Vernier Scan

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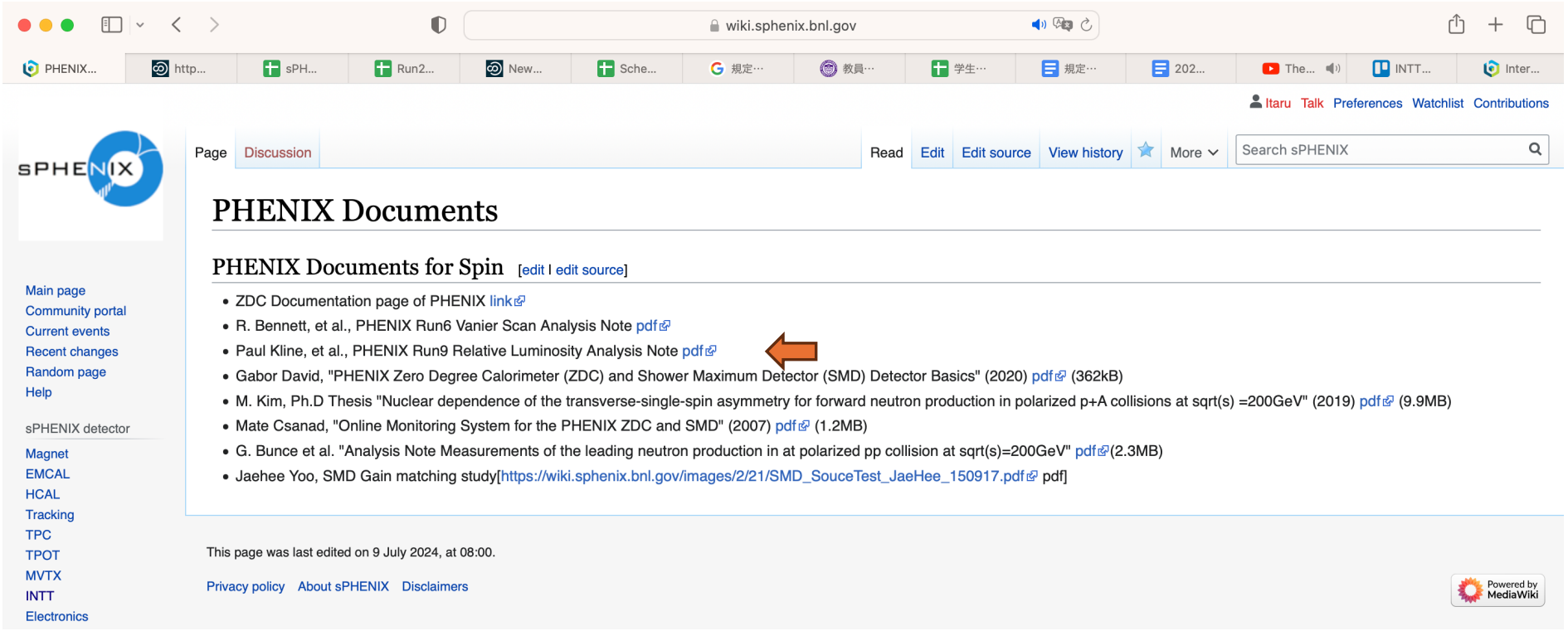
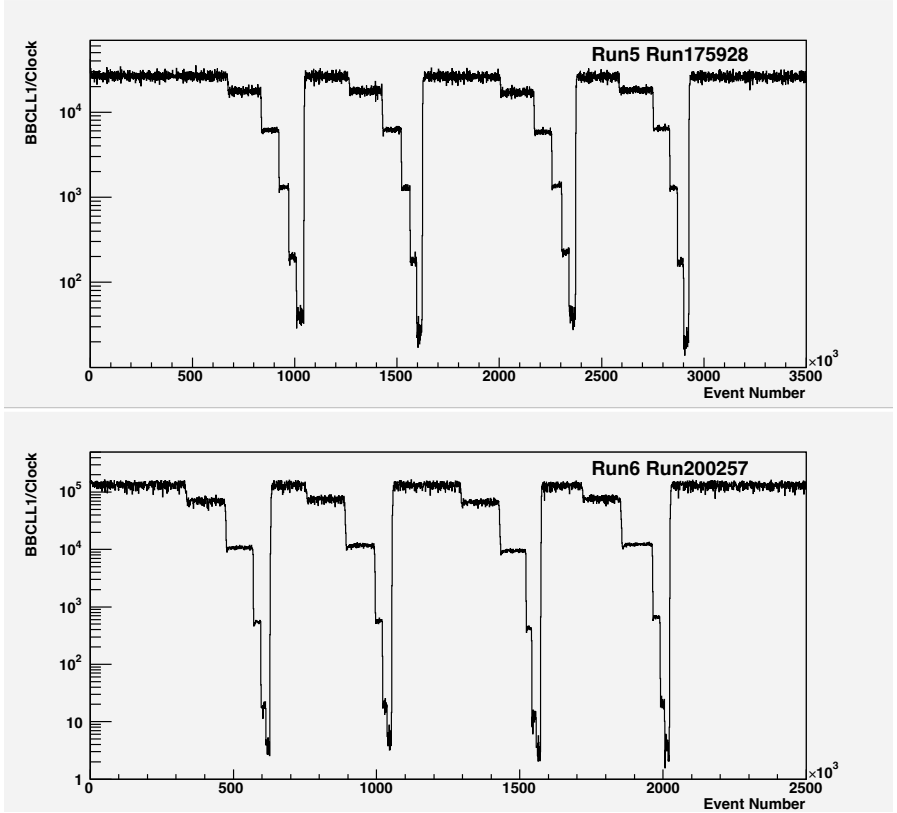
Reference



