RHEINISCH-
WESTFÄLISCHE
TECHNISCHE
HOCHSCHULE
RWTH

Express Line TEC Module Tests with ARC

III. Physikalisches Institut B
&
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RWTH Aachen

Overview

- Environment and Test Setup
- Performed tests and most important observations
- Table of results
- Outlook

Express Line TEC Modules

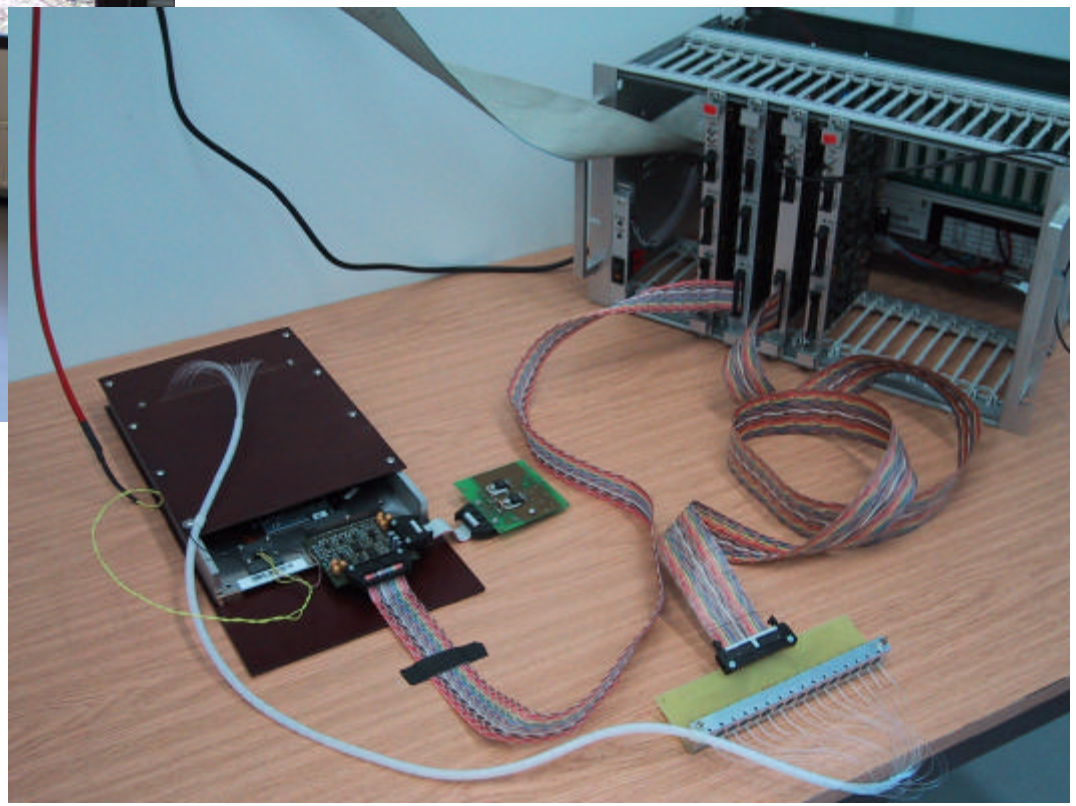
- 2 x 5 TEC Modules received from Karlsruhe

- Bar Codes:

  30216630200012
  30216630200017
  30216630200020
  30216630200022
  30216630200023
  30216630200026
  30216630200027
  30216630200029
  30216630200048
  30216630200056

