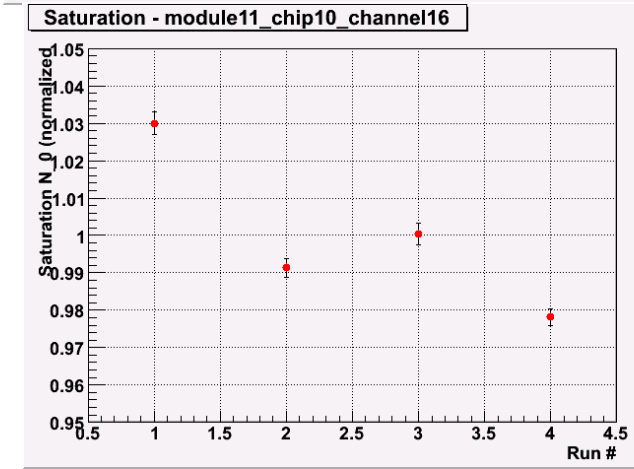
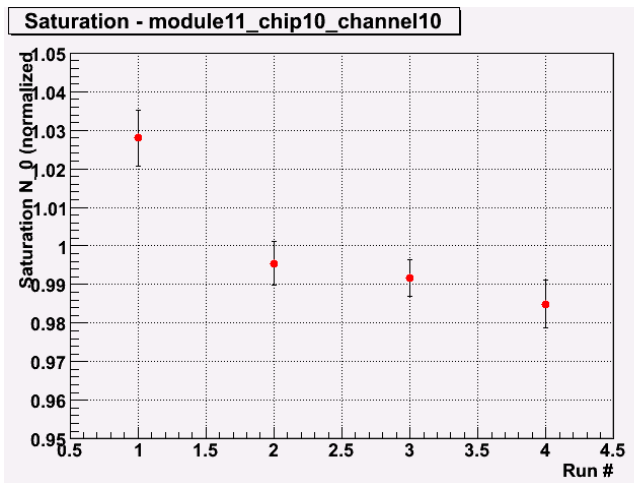
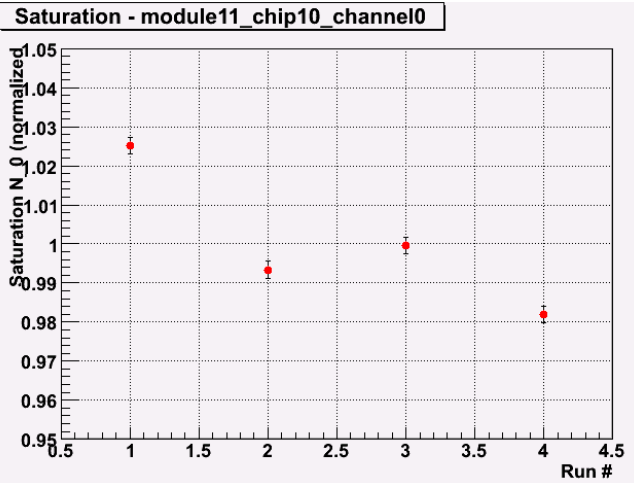
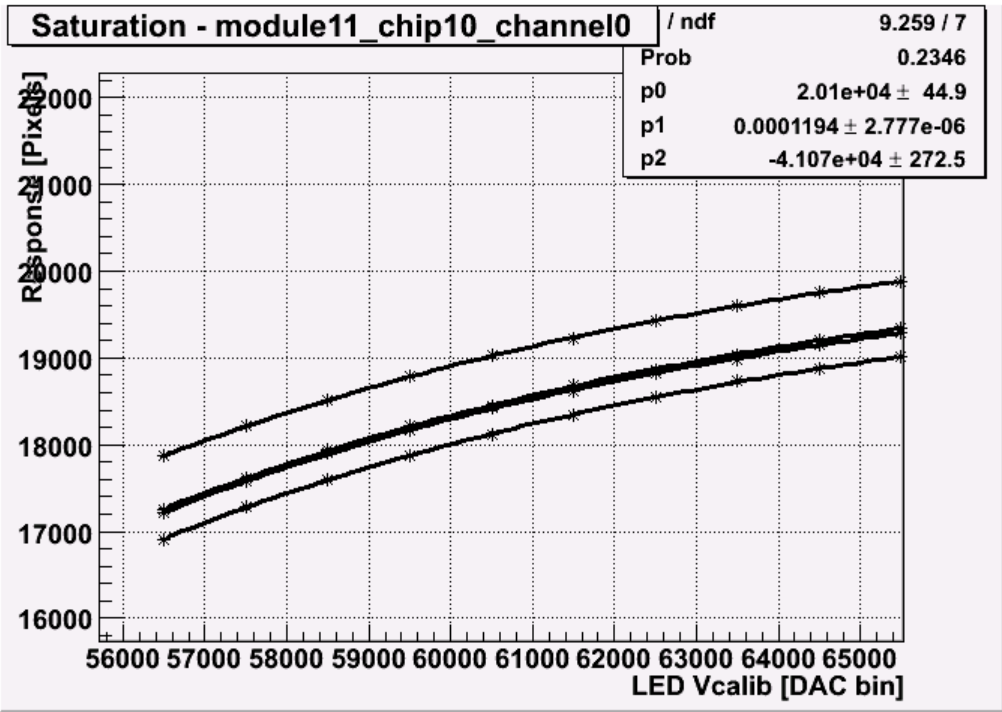
One color = one Channel
@ x 12 Chips (same LEDs)

Fitted saturation in pixels exceed physical numbers of SiPM pixels in many cases
? Wrong calibration or fitting procedure
? Multi-fired pixels, does exist also in ITEP curves?

Simple classification of (problematic) modules



Multi – run (time) saturation



4 runs chosen (other 6 could not be run?)
Within 14 days of F-04

Results consistent at +/- 3%

ToDo:

- better fitting procedure
(avoid saturated ADC bins)
- more runs -> combined fits (?)
- comparison with ITEP saturation curves
- better classification of 'bad' channels
- application of calibration constants on fly
- correction on temperature

? LED Linear? Saturated? Temp. dependent?