

# ZDC/SMD progress & status— “summarized”

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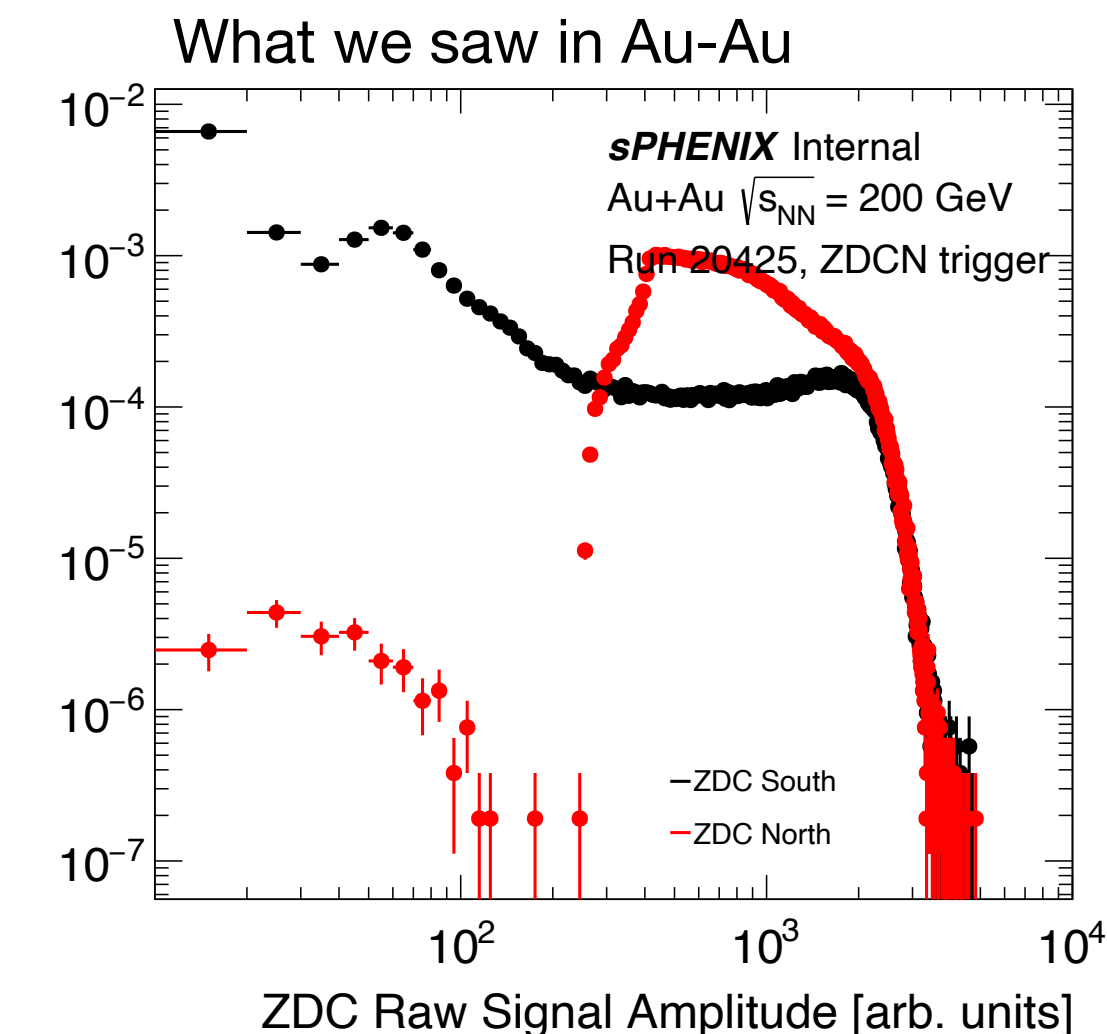
# At last collaboration meeting (12/06/23, ZDC presentation):

[https://indico.bnl.gov/event/21052/contributions/83844/attachments/51470/88042/ZDC\\_readinessv2.pdf](https://indico.bnl.gov/event/21052/contributions/83844/attachments/51470/88042/ZDC_readinessv2.pdf)

- Charge veto counter installed
- SMD mapping complete
- ZDC online monitoring implemented
- ZDC trigger threshold?
  - Set at 20mV for run 2023
  - Noise level (with no beam) ~ 1mV. We could drop threshold to 2mV (John H.)
- ZDC time and vertex calibration?
- Worth investing time into this? Rely solely on the MBD?