Environment & Test Setup

- Clean room used for module test and storage

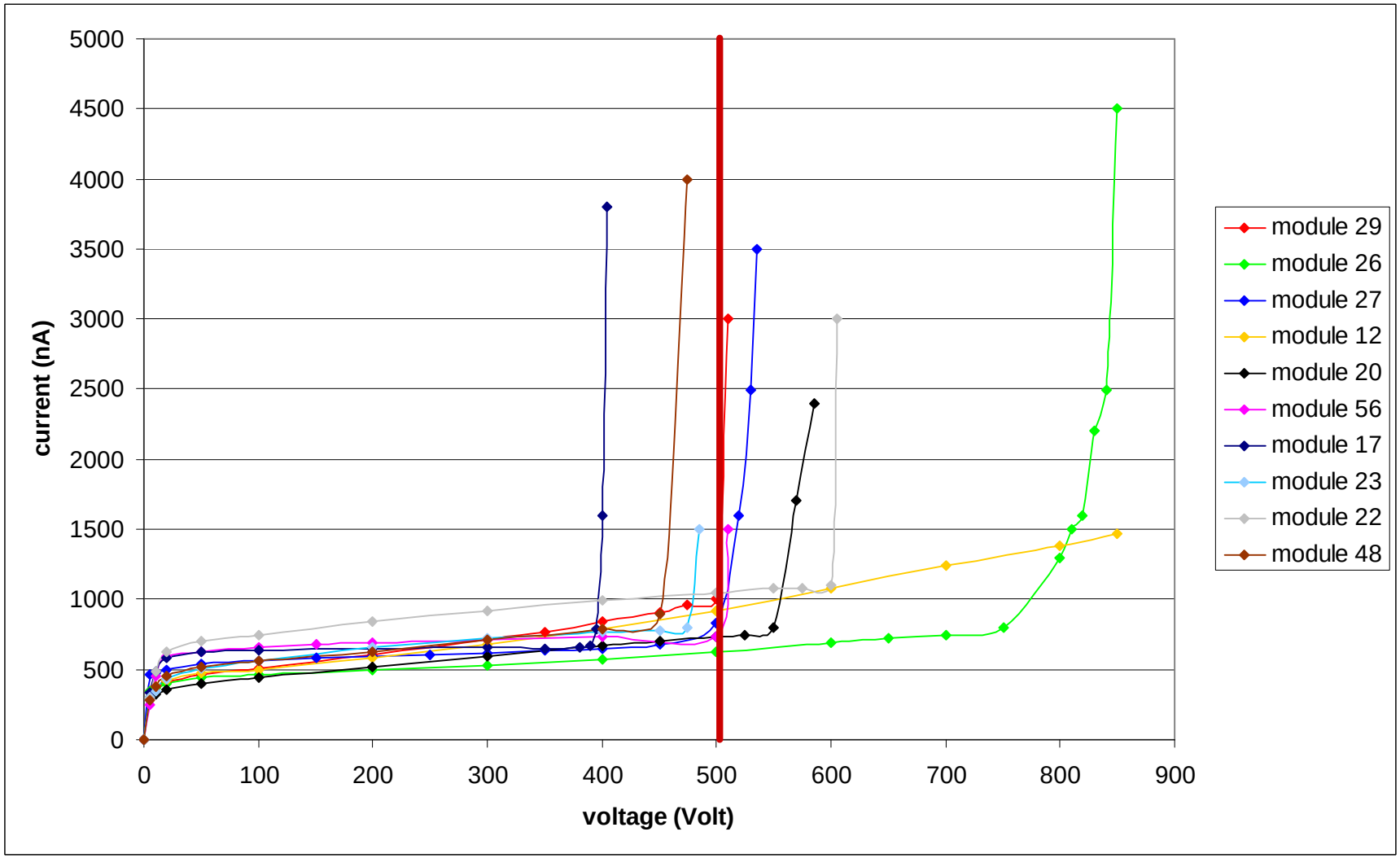


- ARC Test Setup
- LED Pulser
- CAEN Sy126

Performed Tests

- Tests based on proposals from L.Demaria & M.Meschini:
  - IV Curves
  - Basic Tests at 150 V:
    - H0-Tests
    - F-Tests
    - Psh-Tests
  - Advanced Tests at 150 V:
    - Pipe-Tests
    - L-Tests (pulsed light, 950 nm)
    - Laser-Tests (at 50 V, 1060 nm)

