Upgrade of the trigger system

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Overview of the trigger scheme







Sub-parts in trigger electronics





Part A (managed by the trigger group):

generates physics triggers.

Part B (managed by the DAQ group):

makes downscaling of the physics triggers (up to 16 triggers can be provided);

makes Before/After protection;

generates special triggers.



TTL outputs for pulses to Trigger electronics (B)

Upgrade of the TOU module





T0U Module Functionality:

Implements trigger logic in FPGA;

Recieves or provides I/O analog, NIM, TTL signals via cards 4;

Recieves LVDS signals via HDMI connectors 2;

Provides LV to FEE (cards 3, HDMI connectors 2);

Forms input signals to TDC (Molex connectors 1).

Points of upgrade:

- Improved input boards with discriminators (16 inputs)
- Additional I/O boards TTL (LEMO), up to 16 (old) + 24 (new) channels can be used to provide physics triggers or signals to scalers
- New power converter, capable to drive extended set of I/O cards
- Second USB 2.0 port + 2 optical links
- Status and plans:
- All parts are produced and delivered
- Assembly and testing planned for May-July 2021





Status of beam counters





Sketch of vacuum box for BC1 and VC

BC1 and VC Status and plans:

- Vacuum components ready
- PMT Hamamatsu R2490-07 available
- PMT sockets ordered, exp. May 2021
- PMT voltage dividers production, June-July 2021
- Scintillators 100x100x0.25mm³ (BC1) and Ø100x10mm, hole Ø27mm (VC) available
- Scintillator mount design in progress





Design of BC2 PMT base and FEE

Sketch of vacuum box for BC2

BC2 Status and plans:

- Vacuum components ready
- MCP-PMT XPM85112/A1-Q400 (Photonis) available
- PMT base and FEE parts, produced and delivered
- PMT assemby and testing, May-June 2021
- Scintillators BC400B 30x30x0.15mm³ available
- Scintillator mount design in progress



Upgrade of Si Multiplicity Detector



Current status

- trapezoidal detectors (tested, ready for mount on PCB)
- 2 PCBs (design in progress)
- 2 FEE boards 32 ch each (similar to what was used in 2018, but not the same, because of higher noise level due to larger strips area)
- light and EM shielding (design in progress)
- mechanical support (design in progress)

Detector parameters:

- opening for the beam. Dia. 50 mm
- 8 trapeziodal detectors
- 64 strips in total
- 525 μm thick

In the trigger scheme the same electronics module as in 2018 will be used for SiD

BD Shielding from δ -electrons







Centrality selection with BD and SiD triggers



DCM QGSM, Au+Au, 4GeV/n, 300µm



At these thresholds the background level in triggered events is <10% Background from Δ -electrons limits our ability to organize MinBias trigger with BD and SiD

Triggers from Fragment Detector (FD) and neutron zone of FHCal (nZDC)



Currently considered FD: thin scintillator or quartz plate viewed by single PMT (XP2020Q or XP2041 both available)

Ordered 150 x 150 x 1 mm³ quartz 150 x 150 x 0.5 mm³ BC-408



Impact parameter, fm

BM@

Thank you for your attention