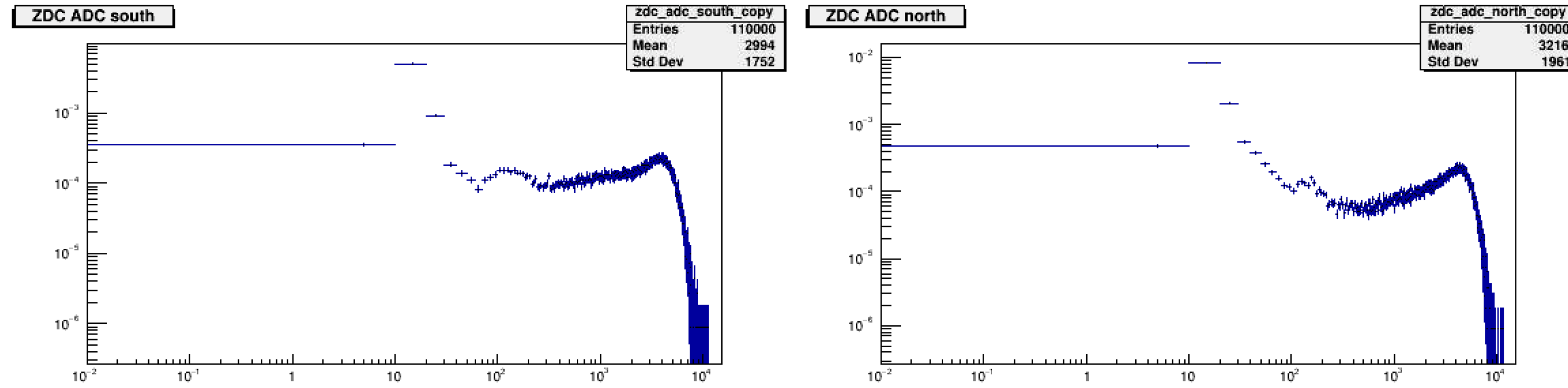
## Work remaining/ issues to address

- **Charged particle veto around the ZDC**
  - Need hodoscopes upstream of the ZDC
  - May need to acquire cables
- **Instrumented the SMD right before beam ended**
  - Yet to complete the SMD mapping
- **ZDC time calibration**
  - WIP, initial studies by P. Steinberg
- **ZDC online monitoring**
  - Implementation can be addressed before beam
- **Issues to address**
  - Optimize the trigger threshold
    - Important for new run to make sure we trigger on a substantial fraction of the pp cross section
    - John made some adjustments w/o beam this year
  - See plot to the right of **raw** ZDC signal, where the ZDC north was the trigger



