Pulser Results from CalDet

MINOS Collaboration Meeting

June 2001

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Introduction and Current Setup

Introduction:

At CERN, we have been analysing light injection data and looking at the linearity of the PMT reponse.

Current Status of CalDet:

- 6 planes (with horizontal readout) light tighted and connected to mux boxes
- Read out on one side by MiniDAQ and on the other by DAQ
- Light injection fibres connected to one ashtray in each of the 6 LIMs on the MiniDAQ side
- Real pulser box not arrived yet, using a temporary one

L.I. Data Acquired

Data Acquired:

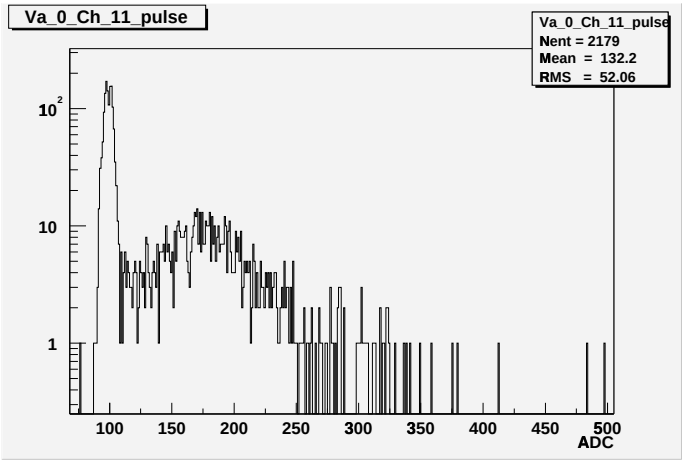
- One Mux box on the MiniDAQ side connected to HV
- Fibres from LEDs connected to PINs:

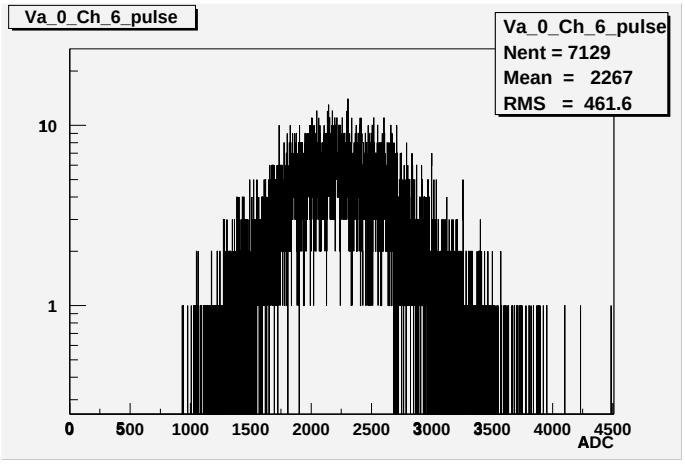
  Fibre direct from pulser box to high gain PIN

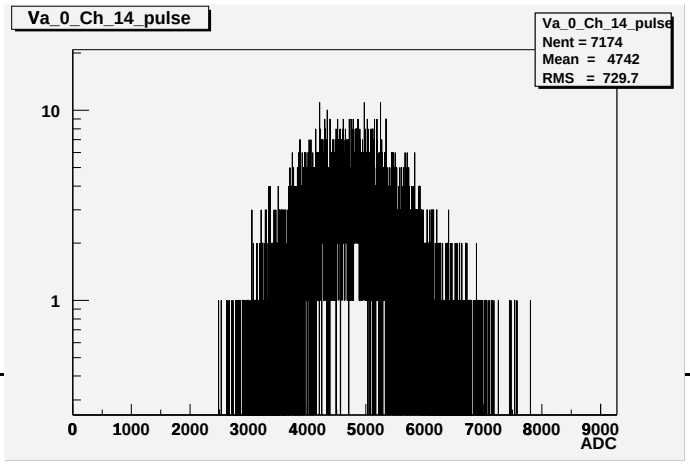
  Separate, very bright LED, pulsed in time with pulser box, to low gain PIN acting as trigger
- 2 planes read out with the MiniDAQ, with and without light
- Pulser box LED pulsed at several different heights

Results:

