PNS Run @ DUNE VD ColdBox Update

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PNS for PDS Calibration Meeting

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Outline

- Installation Update

- DAQ Interface

- First Look at some Data

- Conclusions

PNS Installation

- The PNS was installed at the ColdBox using the polyethylene shielding that was previously used at ProtoDUNE-I PNS run

  - ~10cm of lead in front of the shielding, with a 12cm window

  - 7.5cm of borated polyethylene with 12cm window

- The PNS is placed off-center W.R.T. the active volume (~60 cm)

  - Support structures on the ColdBox & stair platform necessitated this change

- PNS is running in burst mode at 80hz w/ 400us pulse width

DAQ Interface
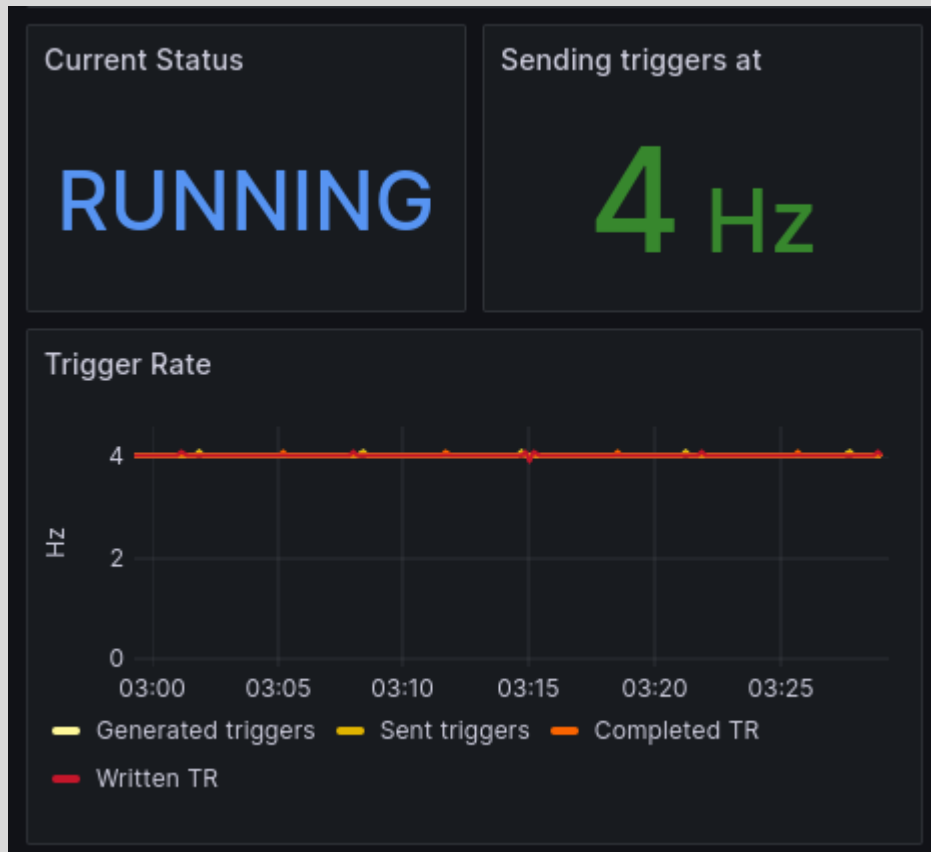
- The synchronized pulse provided by the DDG was not triggering the DAQ

- We are using the second channel of the pulser to trigger DAQ

  - The pulse that triggers the DDG and the pulse that triggers the DAQ were confirmed to be synchronized using an oscilloscope

- With CRP and PD data we can take data at 4Hz

  - Wesley created the config for the DAQ and it is triggering correctly using a prescale factor

- The PNS needs to be cycled every 30 min to remain in burst mode – PNS log output shows exact timestamps

