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Radiation study of the LHCb UT front-end readout ASIC

The LHCb Upstream Tracker (UT) is a new silicon strip detector of the phase-I upgrade. The detector signals are processed by custom-designed front-end ASICs, called SALT (Silicon ASIC for LHCb Tracking). The ASICs work at the sensor proximity. The radiation hardness in a radiation environment and radiation resilience of the ASICs are critical to the detector performance.

We studied the radiation effects of the SALT ASICs in a 100 MeV proton beam at CIAE (China Institute of Atomic Energy), and a 80 MeV proton beam at CSNS (China Spallation Neutron Source). In the former test, SEU (single event upset) effects in the registers have been studied to validate the chip design. In the latter study, we measured the SEU rates of event data and compared the possibilities that the SEUs happened in the memory buffer or during transmission.

In this presentation, the test facilities and setups, as well as the study methods will be described. Results of the two studies will be presented.

Submission declaration

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