

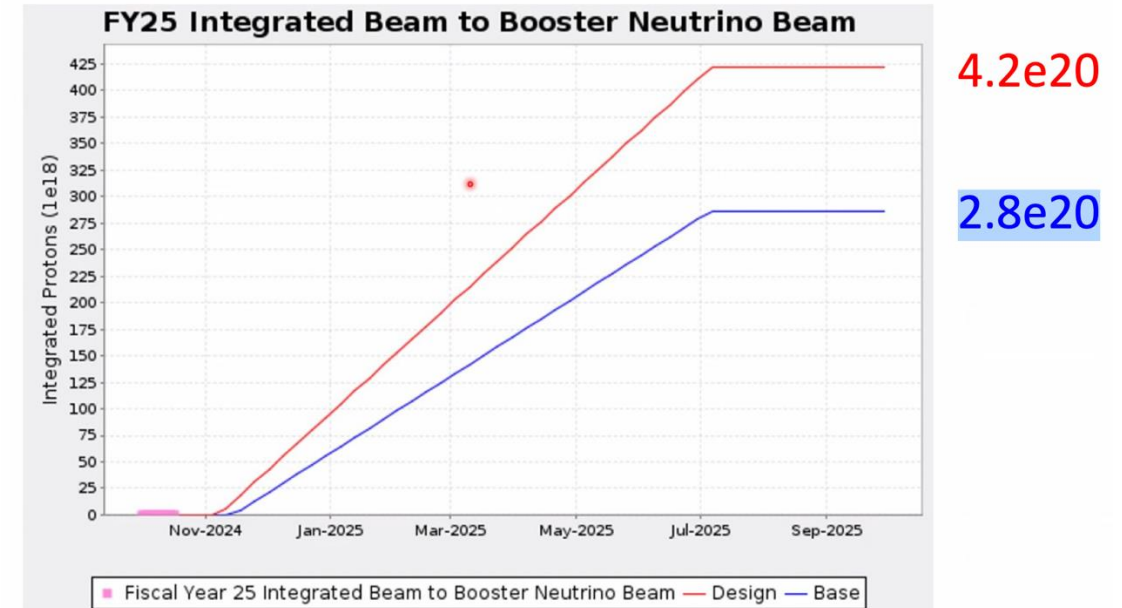
SBND update

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Nov 14, 2024

Beam

- BNB beam is coming very soon (next week?)
- Data access policy
 - Open data: **3%** of total collected data, $\sim 1e19$ POT per year
 - Distributed across the three years of running
 - Each year, $\frac{1}{2}$ open data is added immediately
 - Assuming MicroBooNE's wirecell neutrino selection efficiency, **in open data**
 - **intrinsic nue CC [fully + partially contained]:** **$\sim 200 \times 3$ years**, for development
 - (MicroBooNE open data – $5e19$ POT, 46 intrinsic nue CC)
 - **numuCC [fully + partially contained]:** **$\sim 50k \times 3$ years**, for development