First Look: CRP Data

- CRP is seeing a higher concentration of events on the PNS side of the ColdBox
    - The events are roughly estimated to be in the several MeV range – good sign!
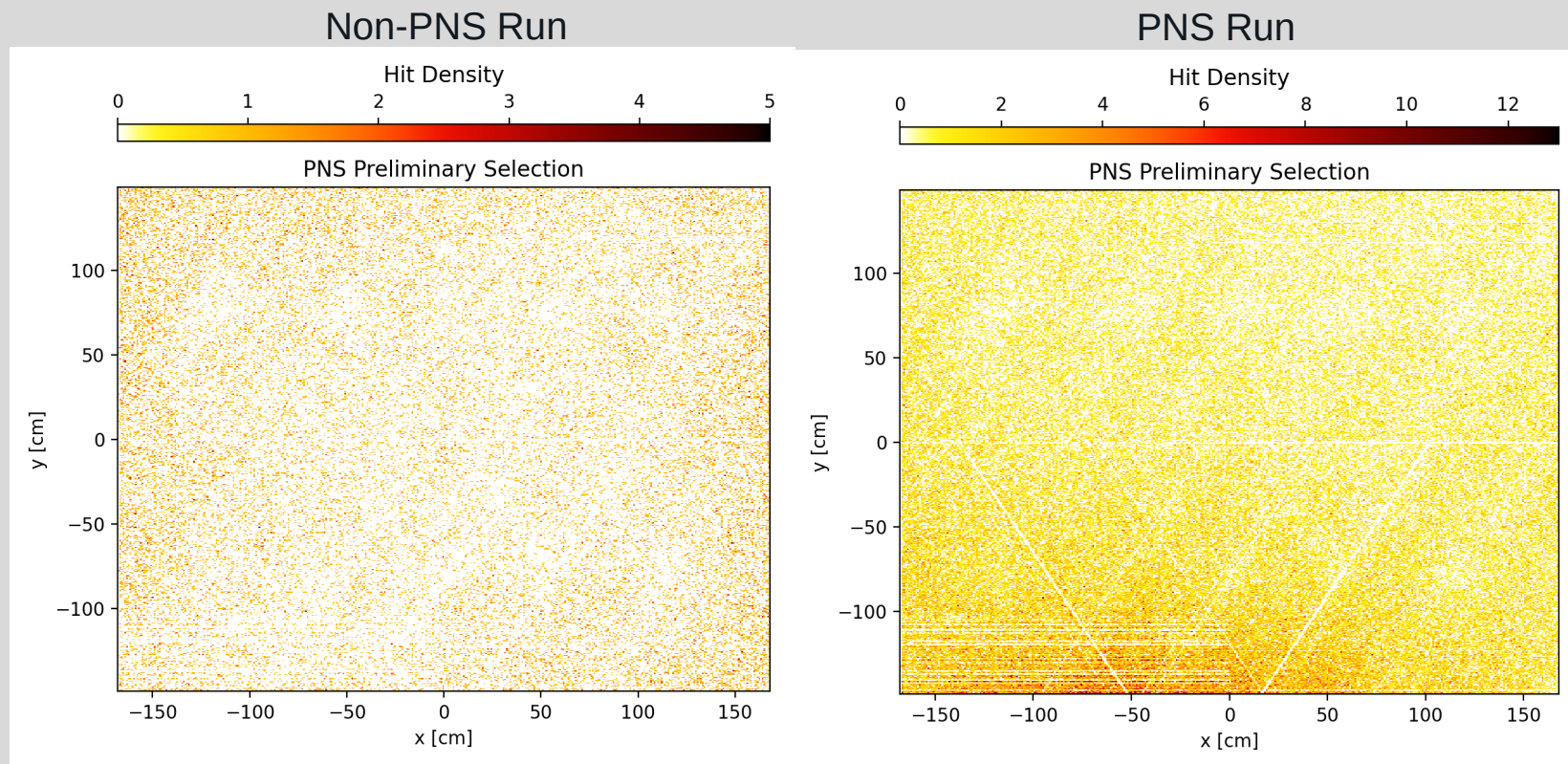
Plots by: Laura Zambelli

