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The NA62 Calorimeter Level 0 Trigger Operation and Performances

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The NA62 experiment at CERN SPS aims to measure the Branching Ratio of the very rare kaon decay K+ -> pi+ nu nubar collecting ~100 events with a 10% background to make a stringent test of the Standard Model in two years of data taking.

The Calorimeter Level 0 Trigger is used to suppress one of the main backgrounds, the K+ -> pi+ pi0 decay, and to select events with a pi+ in the final state.

The Calorimeter Level 0 Trigger identifies clusters in electromagnetic and hadronic calorimeters. It prepares time-ordered lists of reconstructed clusters together with the arrival time, position, and energy measurements of each cluster. It also provides trigger decisions based on complex energy and cluster multiplicity combinations.

The main parameters of the trigger processor are the high design hit rate (30 MHz) and the required single cluster time resolution (1.5 ns).

The calorimeter trigger processor is a parallel system composed of 37 boards, 111 mezzanines and 221 high-performance programmable devices housed in three 9U crates.

The Calorimeter Level 0 Trigger also provides a coarse-grained readout of the calorimeters that might be used in software trigger levels.

The NA62 experiment is currently taking data and the calorimetric trigger is used to suppress the background coming from the K+ -> pi+ pi0 decay and to trigger on many other medium-rare and exotic decays.

The design, operation and performances of the Calorimeter Level 0 Trigger are presented.

Experimental Collaboration

NA62

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