Trigger plan

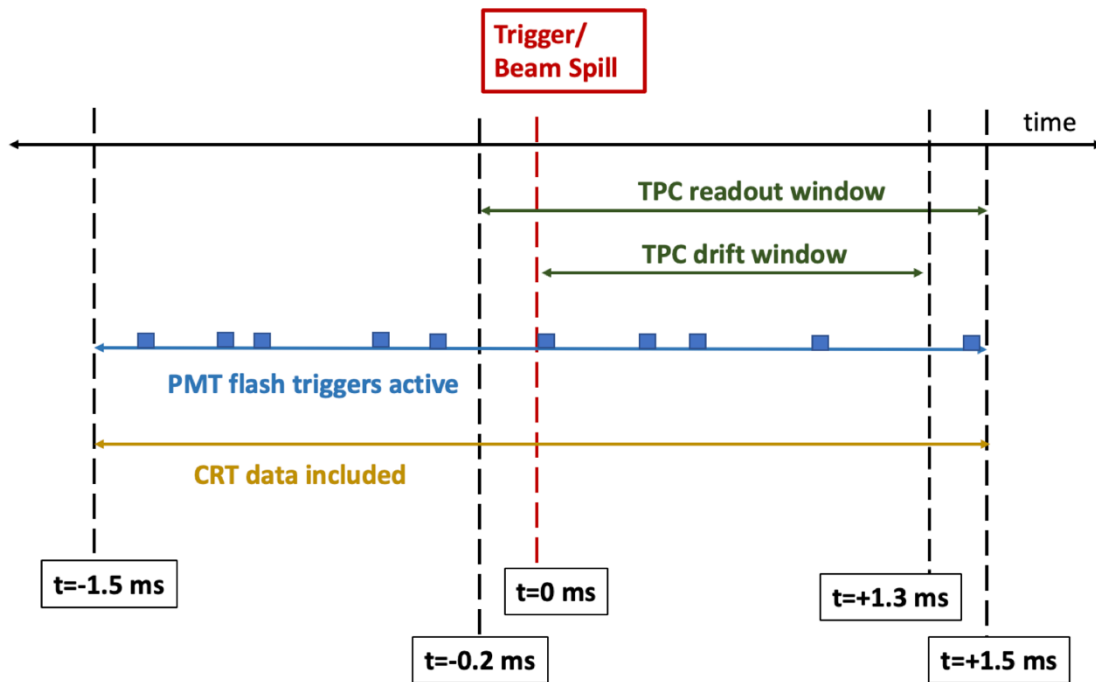


Figure courtesy of M. Stancari

Commissioning Trigger Menu – run all 5 concurrently		
	description	purpose
BNB +light	beam+light	neutrino interactions
off-beam +light	strobe+light (but not during beam spill)	measure cosmic background in BNB+light stream
BNB zero bias	every beam spill (prescaled)	trigger efficiency, commissioning
off-beam zero bias	strobe (prescaled, not during beam spill)	data/MC comparison, overlays
crossing muon	two CRT walls (+light), (prescaled)	commissioning, calibrations