https://wiki.sphenix.bnl.gov/index.php?title=PHENIX_Documents

Vernier Scan

BBC rate vs Time



Beam position vs time

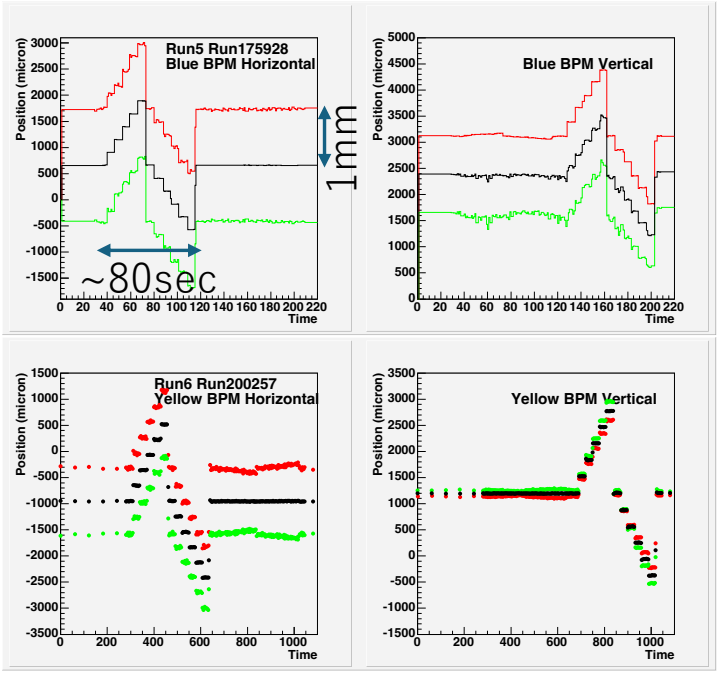


Figure 2: Positions measured by BPM vs time on the south side (7 o'clock) of the IR (Red) the north side (8 o'clock) of the IR (Green) and the mean of the two (Black) for typical two runs in Run5 and Run6. In run5-run175928, the north side measurement shows a unstable behavior and give an unreliable result. The south side measurement is good.

Vernier Scan DAQ

- Activate only GL1p scalers in the DAQ.
- Start rcdaq.
- Call MCR to start steering the magnets on either side of the sPHENIX IP to step one of the beams (blue or yellow) across the other (Angelika should know the procedure).
- Typically the beam is moved every thirty seconds by a few hundred microns. The decrease and subsequent increase in the rates in the MBD can be monitored by the scaler display.
- Once scan is completed (typically 5 minutes), MCR supposed to give a call to 1008.
- Stop rcdaq. Make an entry to cold-QCD channel (Time, Run#).

GL1p trigger mapping

- Last updated : 2024/6/6

(Martin - I added the current GL1 trigger numbers as I see them)

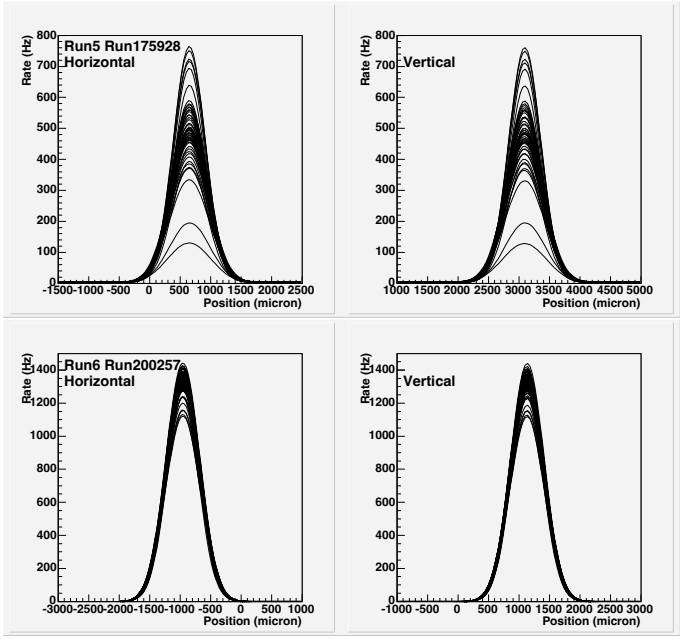
Channel	Trigger	GL1 Trigger number
0	MBD NS	10
1	MBD VTX	14
2	MBD +/-10cm VTX	12
3	MBD S	8
4	MBD N	9
5	ZDC NS	3
6	ZDC S	1
7	ZDC N	2
8	CLOCK	0

Data to be provided from MCR

- Beam Position Monitor (BPM) information (how do we synchronized with sPHENIX data needs to be sorted out) for the beam position during the scan.
- Wall Current Monitor (WCM) and the Direct Current Current Trans- former (DCCT) for the beam current information.

Analysis

$$(\mathcal{L}_{\mathrm{machine}})_i = \frac{f_{\mathrm{beam}}}{2\pi(\sigma_H)_i(\sigma_V)_i}(N_b \cdot N_y)_i,$$



- N_b,N_y : From WCM
- σ_H, σ_V : From Gaussian fitting for each bunch