First Look: PD Data

- In the PD data we see some potential candidate events in a few wave forms that we have taken a look at

- It appears that there is elevated activity during the 400 us neutron pulse – neutron captures and prompt gammas
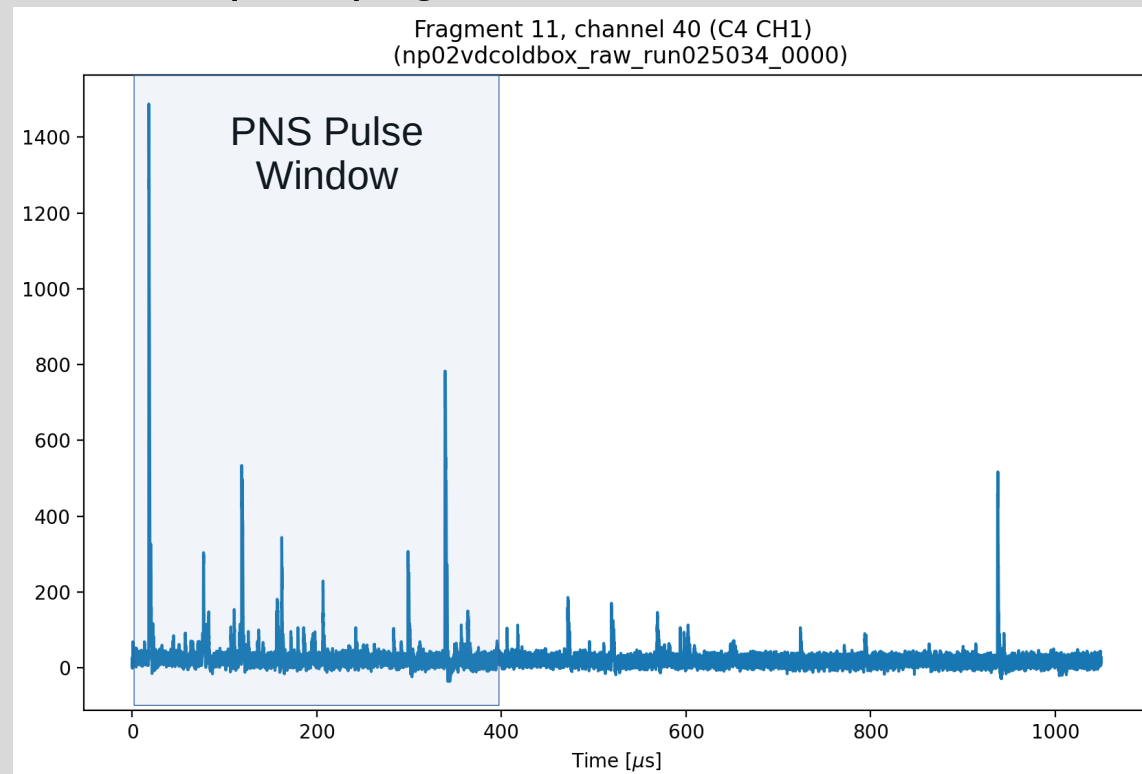
Plot by: Sam Fogarty

First Look: PD (Continued)