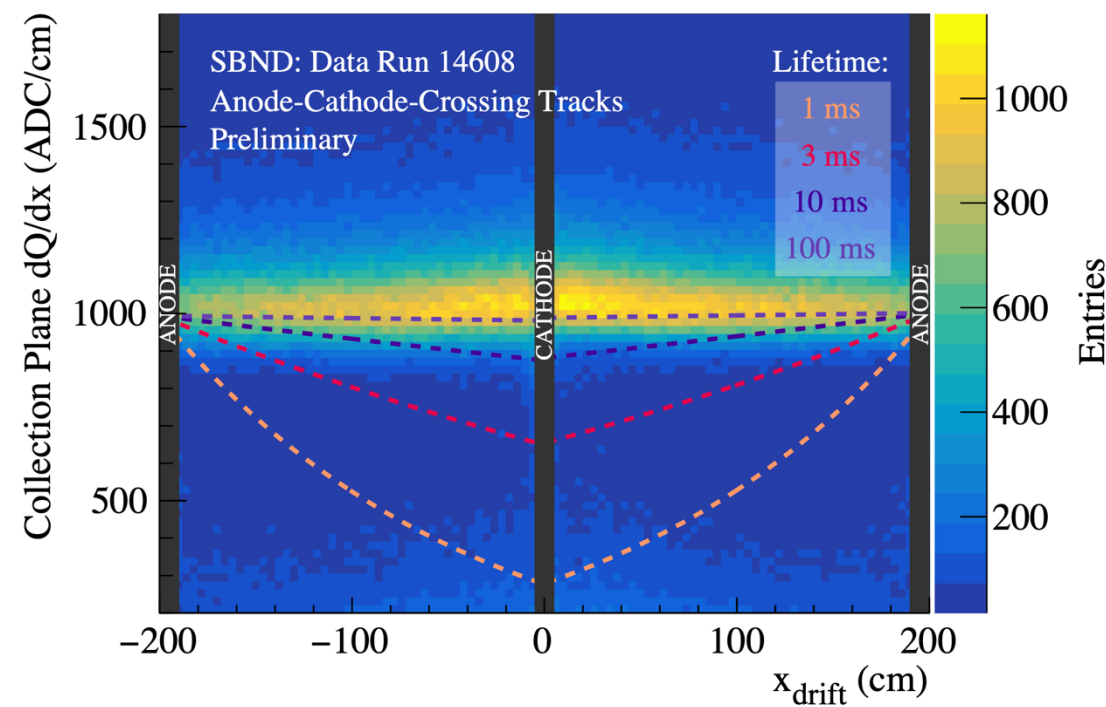
Calibration

data taken in early July

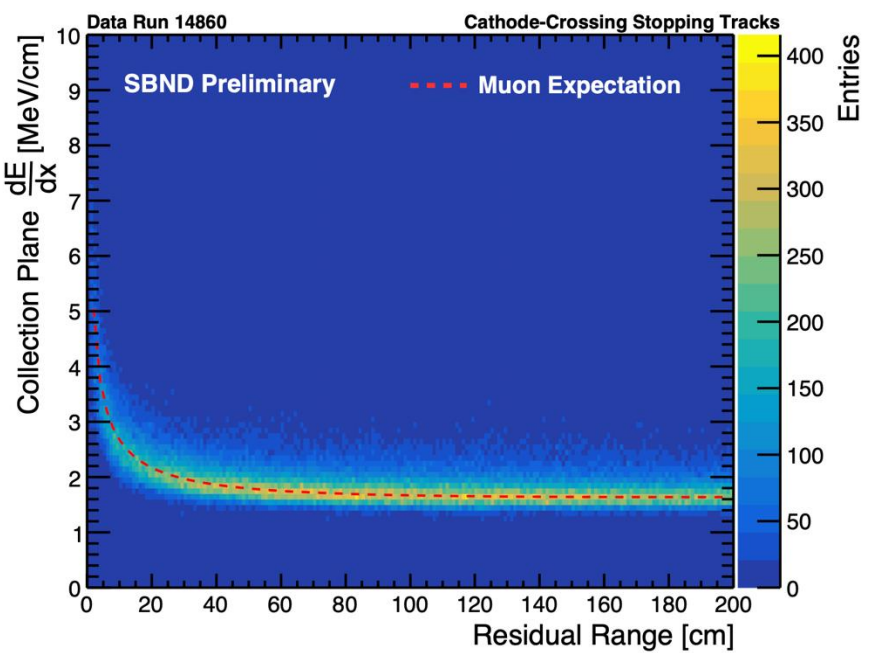
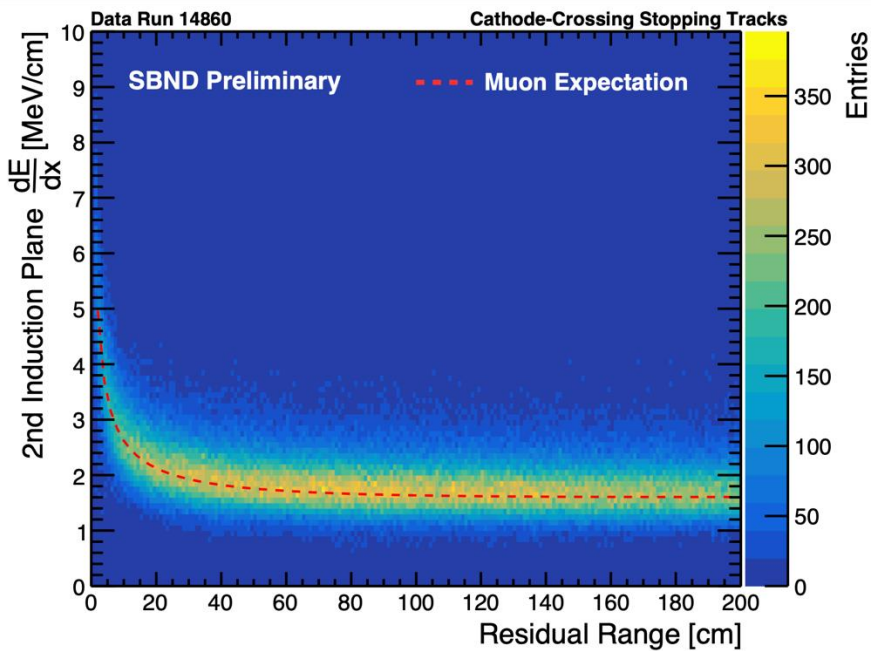
Table 2. Measured calibration constant for Run 14860.

