Request for a Performance Plots Approval

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Overview

- I would like to request an approval of performance plots demonstrating the timing precision of INTT in Run-24
- Analysis note: https://sphenix-invenio.sdcc.bnl.gov/records/xe0ng-36d24

Data used for the analysis

- **INTT Timing scan**
  We conducted a INTT delay parameter scan last year (May 2024)
  to tune INTT timing relative to GTM/GL1.

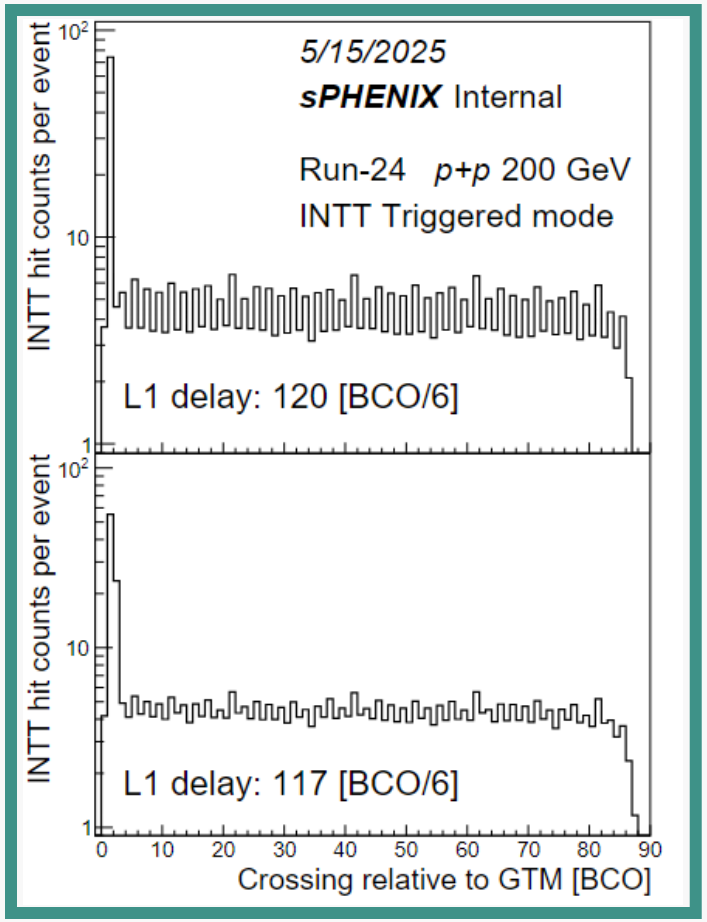
- **Run conditions**
  - RHIC fill pattern: 74 x 74
  - Trigger condition: MBDNS≥1
  - Data taken during the commissioning phase in local mode.

- **Event selection: first 100k events in each run were used, and INTT hot channels removed.**
  - Details in the analysis note

Run	L1 delay [BCO/6]
43291	127
43288	126
43285	125
43283	124
43282	123
43280	122
43278	121
43276	120
43313	119
43408	120
43410	119
43412	118
43413	117
43414	116
43415	115
43417	114
43421	113
43426	112
43441	110
43436	108
43438	107
43440	106