- When looking at PDS peaks throughout the PNS run from yesterday, compared to a run with no PNS we see an excess throughout the 1ms DAQ window which is skewed toward the start of the PNS Pulse
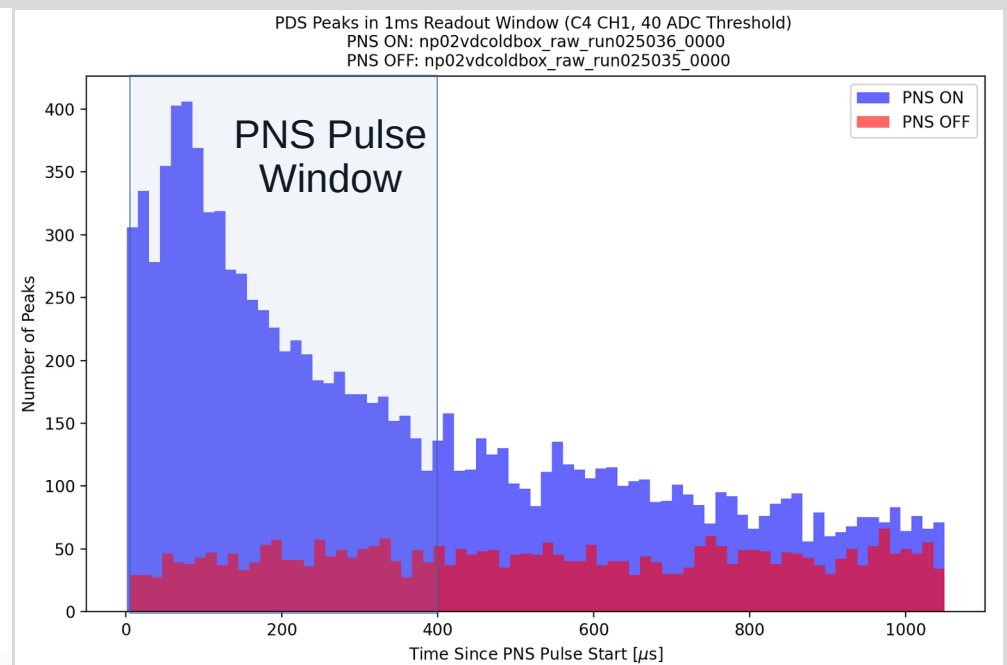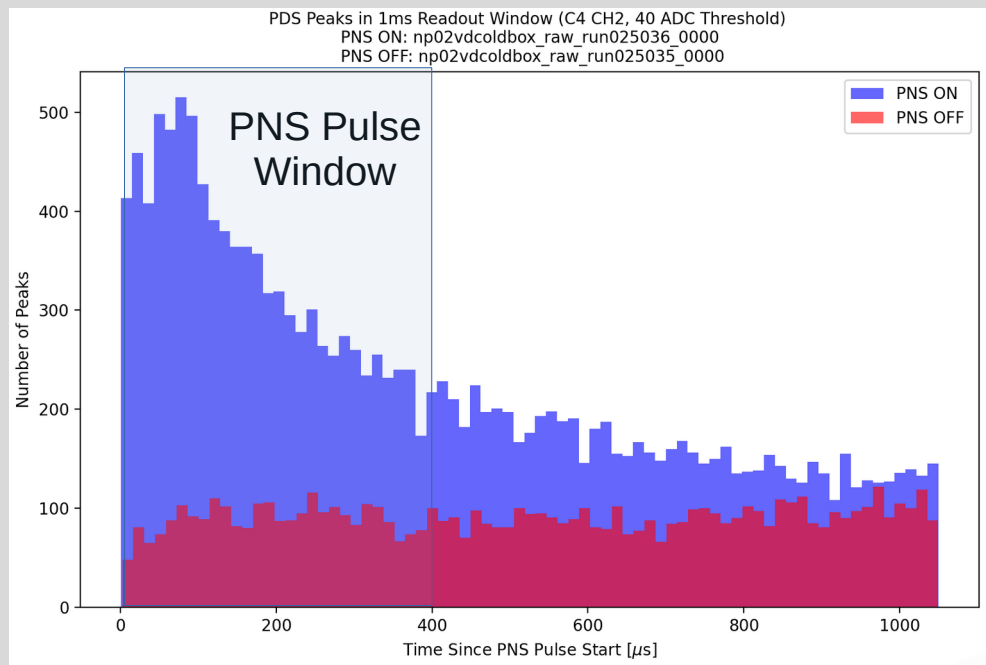