Plane	$C_{cal} (\times 10^{-2} \text{ADC/electrons})$
1st induction	2.035 ± 0.003
2nd induction	2.110 ± 0.003
Collection	1.928 ± 0.003

- Electron lifetime: 50 -150 ms range

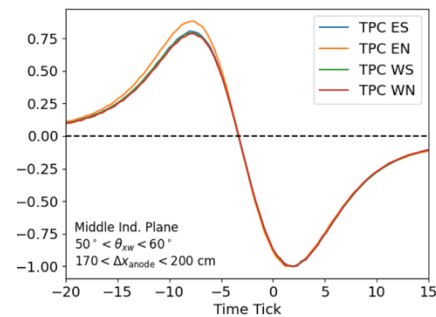


Sungbin Oh

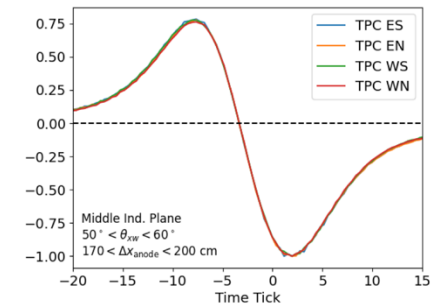


Charge uniformity improvement by changing wire bias voltage

Y plane @ +420 V
V plane @ 0V
U plane @ -200 V



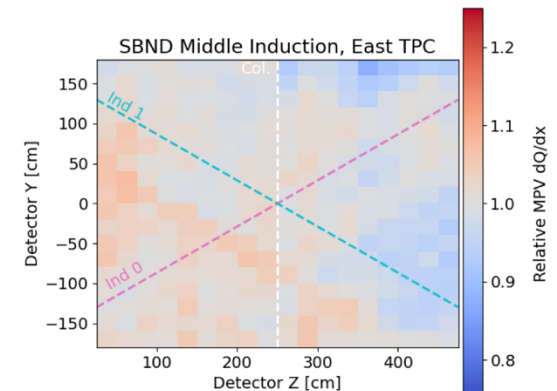
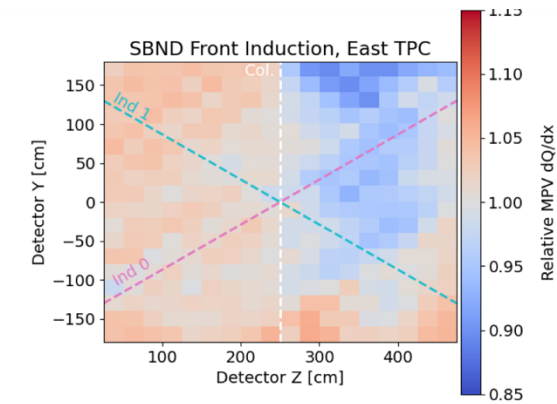
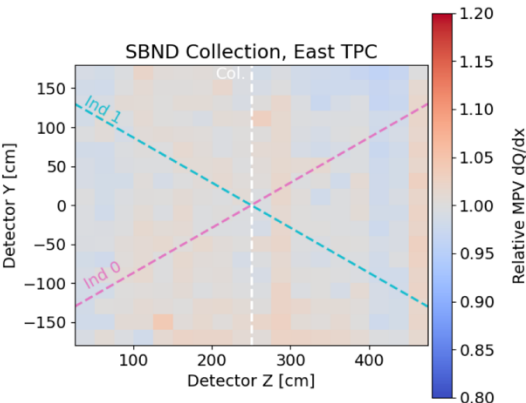
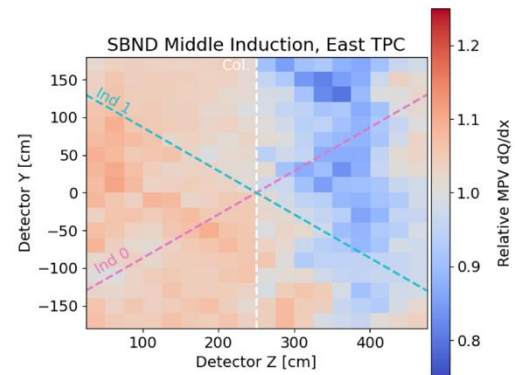
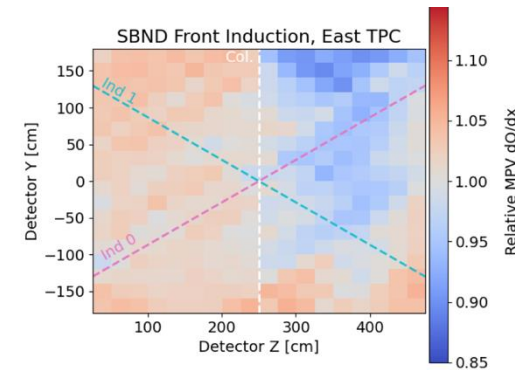
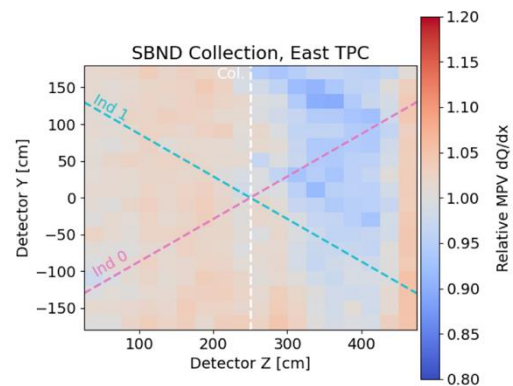
Y plane @ +600 V
V plane @ 0V
U plane @ -210 V