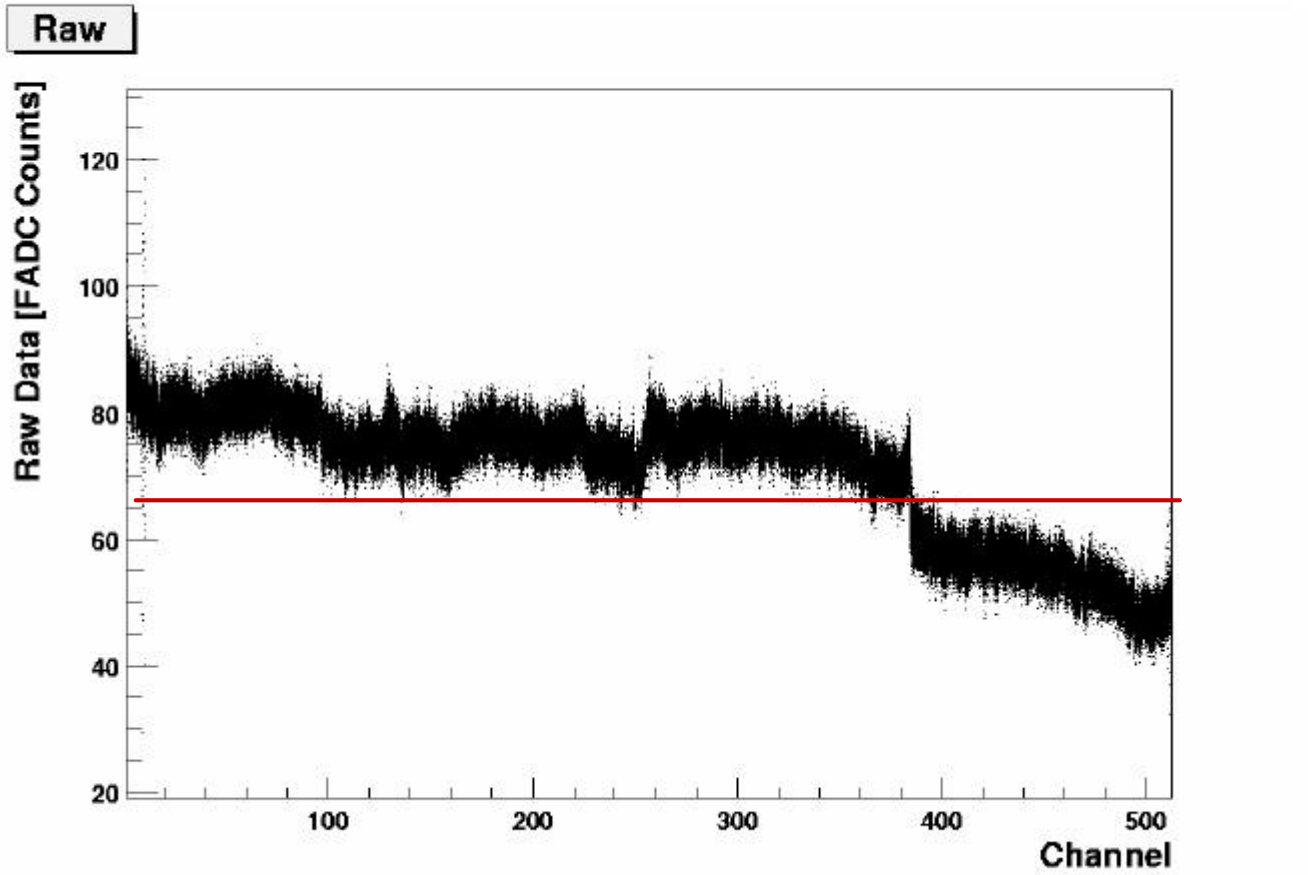
IV Curves



- Measurements done at room temperature with no N_2 flush !

Pedestals / Raw Data

- Different baselines at same APV settings !