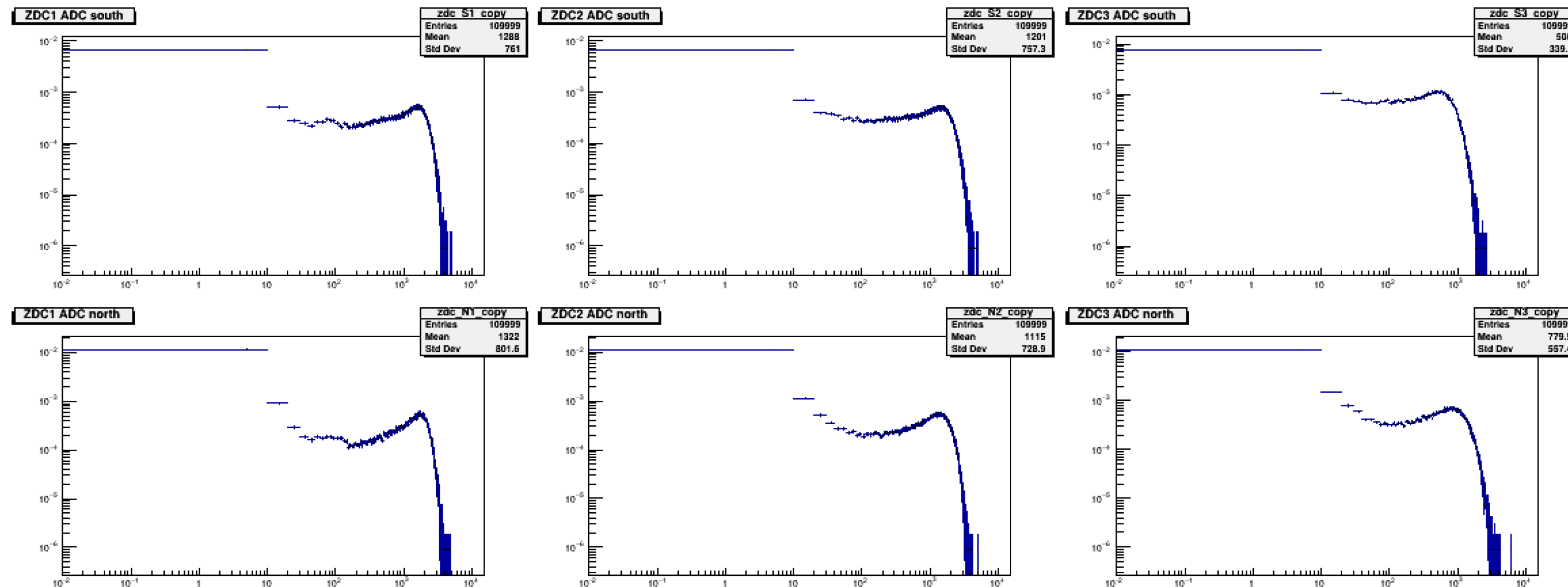
# ZDC Online Monitoring

ZDCMONDRAW\_1 Run 24787, Time: Tue Aug 1 09:04:17 2023



south and north raw signal sums

ZDCMONDRAW\_2 Run 24787, Time: Tue Aug 1 09:04:17 2023



Raw signal per Channels

# At last collaboration meeting (12/06/23, spin presentation):

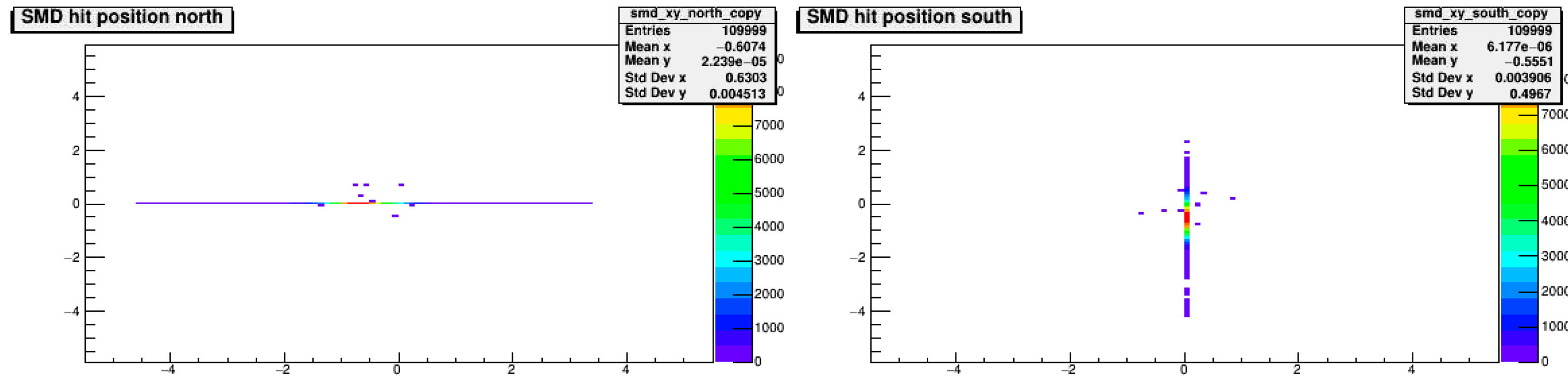
[https://indico.bnl.gov/event/21052/contributions/83849/attachments/51471/88033/231205\\_SpinForRun24v4.pdf](https://indico.bnl.gov/event/21052/contributions/83849/attachments/51471/88033/231205_SpinForRun24v4.pdf)

- SMD commissioned with new electronics
- SMD online monitoring implemented
  - Verification from cold QCD group?
- Spin online monitoring implemented
  - Verification from cold QCD group?
- Vernier scan (upcoming)
- Scaler GL1p bunch-by-bunch?