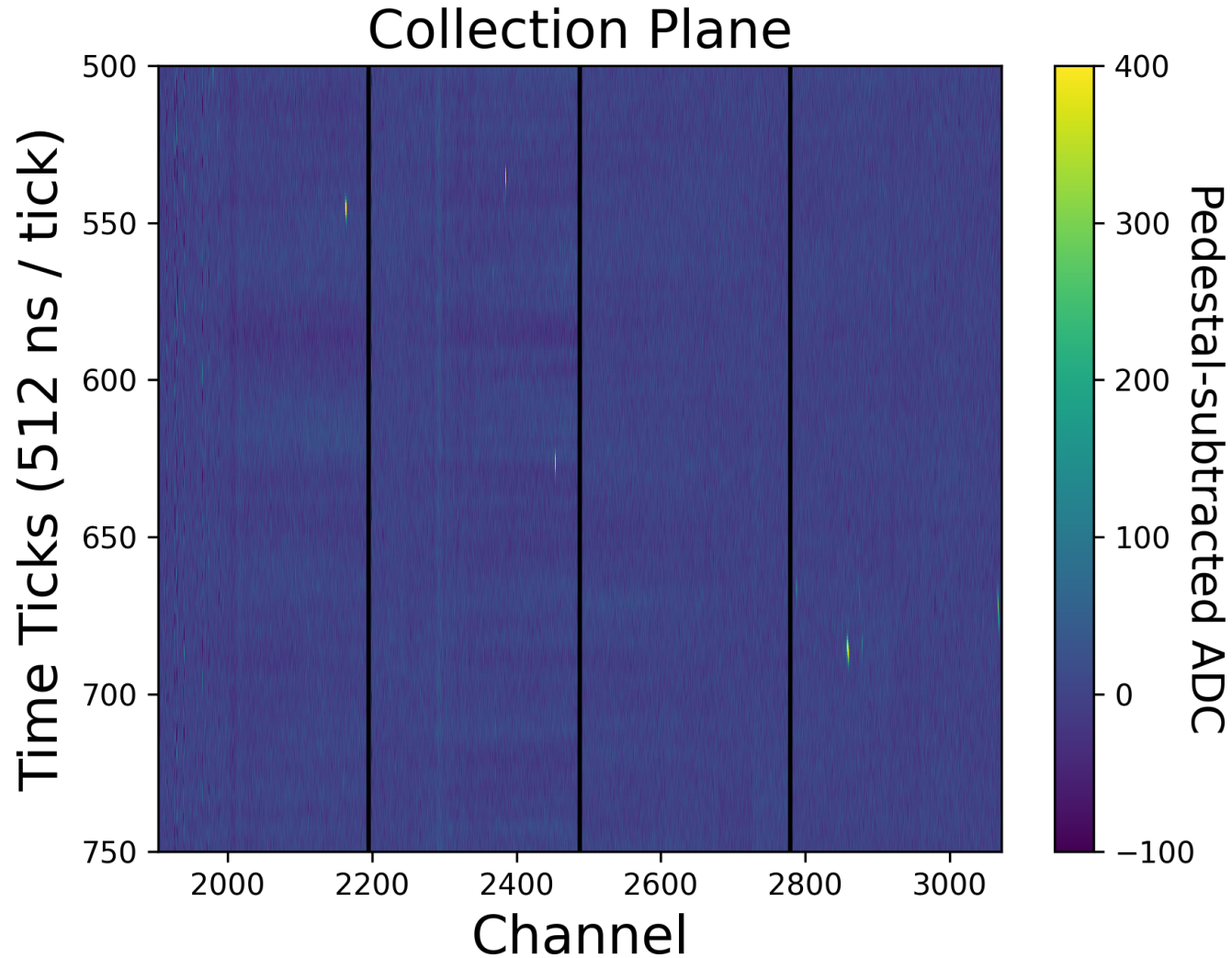

Plots by: Sam Fogarty

Conclusions

- PNS has been successfully installed

- Data taking is progressing smoothly

- Preliminary looks at the data are promising

Example EVD

Provided by:
Roger Huang