Plots waiting for the approval

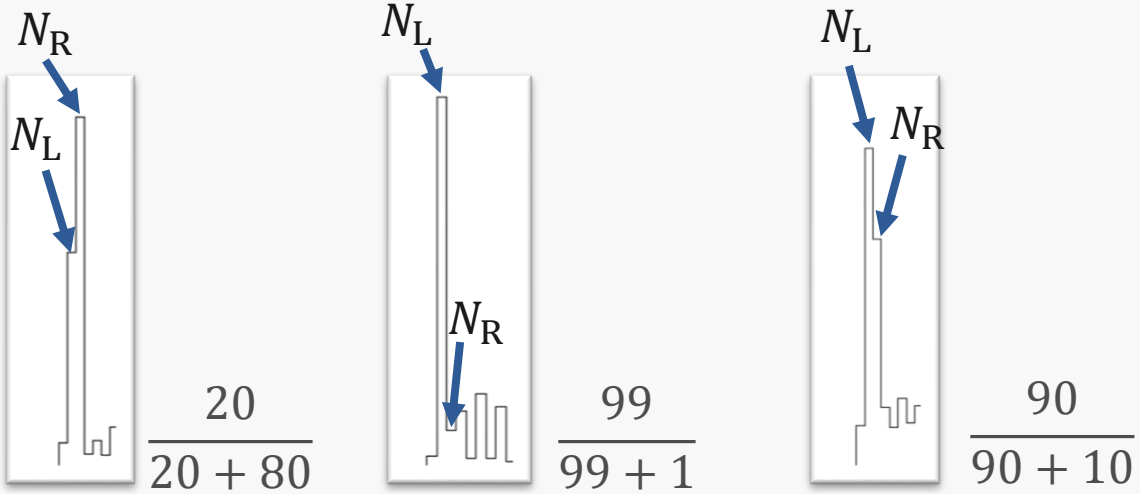
- Comparison of different delay settings.
- L1 delay of 120 shows a sharp peak indicating sub-bunch-crossing time resolution of INTT.

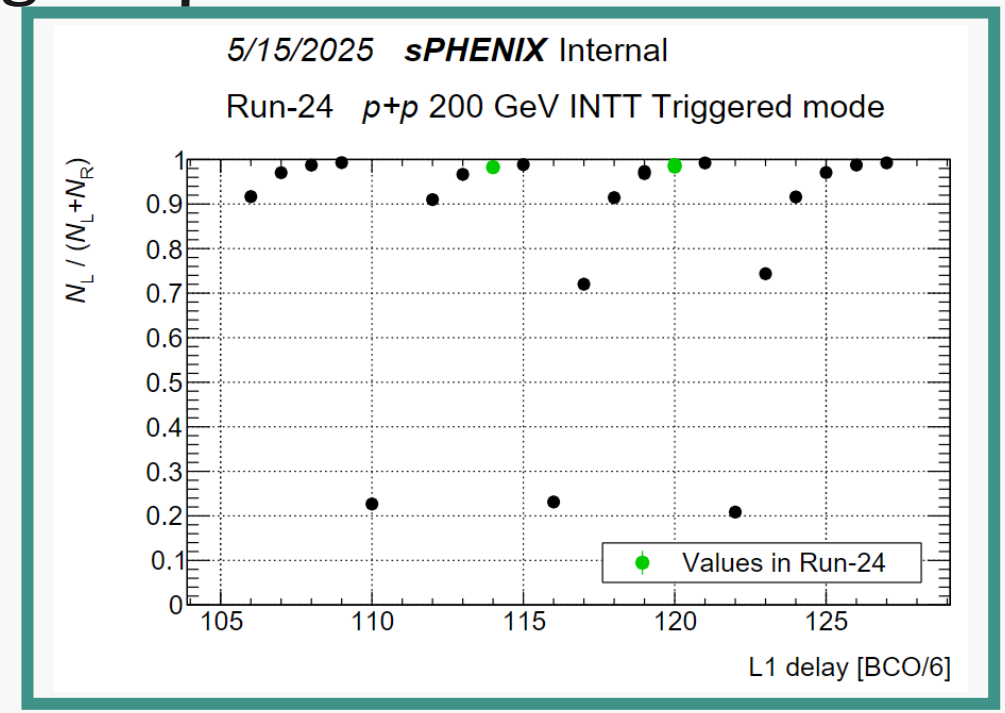


- Message of this plot: Delay optimization and performance evaluation are crucial for INTT.

