

DUNE VD ColdBox PNS Run Update

Walker Johnson

South Dakota School of Mines and Technology, Department of Physics



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CALCI Consortium
Meeting

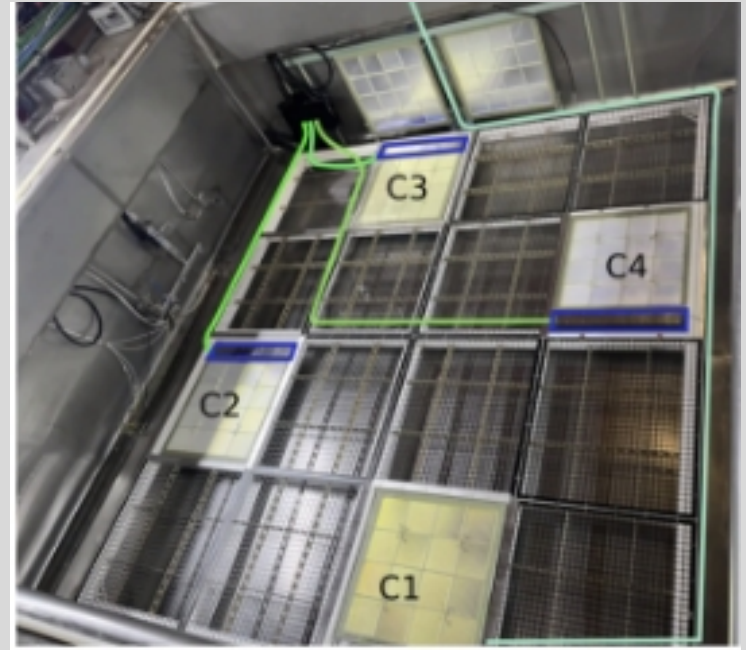
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Overview

- Motivation for PNS at ColdBox
- Current Status
- Conclusion

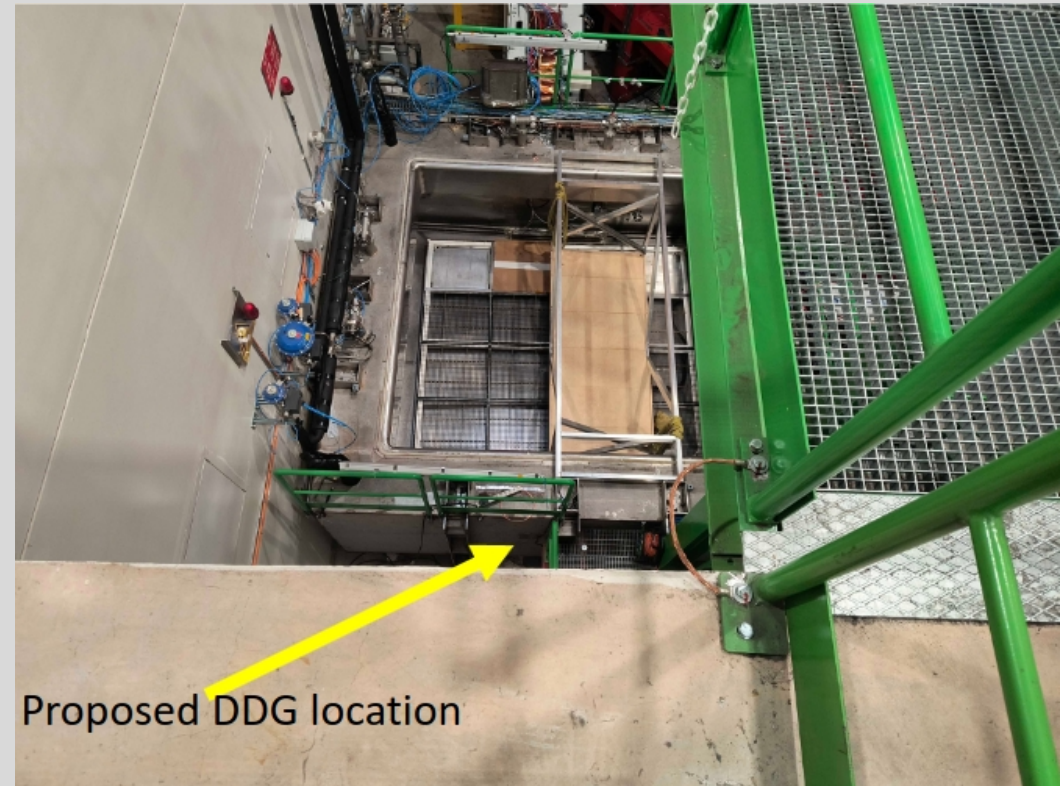
Motivation

- Neutrons capturing on Argon produce a gamma cascade with a well defined energy (6.1 MeV) which can be used as a standard candle for calibration
 - The PNS is one of the main calibration strategies for DUNE Far Detector
 - Can we also use neutrons for PD Calibration?
- ColdBox offers a convenient LArTPC to test the capabilities of the PNS as a calibration source for photodetectors
 - The detector houses 6 X-Arapuca photon detectors



