

Perforamnce of the ALIBAVA portable readout system with irradiated and non-irradiated microstrip silicon sensors

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A readout system for microstrip silicon sensors has been developed as a result of collaboration among the University of Liverpool, the CNM of Barcelona and the IFIC of Valencia. The name of this collaboration is ALIBAVA and it is integrated in the RD50 Collaboration. This system is able to measure the collected charge in one or two microstrip silicon sensors by reading out all the channels of the sensor(s), up to 256, as an analogue measurement. The system uses two Beetle chips to read out the detector(s). The Beetle chip is an analogue pipelined readout chip used in the LHCb experiment. The system can operate either with non-irradiated and irradiated sensors as well as with n-type and p-type microstrip silicon sensors. Heavily irradiated sensors will be used at the SLHC, so this system is being to research the performance of microstrip silicon sensors in conditions as similar as possible to the SLHC operating conditions.

The system has two main parts: a hardware part and a software part. The hardware part acquires the sensor signals either from external trigger inputs, in case of a radioactive source setup is used, or from a synchronised trigger output generated by the system, if a laser setup is used. This acquired data is sent by USB to be stored in a PC for a further processing. The hardware is a dual board based system. The daughterboard is a small board intended for containing two Beetle readout chips as well as fan-ins and detector support to interface the sensors. The motherboard is intended to process the data, to control the whole hardware and to communicate with the software by USB. The software controls the system and processes the data acquired from the sensors in order to store it in an adequate format file.

The main characteristics of the system will be described. Results of measurements acquired with n-type and p-type irradiated and non-irradiated detectors using both the laser and the radioactive source setup will be also presented and discussed.

Primary author: Mr MARCO-HERNÁNDEZ, Ricardo (IFIC(CSIC-UV))

Presenter: Mr MARCO-HERNÁNDEZ, Ricardo (IFIC(CSIC-UV))

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