

EIC “Readout and DAQ” working group

Kick-off meeting
February 17th, 2020

Remarks concerning DAQ and trigger

Strongly depends on the kind of detector to read / physics to measure / background rates. Some general questions can be worked on now.

- Triggered or triggerless DAQ?
 - Identify pro/cons for each strategy - focus on general arguments rather than technical/economical details. Possibly provide experimental data (or at least simulations) to support these arguments.
 - Technical/economical reasons are important, but all numbers will be very different when the EIC will be built.
 - Event definition and construction?
 - Are we ok with the paradigm “1 trigger == 1 event” in the triggered case?
 - Do we save “events” in the triggerless case, or just time-stamped hits / reconstructed quantities?
 - Effect on the physics to be measured / strategies to validate the trigger?
- DAQ
 - Do we need a new DAQ infrastructure or can we adapt/reuse existing systems? *Depends on answer to question before.*
 - Complexity of trigger/filter decision? → How many trigger/filter levels?
 - How to implement online software filtering (relevant for triggerless system and for a L3 software trigger level)?
 - Interconnection with the reconstruction software is critical
 - How to simulate the trigger / filtering?

Remarks concerning DAQ and trigger

More technical issues:

- Triggered case:
 - Size of the analog array? Digitization rate? *Depends on the input rate / number of channels*
 - Time available for trigger decision, i.e. front-end maximum latency?
 - How to distribute timing to FE?
- Triggerless case:
 - Digitization rate? Size of the memory buffer? *Depends on the input rate / number of channels*
 - Identify existing chips / readout solutions compatible with a triggerless architecture, do we need something new?
 - How to distribute timing to FE and associate it to the streamed data?