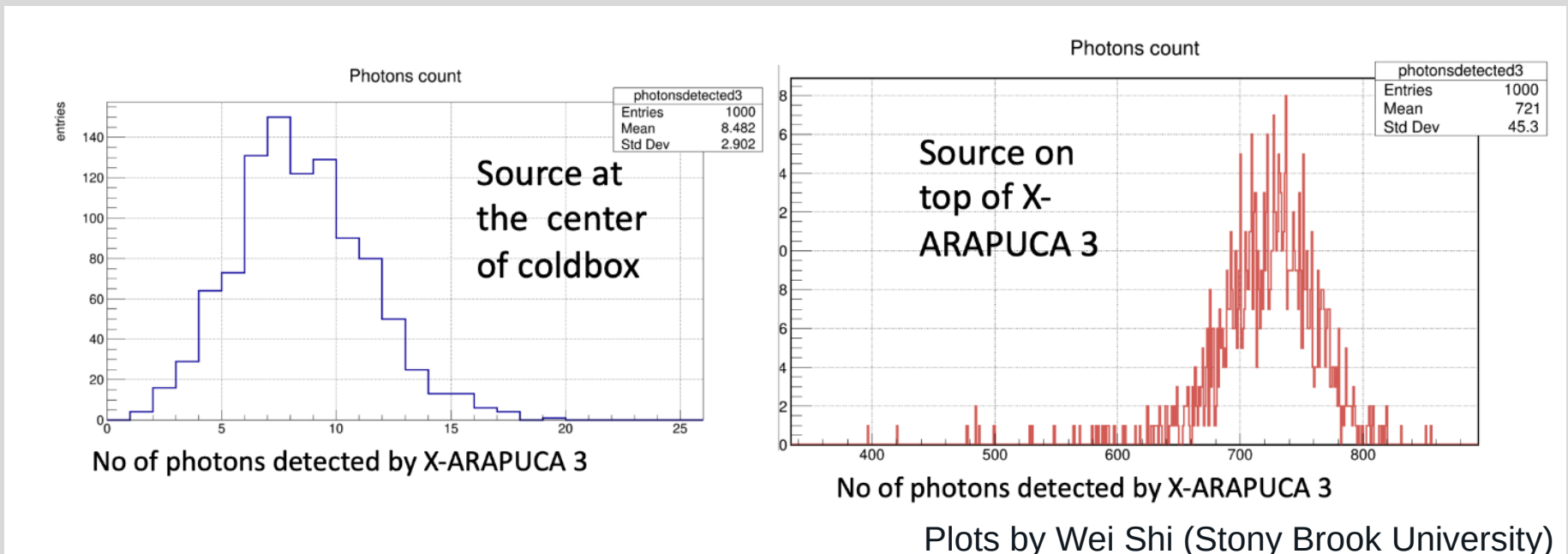
Hardware Status

- ThermoFischer DD-Generator has been shipped to, and received at CERN
- Shielding material shipping has faced some hang-ups but should be shipped before the end of the week
- Will begin installation once collaborators arrive on-site (early next week)



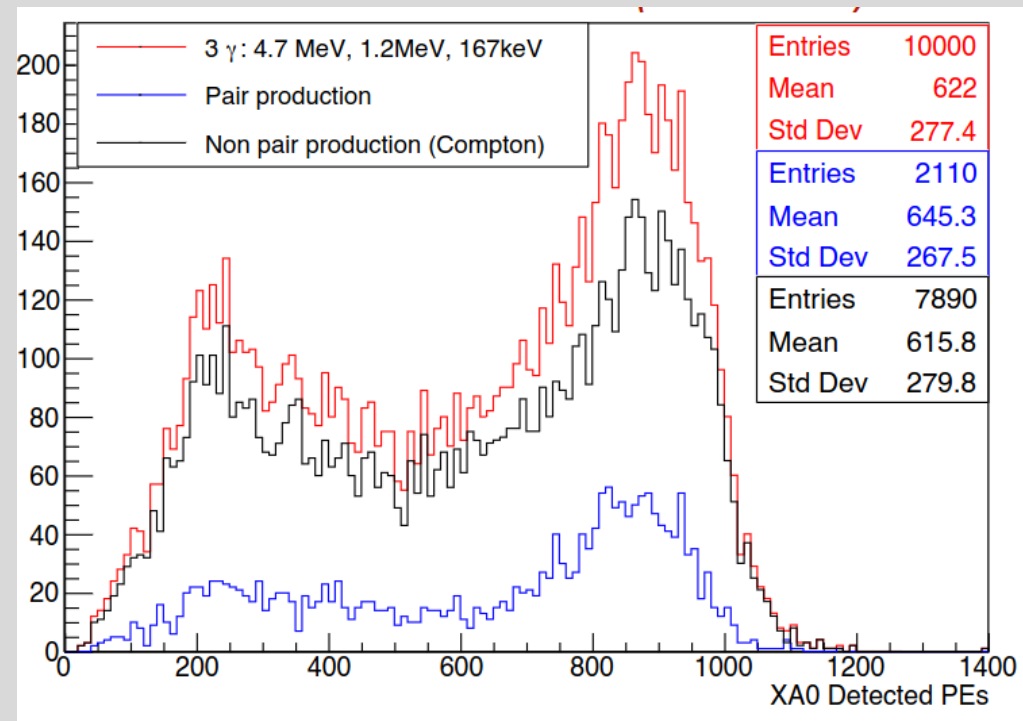
Simulation Status

- Due to the geometry of the detector neutron capture events which do not occur directly over a particular PD will produce very few hits on that PD
- Can use this effect for signal identification
 - Neutron captures which happen directly above a particular PD will have a large discrepancy in detected PEs with all of the other PDs



LArSoft Simulation

- The most common combination of gammas from a neutron capture simulated above one of the X-Arapucas
- We see a distinct spectrum in the detected PEs
- The contribution from pair production events does not contain escape-peaks
 - The annihilation gammas do not tend to travel far enough away from the photodetector to be missed
- Simulation done by Wei Shi



Conclusions

- The DDG has been shipped to CERN
- Collaborators will be arriving on-site next week
- Should begin taking data with PNS as early as the following week