

The Data acquisition system of the NA62 experiment at CERN

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The NA62 experiment looks for the extremely rare Kaon decay $K^+ \rightarrow \pi^0 \mu^+ \nu_\mu$ and aims at measuring its branching ratio with a 10% accuracy.

In order to do so a very high intensity secondary beam from the CERN SPS is used to produce charged Kaons whose decay products are detected by many detectors installed along a 150m decay region.

The NA62 Data Acquisition system exploits a multilevel trigger system; following a L0 trigger decision, the 1MHz data flux from about 60 sources is read by a PC farm, the partial event is built and then passed through a series of L1 algorithms to further reduce the trigger rate. Events passing this level are completed with the missing, larger, data sources (~400 units) at the rate of 100KHz.

The DAQ is built around a high performance Ethernet network interconnecting the detectors to a farm of 30 PCs. After an overall description of the system design and the main implementation choices that allowed to reach the required performance and functionality, this paper describes the overall behaviour of the DAQ in the 2017 data taking period, which has been the first year of high intensity and high efficiency data taking for the experiment. It then concludes with an outlook of possible improvements and upgrades that may be applied to the system in the future

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