Contribution ID: **281** Type: **Poster**

The DAQ of the Mu3e Integration Runs

Tuesday, 18 October 2022 16:26 (1 minute)

The Mu3e experiment at the Paul Scherrer Institute (PSI) searches for the charged lepton flavour violating decay $\mu^+ \to e^+e^+e^-$.
The experiment aims for an ultimate sensitivity of one in 10^{16} μ decays.
The first phase of the experiment, currently under construction, will reach a branching ratio sensitivity of $2 \cdot 10^{-15}$ by observing 10^8 μ decays per second over a year of data taking.
The highly granular detector based on thin high-voltage monolithic active pixel sensors (HV-MAPS) and scintillating timing detectors will produce about 80 GB/s of data at these particle rates.

The Field Programmable Gate Array based Mu3e Data Acquisition System (DAQ) will read out the different detector parts.
The trigger-less online readout system is used to sort, time align and analyze the data while running.
A farm of PCs equipped with powerful graphics processing units (GPUs) will perform the data reduction and the identification of interesting events.

The poster presents the ongoing integration of the sub detectors into the DAQ, in particular focusing on the time aligning and the data flow inside the FPGAs of the filter farm.
It will show the DAQ system used in the Mu3e Integration Runs performed in spring 2021 and 2022.

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Session Classification: BBQ - Drinks & Posters