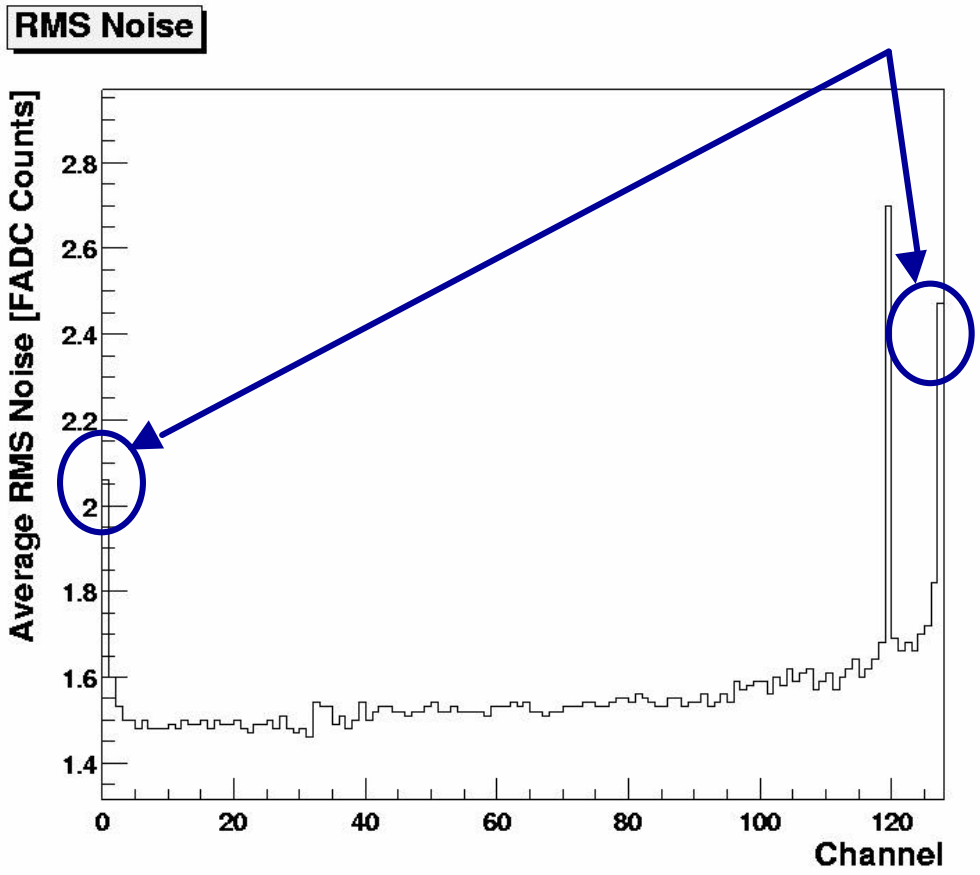


RMS Noise

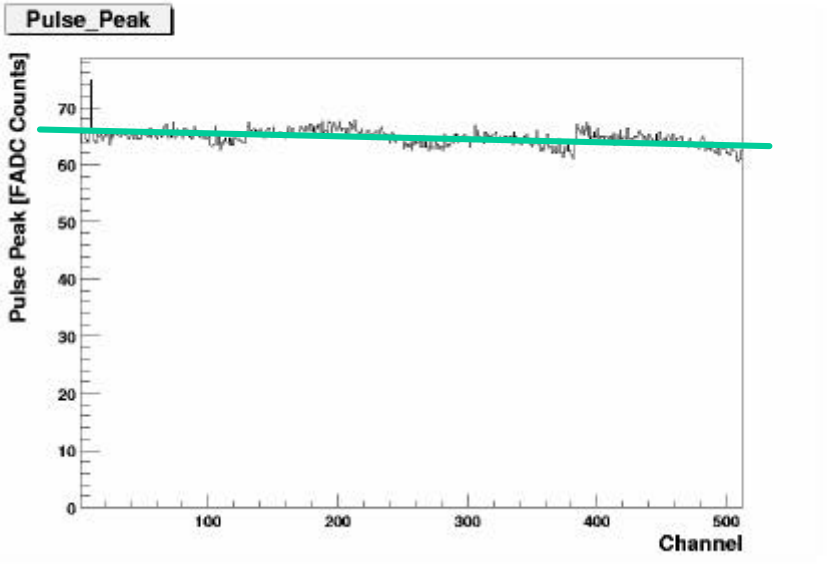
Noise of channels on the edges is
often in the order of defect channels !

Chip Settings:
I2C.Address= 74
Mode= 43
Latency= 4
IPRE= 98
IPCASC= 52
IPSF= 34
ISHA= 34
ISSF= 34
IPSP= 55
IMUXIN= 34
ISPARE= 0
ICAL= 29
VFP= 30
VFS= 60
VPSP= 40
CDRV= 254
CSEL= 1
MUXGAIN= 4
Error= 0

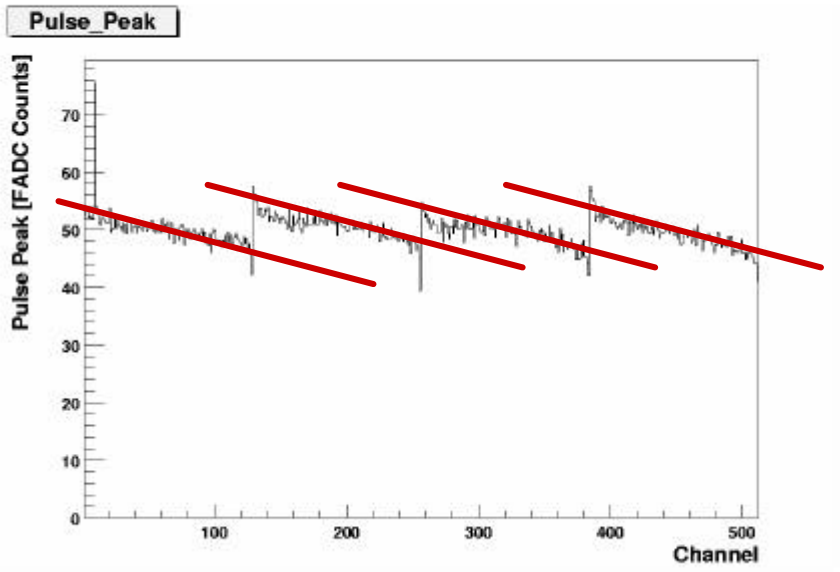
Cut: 3*RMS
Bad Channel:
0
119
127



Calibration Pulse Shapes (Psh-Test at 150 V)

