Module-0 opportunities

All of us

DUNE-France analysis workshop

April 19th, 2023
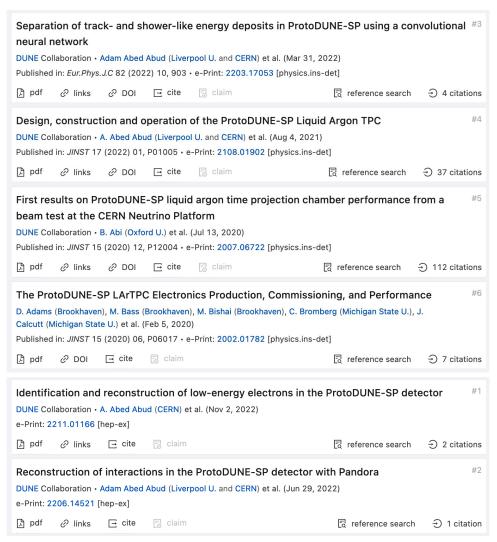
Feedback from yesterday

- Our wish list to be shared with ProtoDUNE-VD sim/reco

https://docs.google.com/document/d/1_tRzAbZVq4LN9yglX9ofgsktFC2z fARpPRChKC5Aj2A/edit#heading=h.pntz3l3bojwl

ProtoDUNE-SP set of publications

Separation of track- and shower-like energy deposits in ProtoDUNE-SP using a convolutional neural network #3
DUNE Collaboration • Adam Abed Abud (Liverpool U. and CERN) et al. (Mar 31, 2022)
Published in: *Eur.Phys.J.C* 82 (2022) 10, 903 • e-Print: 2203.17053 [physics.ins-det]
📄 pdf   🔗 links   🔗 DOI   🗐 cite   claim   reference search   4 citations

Design, construction and operation of the ProtoDUNE-SP Liquid Argon TPC #4
DUNE Collaboration • A. Abed Abud (Liverpool U. and CERN) et al. (Aug 4, 2021)
Published in: *JINST* 17 (2022) 01, P01005 • e-Print: 2108.01902 [physics.ins-det]
📄 pdf   🔗 links   🔗 DOI   🗐 cite   claim   reference search   37 citations

First results on ProtoDUNE-SP liquid argon time projection chamber performance from a beam test at the CERN Neutrino Platform #5
DUNE Collaboration • B. Abi (Oxford U.) et al. (Jul 13, 2020)
Published in: *JINST* 15 (2020) 12, P12004 • e-Print: 2007.06722 [physics.ins-det]
📄 pdf   🔗 links   🔗 DOI   🗐 cite   claim   reference search   112 citations

The ProtoDUNE-SP LArTPC Electronics Production, Commissioning, and Performance #6
D. Adams (Brookhaven), M. Bass (Brookhaven), M. Bishai (Brookhaven), C. Bromberg (Michigan State U.), J. Calcutt (Michigan State U.) et al. (Feb 5, 2020)
Published in: *JINST* 15 (2020) 06, P06017 • e-Print: 2002.01782 [physics.ins-det]
📄 pdf   🔗 DOI   🗐 cite   claim   reference search   7 citations

Identification and reconstruction of low-energy electrons in the ProtoDUNE-SP detector #1
DUNE Collaboration • A. Abed Abud (CERN) et al. (Nov 2, 2022)
e-Print: 2211.01166 [hep-ex]
📄 pdf   🔗 links   🗐 cite   claim   reference search   2 citations

Reconstruction of interactions in the ProtoDUNE-SP detector with Pandora #2
DUNE Collaboration • Adam Abed Abud (Liverpool U. and CERN) et al. (Jun 29, 2022)
e-Print: 2206.14521 [hep-ex]
📄 pdf   🔗 links   🗐 cite   claim   reference search   1 citation

- Rich physics analysis program from ProtoDUNE-SP experience

- In particular for new comers: can help developing a data taking plan / strategy

Which instrumentation we need is tighted to what we want to measure

- Lots of studies can be made in preparation of the Module-0 cosmics/beam runs data taking

  - Cf. discussion at 21/09/2022 IN2P3 meeting https://indico.in2p3.fr/event/28048/contributions/114781/attachments/72741/104196/220921_Module-0_analysis.pdf

    - Plan, by Wenqiang, to call for more people to get involved in the upper simulation stages and the data analysis setup (reco, calibration, …)

    - **But also need to review what is being done**

      - Experience from hardware dev & install

      - Independent checks / calculations, like geometry, deconv, or SCE

    - **Shall we have beam data ?? Yes (personal opinions)**

      - Filippo mentioned at the meeting it would be difficult by end of March (beam plug) but …

      - Crucial to validate track/shower separation for VD (PD-SP: https://arxiv.org/abs/2203.17053)

      - Cross-section certainly less important (improve with different detector systematics?)

      - Collect a test dataset in well known run conditions for students being in labs that have contributed to VD hardware developments

    - **What else?**

      - Plan for runs at various HV (same drift time, same E-field, same HV)

      - Position dependent CRT to scan dQ/dx & dE/dx (purity, electric field homogeneity)

      - Think about energy reconstruction strategies (multiple scattering, …)

      - …

AOB?

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