## The work that remains to be done

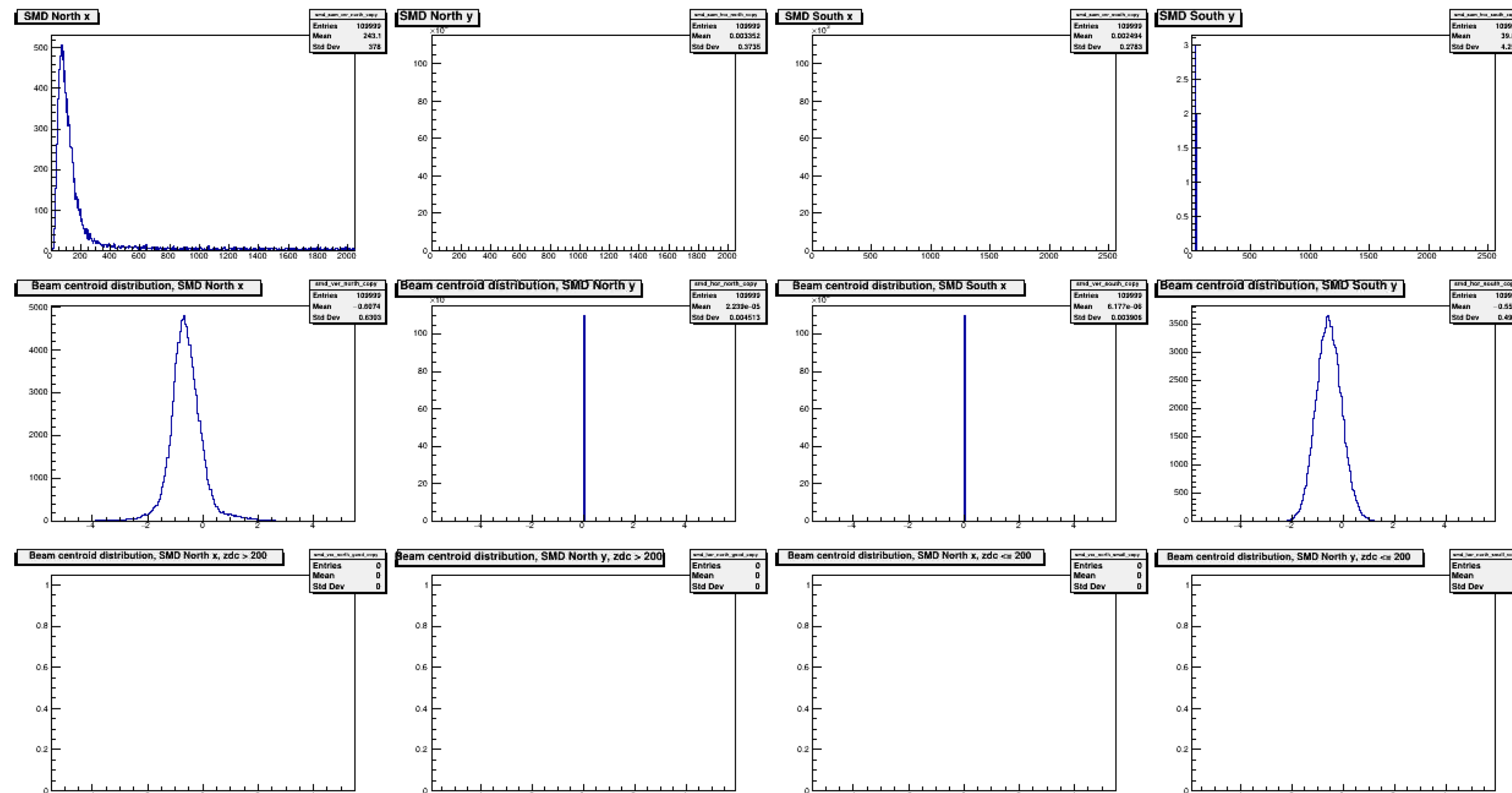
Item	Hardware	DAQ/Software
Local Polarimetry	SMD needs to be commissioned with new electronics (February?)	ADC/Timing readout and scaler GL1p bunch-by-bunch + Online monitor (January?)
Relative Luminosity	ZDC and MBD	scaler GL1p bunch-by-bunch (January?)
Spin Pattern Recording		http-based delivery from CAD ✓ and saved in the spin database (Used to be broad casted via V124)
Spin Online Monitor		Modify PHENIX online monitor?
Vernier Scan (1 <sup>st</sup> attempt of the scan at 2mrad crossing)	Singlet scaler	