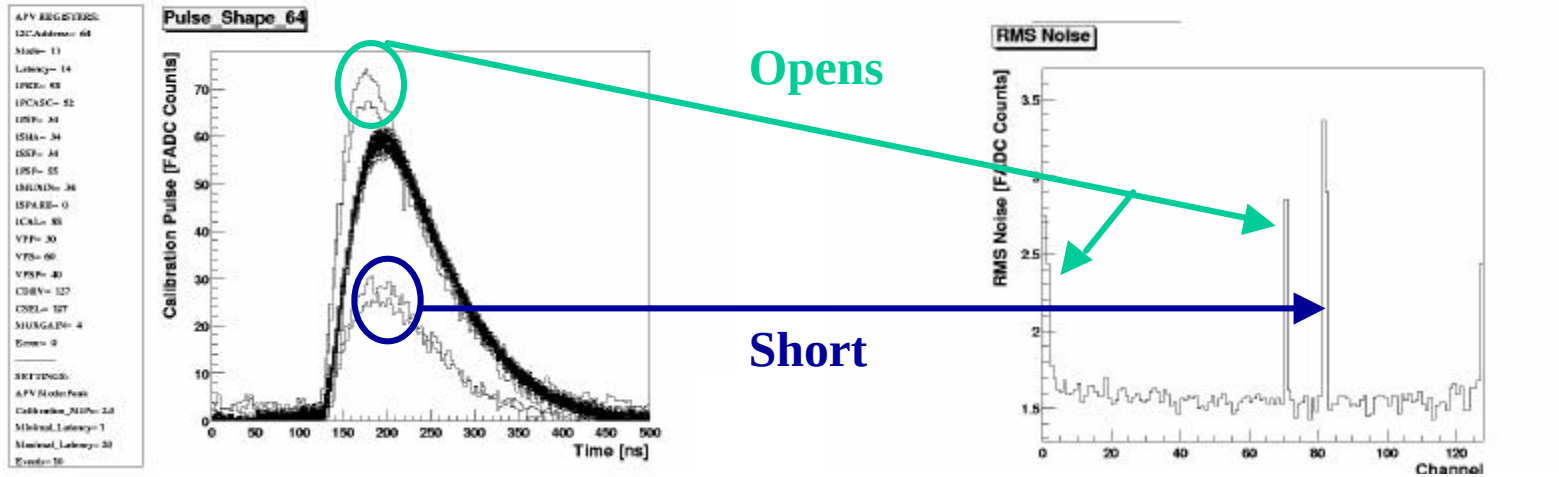


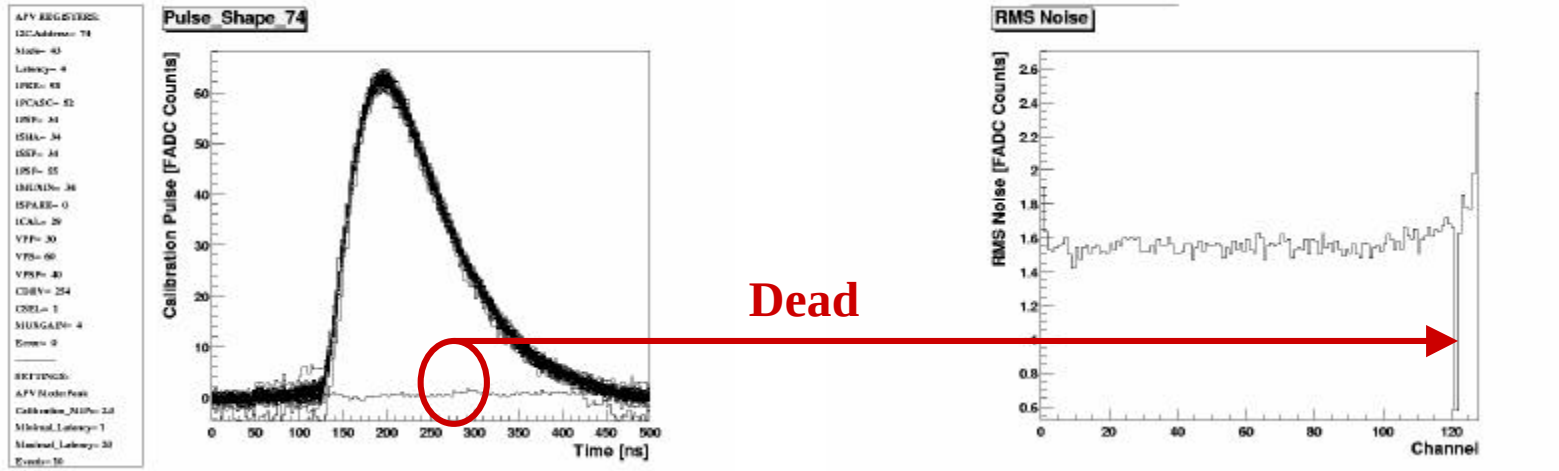
Pulse shape maxima distribution in peak mode



