Report of the trigger & DAQ discussion

Giacomo Traini and Luca Galli

giacomo.traini@roma1.infn.it

Luca.galli@pi.infn.it





DAQ troubles @ GSI : status

- <u>BM</u>: The trigger re-sync prevented to use the BM information with the proper time resolution (that means poor spatial resolution!) Solution: change the V2495 firwmare in order to remove the re-sync feature. Fixing in progress
- <u>VTX</u>: Some problems happened both at detector and at event building level. Fixing in progress
- <u>TW</u>: We experienced data transfer problems in long runs (event loss after a given number of events) from the WaveDAQ boards Fixed (tested by DAQ group during summer 2019)

An unpleasant memory: trigger test @ GSI



 Unfortunately, the planned tests of the fragmentation trigger did not take place due to the beam failure... we just observed the trigger rates scaled as expected



Towards CNAO 2020...



- We will have the chance to test the **trigger strategy**, implementation and efficiency measurements during the data taking.. everything needs to be planned carefully and in due time
- Several triggers to be tested are already known.
 - Minimum bias trigger: majority of SC.
 - Prescale fraction tuning
 - Frag1: Veto (central bars) + majority
 - Frag2: shall we add CALO (as veto)?
 - Check CALO in different positions to mimic frag with calo (coincidence already implemented)?
 - Neutrons (dedicated trigger?)

For each condition we need to decide: how many triggers, how many events, which setup. This is needed to plan with due time the data taking and time needed in the global schedule. 07/10/20

Trigger tuning



- We have to account some time to properly tune the timing of signals (delays, coincindence windows...) as well as the thresholds for the VETO(es). Knowing in advance the cables length, the detectors response and the jitter due to the physics, a reasonable guess of the threshold, delays, time windows that have to be used could be done in the incoming weeks.
- Test0: check if the trigger rates scales as expected with "safe" thresholds
- According to the foreseen reserved shifts and the other needs, maybe the trigger tuning could be performed in the "other nights" (in the meanwhile of the weeks). This has to be discussed
 - Quick analysis needed for threshold tuning

Efficiency measurement



A standard way to measure trigger efficiency would be to acquire a sample of events with the minimum bias trigger, recording the status of the other triggers, and using the a-posteriori reconstruction to compute the efficiency. With the hardware available at CNAO, this will could be done at expense of a very low trigger rate (<50 Hz, to be checked). We have to discuss if/when this measurement will be performed