

Title

DUNE Database Development

The Deep Underground Neutrino Experiment (DUNE) is a long-baseline experiment which aims to study neutrino oscillation and astroparticle physics. It will produce vast amounts of metadata, which describe the data coming from the read-out of

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Using parallel I/O libraries for managing HEP experimental data

The computing and storage requirements of the energy and intensity frontiers will grow significantly during the Run 4 & 5 and the HL-LHC era. Similarly, in the intensity frontier, with larger trigger readouts during supernovae explosions, t

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Differentiable Simulation of the DUNE Near Detector Liquid Argon Time Projection Chamber

Liquid argon time projection chambers (TPCs) are widely used in particle detection. High quality physics simulators have been developed for such detectors in a variety of experiments, and the resulting simulations are used to aid in reconst

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Neutrino interaction vertex-finding in a DUNE far-detector using Pandora deep-learning

The Deep Underground Neutrino Experiment (DUNE) will operate four large-scale Liquid-Argon Time-Projection Chambers (LArTPCs) at the far site in South Dakota, producing high-resolution images of neutrino interactions. LArTPCs represent a st

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Implicit Neural Representation as a Differentiable Surrogate for Photon Propagation in a Monolithic Neutrino Detector

Modern neutrino experiments employ hundreds to tens of thousands of photon detectors to detect scintillation photons produced from the energy deposition of charged particles. A traditional approach of modeling individual photon propagation

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DUNE Computing Tutorials

Providing computing training to the next generation of physicists is the principal driver for a biannual multi-day workshop hosted by the DUNE Computing Consortium. Materials are cast in the Software Carpentries templates, and to date topic

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vDUNE, a Virtual Tour of the DUNE South Dakota Laboratory

Deep underground, the removal of rock to fashion three soccer field sized caverns is underway, as are detector prototypings. In 2024, the first DUNE far detector will be constructed as a large cryostat, instrumented as a traditional trackin

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All Things Computing, DUNE

Documentation on all things computing is vital for an evolving collaboration of scientists, technicians, and students. Using the MediaWiki software as the framework, a searchable knowledge base is provided via a secure web interface to the

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DUNE HDF5 Experience

The Deep Underground Neutrino Experiment (DUNE) has historically represented data using a combination of custom data formats and those based on ROOT I/O. Recently, DUNE has begun using the Hierarchical Data Format (HDF5) for some of its dat

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Meld: Exploring the feasibility of a framework-less framework

HEP data-processing frameworks are essential ingredients in getting from raw data to physics results. But they are often tricky to use well, and they present a significant learning barrier for the beginning HEP physicist. In addition, exist

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Darshan for HEP application

Modern HEP workflows must manage increasingly large and complex data collections. HPC facilities may be employed to help meet these workflows' growing data processing needs. However, a better understanding of the I/O patterns and underlying

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Status of DUNE Offline Computing

We summarize the status of Deep Underground Neutrino Experiment (DUNE) software and computing development. We describe plans for the computing infrastructure needed to acquire, catalog, reconstruct, simulate and analyze the data from the DU

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Kubernetes for DUNE DAQ

The Deep Underground Neutrino Experiment (DUNE) is a next generation long-baseline neutrino experiment based in the USA which is expected to start taking data in 2029. DUNE aims to precisely measure neutrino oscillation parameters by detect

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Online tagging and triggering with deep learning AI for next generation particle imaging detector

The current and future programs for accelerator-based neutrino imaging detectors feature the use of

Liquid Argon Time Projection Chambers (LArTPC) as the fundamental detection technology. These detectors combine high-resolution imaging and

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Scale tests of the new DUNE data pipeline

In preparation for the second runs of the ProtoDUNE detectors at CERN (NP02 and NP04), DUNE has established a new data pipeline for bringing the data from the EHN-1 experimental hall at CERN to primary tape storage at Fermilab and CERN, and

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