# SMD Online Monitoring



SMD south and north hit positions

ZDCMONDRAW\_2 Run 24787, Time: Tue Aug 1 09:04:17 2023



SMD south/north horizontal/vertical signal

# Mappings for SMD and Veto counter

<https://sphenix-intra.sdcc.bnl.gov/WWW/run/2024/ZDC-SMD/>

## North SMD

SLAT	Patch Channel @ SMD	RG58 Cable Label	RG58 Cable Label (New)	Amplifier Model 776 Input	SE-Differential Input	HardMetric Differential Cable	ADC Channel
H1	1	1	N-SMD-H1	1	13	E-S-1-3 (North SMD)	16
H2	2	17	N-SMD-H2	2	12		17
H3	3	3	N-SMD-H3	3	15		18
H4	4	18	N-SMD-H4	4	14		19
H5	5	5	N-SMD-H5	5	9		20
H6	6	23	N-SMD-H6	6	8		21
H7	7	7	N-SMD-H7	7	11		22
H8	8	22	N-SMD-H8	8	10		23
V1	9	9	N-SMD-V1	9	5		24
V2	10	10	N-SMD-V2	10	4		25
V3	11	11	N-SMD-V3	11	7		26
V4	12	12	N-SMD-V4	12	6		27
V5	13	13	N-SMD-V5	13	1		28
V6	14	19	N-SMD-V6	14	0		29
V7	15	15	N-SMD-V7	15	3		30
SUM	16	16	N-SMD-SUM	16	2		31
				Last Update		07/03/2024	Added Labels
						01/03/2024	Confirmed f
						26/01/2024	Added ADC
						09-03-2024	Added SE-I

## South SMD

SLAT	Patch Channel @ SMD	RG58 Cable Label	RG58 Cable Label	Amplifier Model 776 Input	SE-Differential Input	HardMetric Differential Cable	ADC Channel
H1	1	1	S-SMD-H1	1	13	E-S-1-4 (South SMD)	32
H2	2	2	S-SMD-H2	2	12		33
H3	3	3	S-SMD-H3	3	15		34
H4	4	4	S-SMD-H4	4	14		35
H5	5	5	S-SMD-H5	5	9		36
H6	6	6	S-SMD-H6	6	8		37
H7	7	7	S-SMD-H7	7	11		38
H8	8	8	S-SMD-H8	8	10		39
V1	9	9	S-SMD-V1	9	5		40
V2	10	10	S-SMD-V2	10	4		41
V3	11	11	S-SMD-V3	11	7		42
V4	12	12	S-SMD-V4	12	6		43
V5	13	13	S-SMD-V5	13	1		44
V6	14	14	S-SMD-V6	14	0		45
V7	15	15	S-SMD-V7	15	3		46
SUM	16	18	S-SMD-SUM	16	2		47
				Last Update		29/02/2024	Fixed cor
						26/01/2024	Added AI
						09-03-2024	Added SI

## Veto counter

Arm	Counter	RG58 Cable No.	RG58 Cable Label	Differential Module Channel	SE-Differential Input	HardMetric Differential Cable	ADC Channel
North	Front	21	N-Veto-Front	1	13	E-S-1-5 (N&S Veto)	48
	Back	14	N-Veto-Back	2	12		49
South	Front	19	S-Veto-Front	3	15		50
	Back	23	S-Veto-Back	4	14		51
				Last Update		07/03/2024	Added Diffe
						06/03/2024	Added RG5
						09-03-2024	Added SE-I

**To do! Add SMD & Veto counter to offline calo tower builder**

# To-dos

- Check veto counter signal. Previous check showed noisy signal
- ZDC-SMD survey after relocation (moved by 1.8cm)
- Add SMD & veto counter to offline reconstruction software
- Update Detector status page: (<https://sphenix-intra.sdcc.bnl.gov/WWW/run/2024/ZDC-SMD/>)
- Any way to check effect of changing ZDC trigger threshold without beam?
- ZDC now assigned to seb20. Testing in progress. Potential GL1 firmware issue observed where event count between GL1 and sEPD/ZDC is not equal
- More hardware work for SMD/ veto counter?
- ???