Examples of L.I. spectra

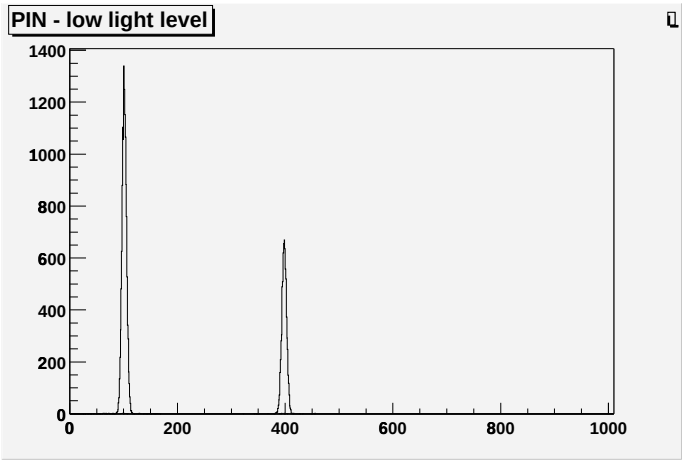


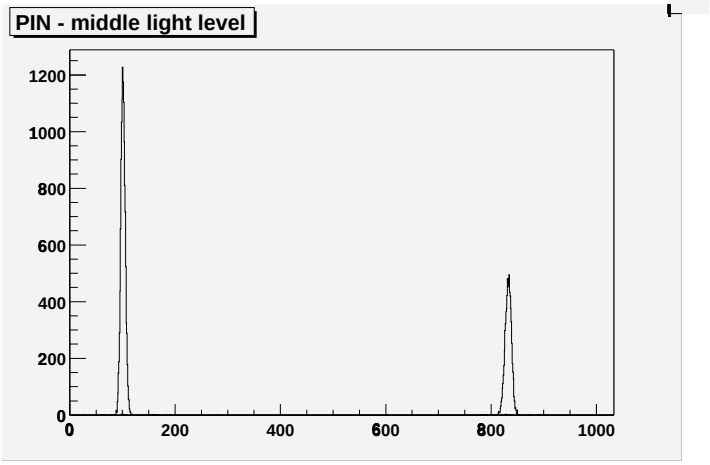


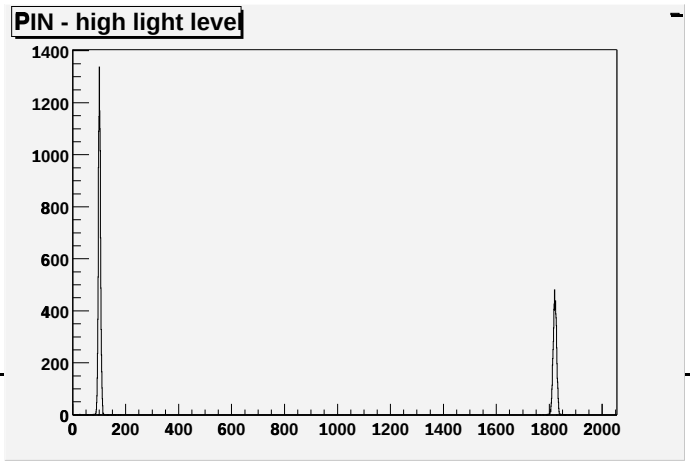


Results:

Examples of PIN L.I. spectra

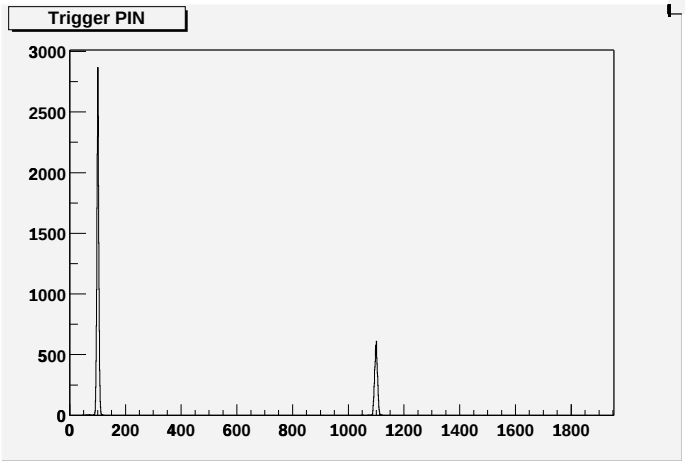






Results:

Trigger PIN



Results:

To show that we get the expected checkerboard flashing pattern:

Results:

Linearity: PIN vs ADC

Linear fits

Results:

Linearity: PIN vs ADC

Quadratic fits

Results:

Linearity: PIN vs ADC

Histogram of (Quadratic term/Linear term) from quadratic fits

Results:

Linearity: NPE vs ADC

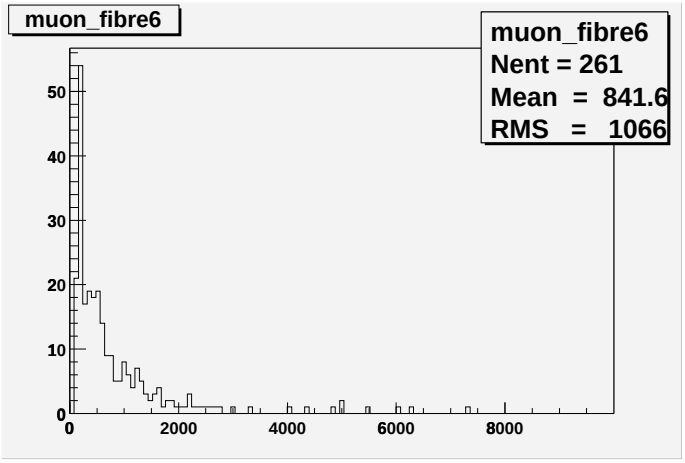
NPE value for each light level calculated using Mean/Sigma method.

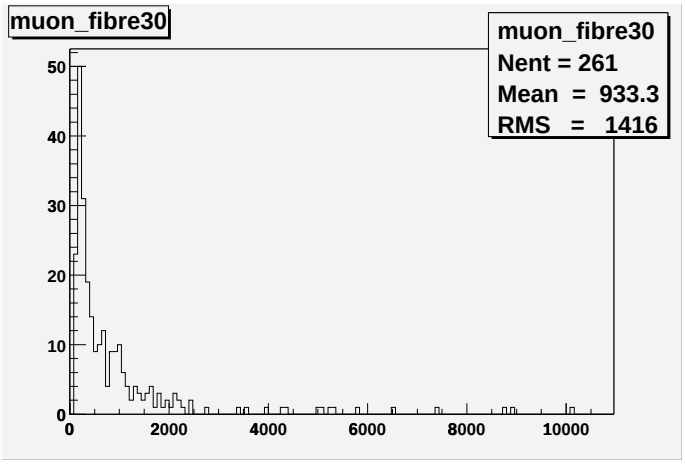
Linear fits to gain curves.

Results:

Muon Search

Look for coincidences between corresponding strips from two planes.





Results:

Linearity: NPE vs ADC

Histogram of gains from linear fits

Summary:

- ADC values increase linearly with light to 0.015%
- Mean/Sigma method for NPE calculation produces values which increase linearly with ADC values
- 1 photoelectron corresponds to 100 ADCs