Pulse shape maxima distribution in deconvolution mode

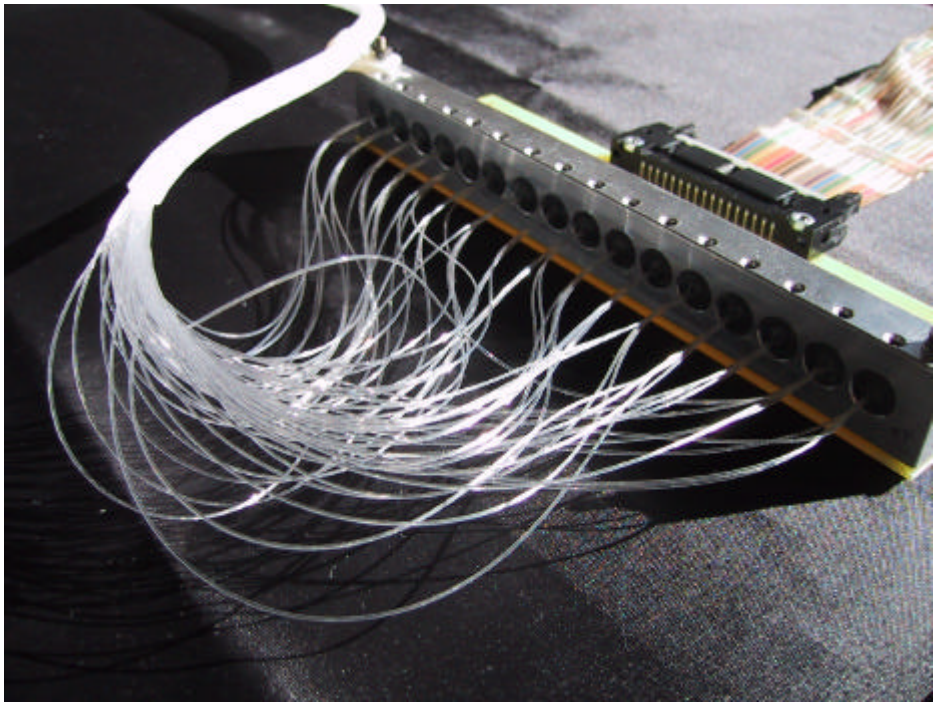
Calibration Pulse Shapes and RMS Noise

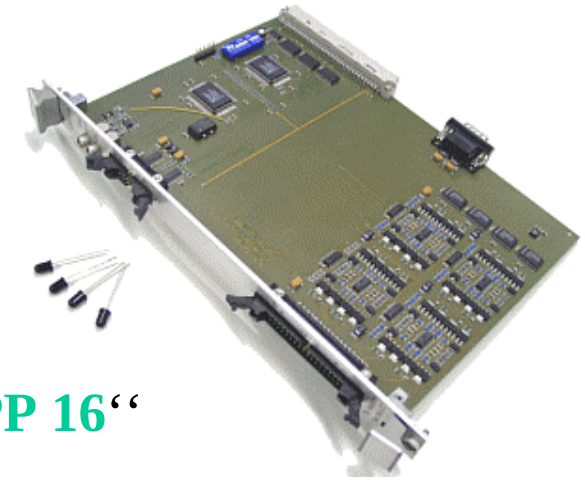




IR LED Array

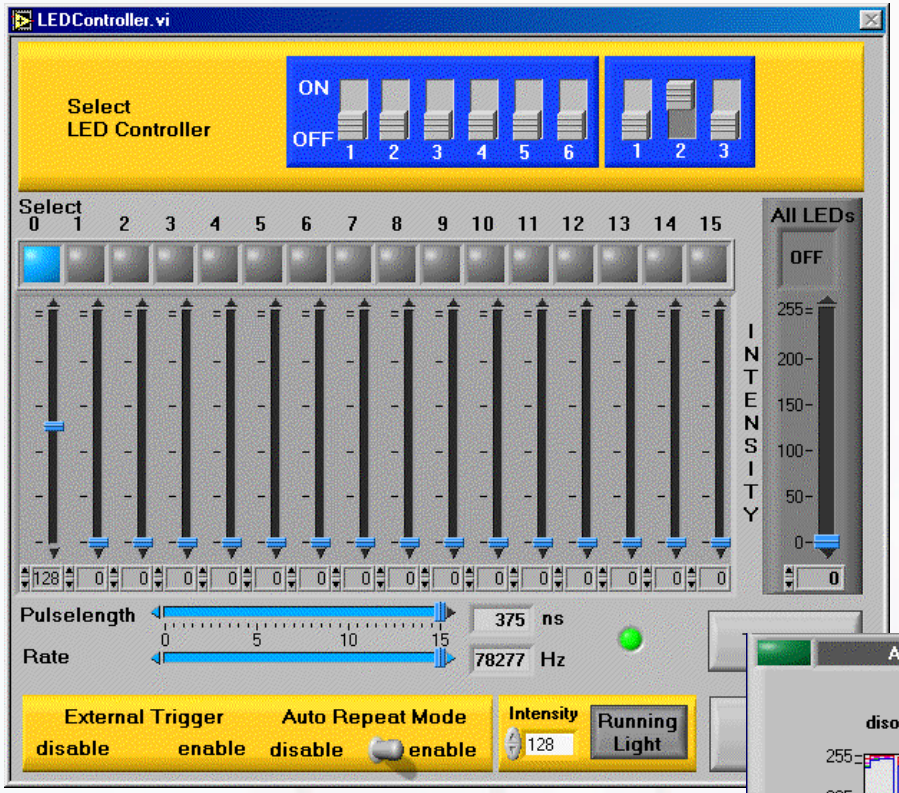
- 16 IR LEDs (950 nm)
- 4 fibres connected to 1 LED





