

ALIBAVA: A compact readout system for silicon microstrip detectors

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The Alibava system has been developed in the framework of the CERN RD50 collaboration to test silicon microstrip detectors. The Alibava System is conceived to characterize strip radiation detectors, providing high sensitivity to small signals, high position resolution and high speed. The system is able to measure the collected charge in one or two microstrip silicon sensors by reading up to 256 channels in analog mode. Characteristics of detectors before and after irradiation, as a function of bias voltage or other variables (temperature, influence of magnetic field, etc.) can be studied in real operation conditions. The frontend electronics is based on the beetle chip and is a low noise ASIC with 128 input channels and a clock speed of 40MHz. The beetle chip has been designed by the ASIC laboratory of the University of Heidelberg and the Max-Planck-Institute for Nuclear physics in Heidelberg for the LHCb experiment. It is used by the LHCb Vertex Detector (VELO), the Silicon Tracker and the RICH. The mother board (MB) arbitrates the communication between the PC and the DB. The core of the MB is a FPGA block that is composed of a FPGA (Spartan 3, Xilinx) that controls hardware and commands and synchronises the readout. The board includes line driver amplifiers, 2 ADCs (10 bits) clocked at 40 MHz, a TDC for signal shape reconstruction, comparators and coincidence for logic handling of the trigger. The data passing to and from the computer is performed through a USB controller. The DC power needed by the MB and the DB are generated by DC-DC converters and LDO regulator. In this work we will present new results obtained with the Alibava system on heavy irradiated detectors and the future developments implemented to create a sophisticated scientific instruments to be used as particle telescope.

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