

The Data-Acquisition System and new GPU-based L3 of the KOTO Experiment

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The KOTO experiment's main aim is to measure the branching ratio of the CP-violating $K_L \rightarrow \pi^0 \nu \bar{\nu}$ decay. However, data targeting other physics studies can also be recorded at KOTO. Events are rejected or tagged at the L1 stage of KOTO's DAQ based on total energy deposition in different detectors, and trigger modes with high rate are prescaled. The L2 has been recently expanded, increasing the bandwidth from L1 to L3 by a factor of 2 to more than 25 kEvents per second while keeping the event loss less than 1%. Each L3 node captures data at 40 Gbps. Events are offloaded to a GPU where reconstruction, selection, and compression are performed in parallel, reducing the data rate by a factor of 20. The increase in bandwidth at the L2, together with the capabilities of the new L3 allow to reduce prescale factors in favor of sophisticated online event selection. The DAQ system of the KOTO experiment and the design and performance of the new L3 are described in this talk.

Alternate track

I read the instructions above

Yes

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