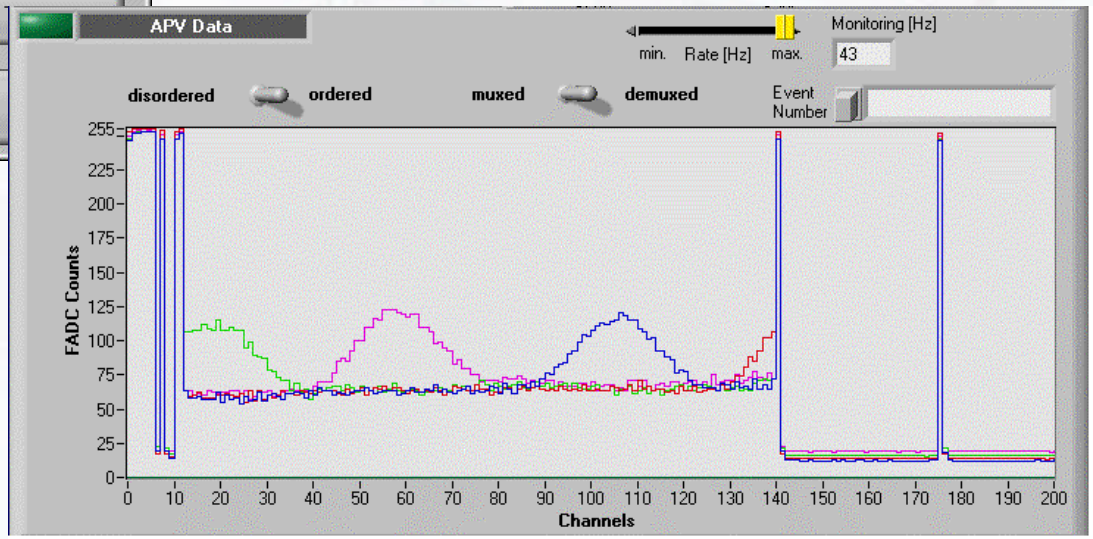
“LEPP 16“

Automated „Running Light“



LED control window

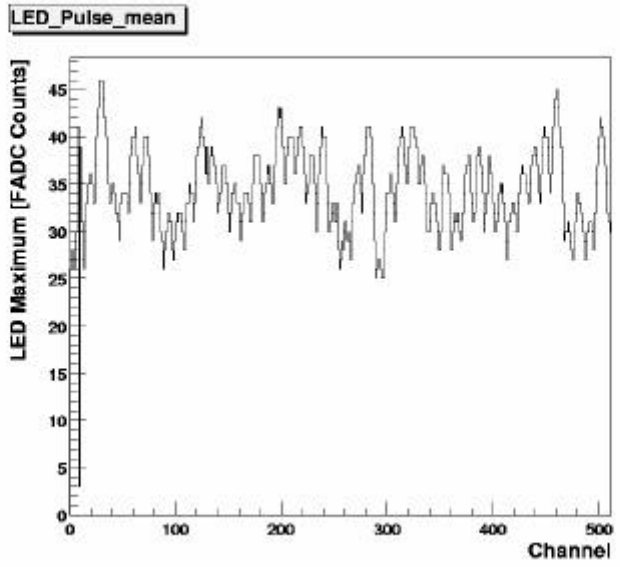
(as implemented in ARCS)