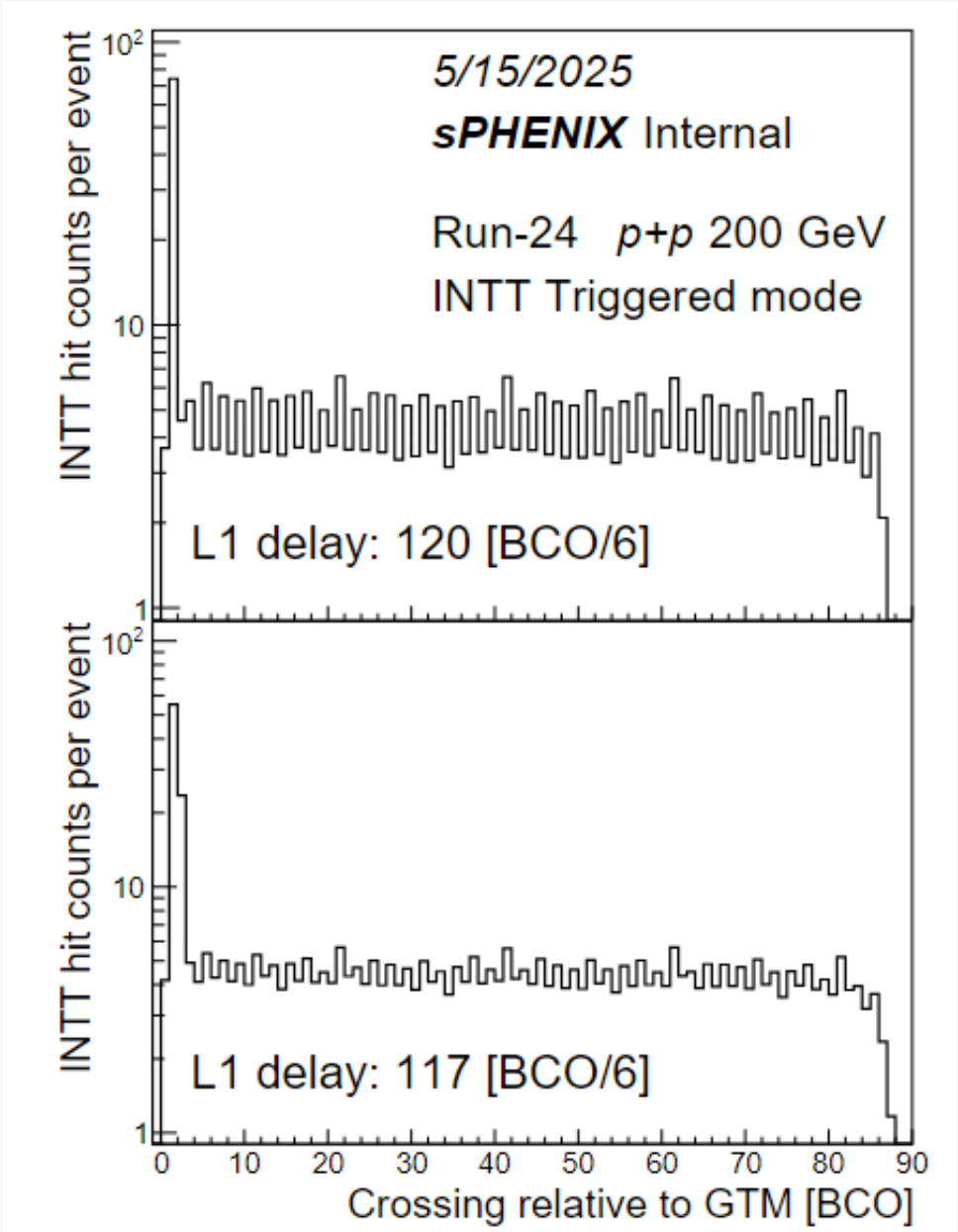
Plots waiting for the approval

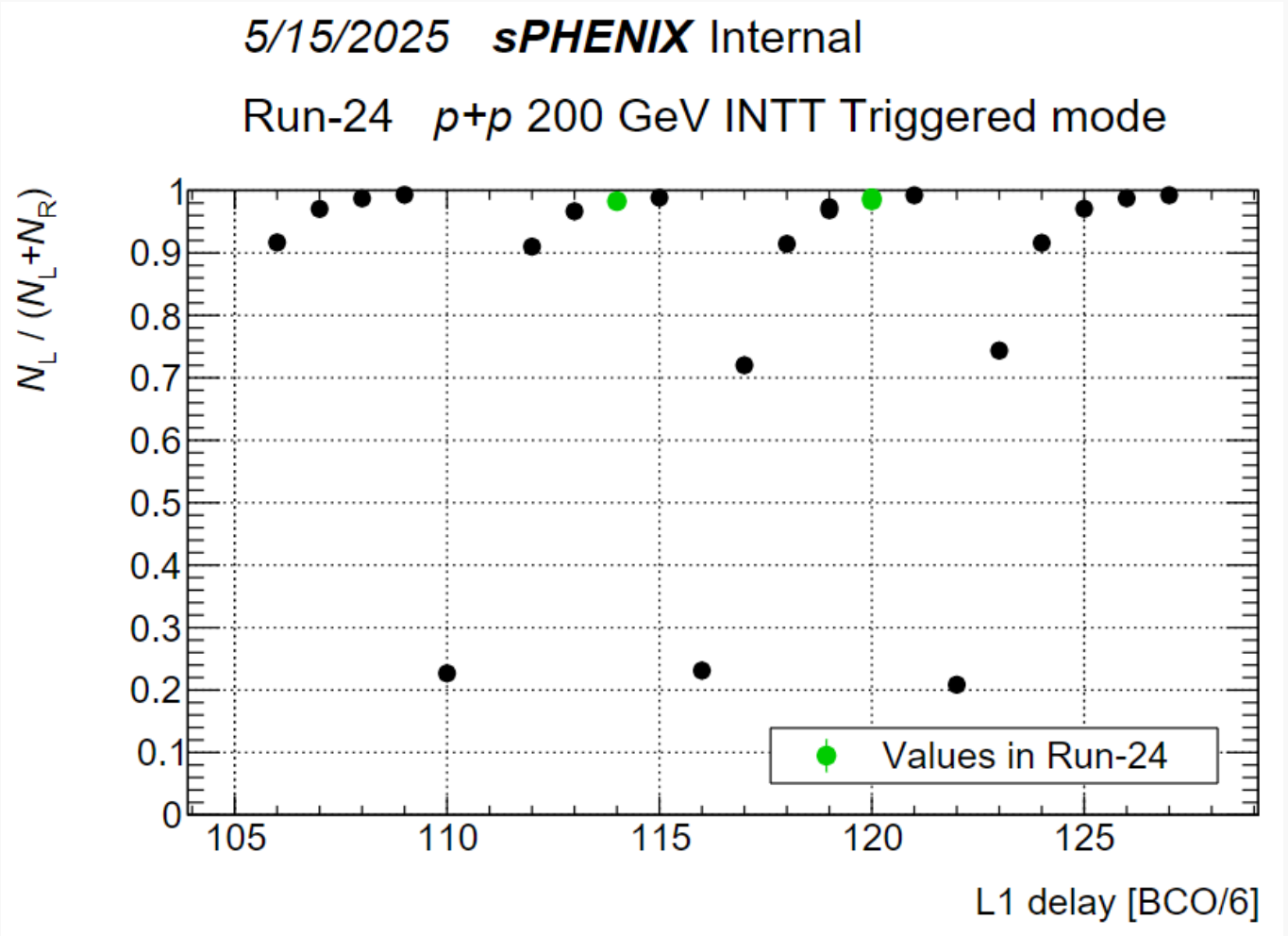
- An index was calculated for an evaluation of how good each setting was, based on 2 bins that were considered sharing the peak.
- Method to choose the 2 bins





- The index is $\frac{N_{\mathrm{Left}}}{N_{\mathrm{Left}}+N_{\mathrm{Right}}}$; A value close to 1 → The setting is good.
- Message of this plot: INTT was operated with good settings during Run-24. INTT recorded almost all hits within 1 BCO interval.


5/15/2025
sPHENIX Internal
Run-24 p+p 200 GeV
INTT Triggered mode
INTT hit counts per event
L1 delay: 120 [BCO/6]
INTT hit counts per event
L1 delay: 117 [BCO/6]
Crossing relative to GTM [BCO]


5/15/2025 sPHENIX Internal
Run-24 p+p 200 GeV INTT Triggered mode
$N_L / (N_L+N_R)$
Values in Run-24
L1 delay [BCO/6]