Educational Alibava System

What can I do with an EASY ?

The EASY system illustrates the operation of a silicon strip detector with LHC readout electronics in 10 EXERCISES.

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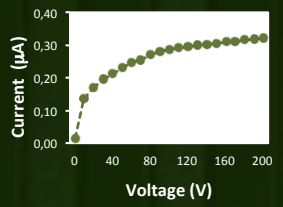
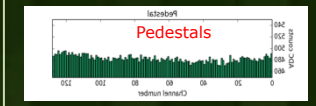
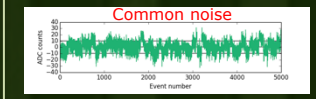
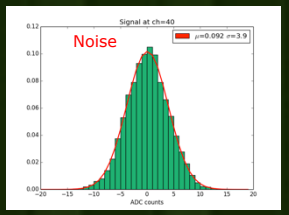
EXERCISE 1: verifies the performance of the silicon detector by measuring the leakage current



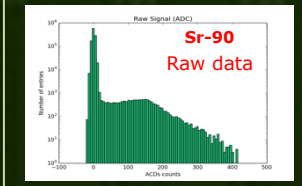
EXERCISE 2: introduces the student to the concepts of pedestal, common noise and electronic noise.

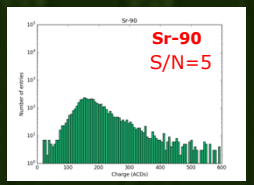




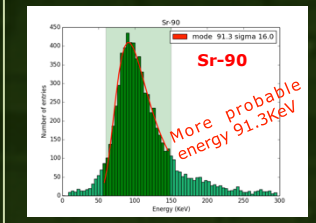


EXERCISE 3: explains the signal extraction from raw data, S/N and charge sharing and cluster formation.



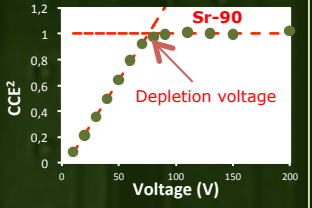


EXERCISE 4: is devoted to the synchronisation of the trigger signal and the data signal.

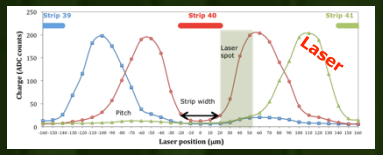


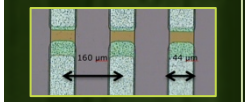
EXERCISE 5: gets the energy deposition of a minimum ionization particle (*mip*) in 300μm of silicon.

EXERCISE 6: the students will calculate the depletion voltage from the Charge Collection Efficiency (CCE).

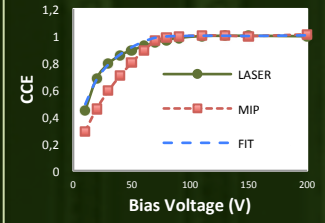


EXERCISE 7: the laser beam is used to demonstrate the strip structure of the detector.



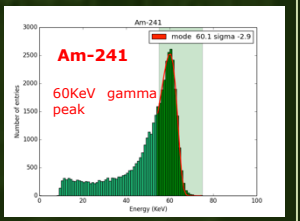


EXERCISE 8: introduces to the students the concept of space resolution assuming digital and analogical readout.



EXERCISE 9: the CEE of a *mip* and an absorbed 980nm laser beam are compared. The laser penetration is calculated.

EXERCISE 10: a self-trigger is used to determinate the energy of particles fully absorbed in 300μm of silicon.



MORE EXERCISES WILL FOLLOW ...

EASY is a PORTABLE, COMPACT and COMPLETE system

(Radioactive sources not included)

Control unit

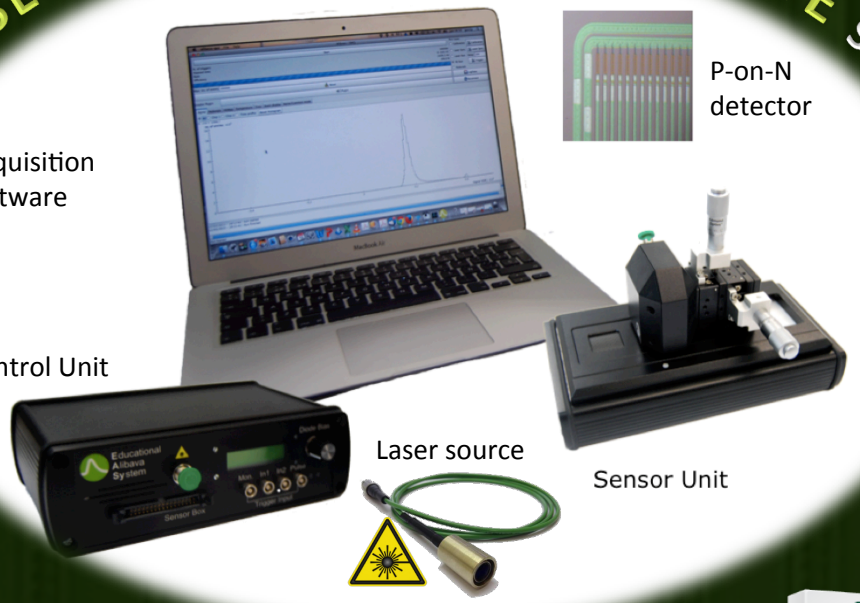
- Control of the acquisition process.
- Processing of the sensor data, trigger signals and laser source.
- Adjustable HV unit for microstrip sensor bias, with voltage and current display.
- Include the laser source
- Communication with computer software via USB

Sensor unit

- Hold the silicon microstrip detector and the Beetle chip.
- Opaque carbon window to place radioactive source.
- Laser micropositioner and focus system.
- A diode placed under the detector provides a trigger signal.

Silicon microstrip P-on-N Detector

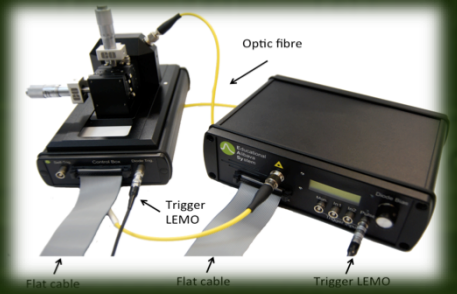
- Size: 20x20 mm^2
- Thickness: 300 µm
- Channels: 128
- Interstrip pitch: 160 µm



Beetle characteristics

- Low noise ASIC developed for CERN/LHC experiments
- 128 channels
- Clock speed 40MHz

Compact and portable



Plug-and-play system

Acquisition software for Windows, Linux and Mac, manual and exercises book