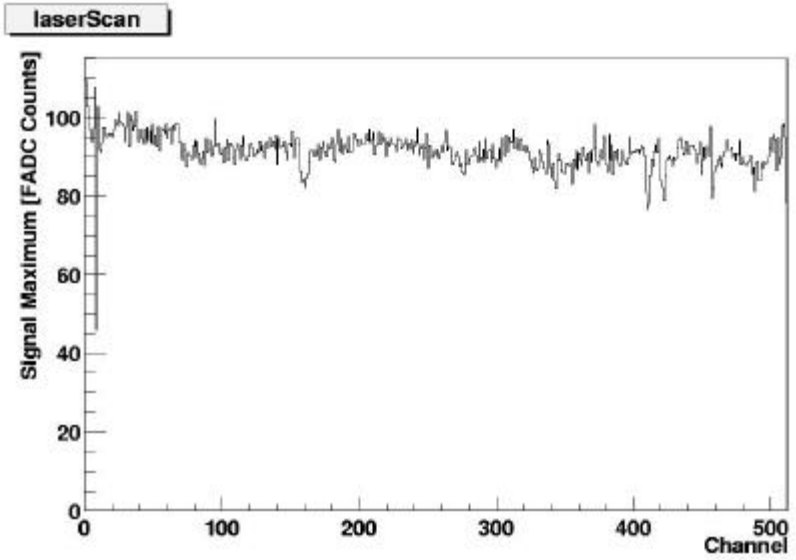
Online data display

LED & Laser Tests

LED tests at 150 V, 950 nm



Laser tests at 50 V, 1050 nm



Preliminary Test Results

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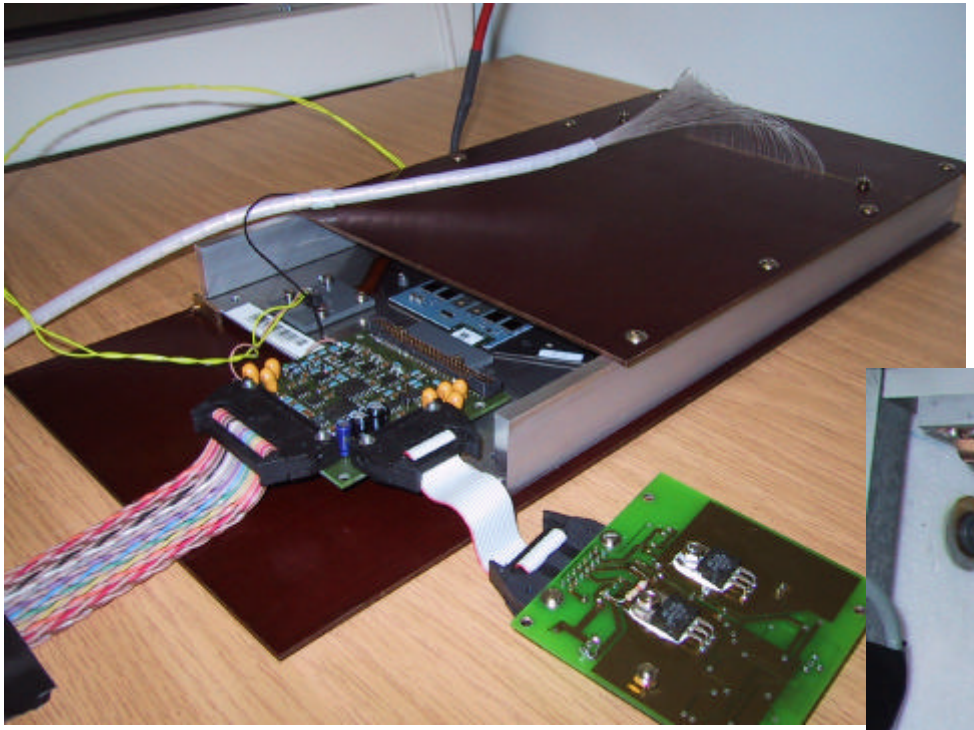
Module		Tests								Results	
		IV	Basic			PSh	LED	Laser	Pipe	Bad strips	Grade: < 2% Grade A < 4% Grade B
			H0 F	Ped	Noise						
302166302000	12		✓	✓	✓ 512 511 442 431 430 257 256 209 129 1	✓ 511 442 431 430	✓ 511 442 431 430 209		✓	10	B
	17	X 400 V	✓	✓	✓ 512 443 442 384 257 256 129 93 92 1	✓ 443 442 93 92	✓	✓ 443 442 93 92	✓	10	B
	20	✓	✓	✓	✓ 512 511 385 384 258 257 256 129 1	✓	✓		✓	9	A
	22	✓	✓	✓	✓ 512 511 385 384 257 256 129 1	✓ 318	✓ 318		✓	8	A
	23	X 480 V	✓	✓	✓ 512 511 385 384 258 257 256 129 1	✓	✓	✓	✓	9	A
	26	✓	✓	✓	✓ 512 480 385 384 258 257 256 129 128 1	✓ 480	✓ 480	✓ 480	✓	10	B
	27	✓	✓	✓	✓ 512 385 384 257 256 248 129 128 93 1	✓ 93 248	✓ 93 248	✓ 93 248	✓	10	B
	29	✓	✓	✓	✓ 512 385 384 257 256 189 129 7 1	✓ 7 189	✓ 7 189		✓	9	A
	48	X 450 V	✓	✓	✓ 512 385 384 257 256 129 128 9 1	✓ 9	✓ 9	✓ 9	✓	9	A
	56	✓	✓	✓	✓ 512 511 385 384 257 256 129 128 1	✓	✓	✓	✓	9	A

Outlook

- Investigation of LED tests
- Comparison of LED and laser results
- Cooling tests
- Detailed comparison of results of both test systems

Environment & Test Setup



- Cooling Tests
  (with LED array)

- Cooling Box
  (can house 5 modules)