East TPC Variable Intransparency

- Y nominal, U nominal
- ~10-15% variation in North-East TPC

East TPC Performance Comparison: Optimized

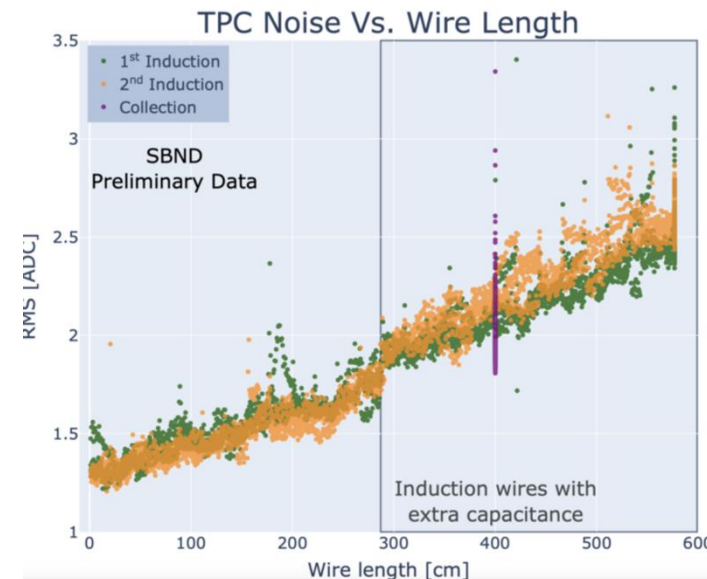


WireCell signal processing and simulation update

- Electronics calibration [done]
 - shaping, gain correction in data processing [in PR]
 - undershoot/overshoot [not obvious]
 - nonlinearity calibration done, implementation requires new coding, will do at a later time]
- RC response – “measured” to be 0.5 ms in the pulser data
- Field response calibration [we will hear update soon]
- Noise filtering [concluded; good performance and signal protection]
- Tear drop issues [to be further discussed]
 - seems to be random fluctuation of low frequency noise
 - MP2 & MP3 as a solution?
 - ROI refinement tuning?
 - DNN ROI serves the purpose of removing tear drops
- Noise simulation update
 - intrinsic [almost done]
 - coherent [potentially]

DNN ROI

- good performance
- implication on Pandora reco
- memory reduction on CPU
- testing on GPU



WireCell 3D imaging + clustering + charge-light matching

- This is the focus in next steps, also leadership's expectation
- by early Dec & presentation in next SBND collaboration meeting
 - 3D imaging + clustering workflow ready
 - first pass hand scan on data events
 - try best to make the relevant codes (mostly I/O modules) be in larwirecell release (part of sbndcode)
- by Christmas
 - ramp up charge-light matching effort
 - detailed plan (time table, task divisions)
- a bit aggressive goal
 - early next year wirecell generic neutrino selection in SBND