

The neutrino program at CERN

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Neutrino organization at CERN

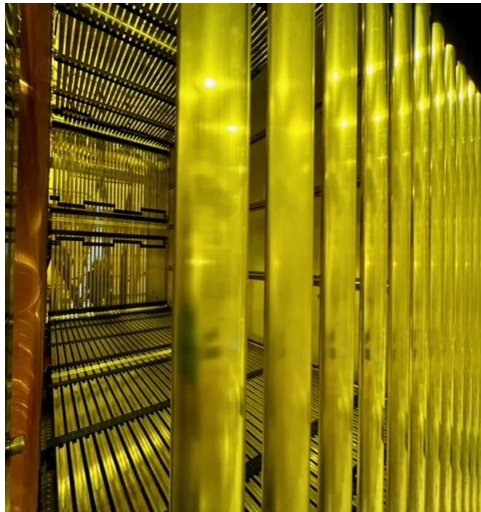
Two formally separated, but integrated bodies :

- **The CERN Neutrino Platform**
 - Born from the mandate of the EU Particle Physics Strategy in 2013, confirmed in 2020: “pave the way for a substantial European role in future long-baseline experiments.”
 - CERN as a facility for R&D and a partner in present and future neutrino research programs
- **The CERN Neutrino Group** in the Experimental Physics Department
 - The CERN group contributing to major neutrino experiments in US and Japan facilities (SBN, DUNE, T2K) as well to neutrino initiatives at CERN (ProtoDUNE, and also FASER and SND@LHC programs)

SBN program at Fermilab: ICARUS and SBND detectors



On the way from the Gran Sasso Laboratory to Fermilab, the **ICARUS** detector spent time at the Neutrino Platform and was upgraded in several components (cathode, cabling, new warm electronics, new light detection system). Further contributions were made to the cosmic ray tagger (outer veto) and the cryogenics system. ICARUS is now ready for physics.



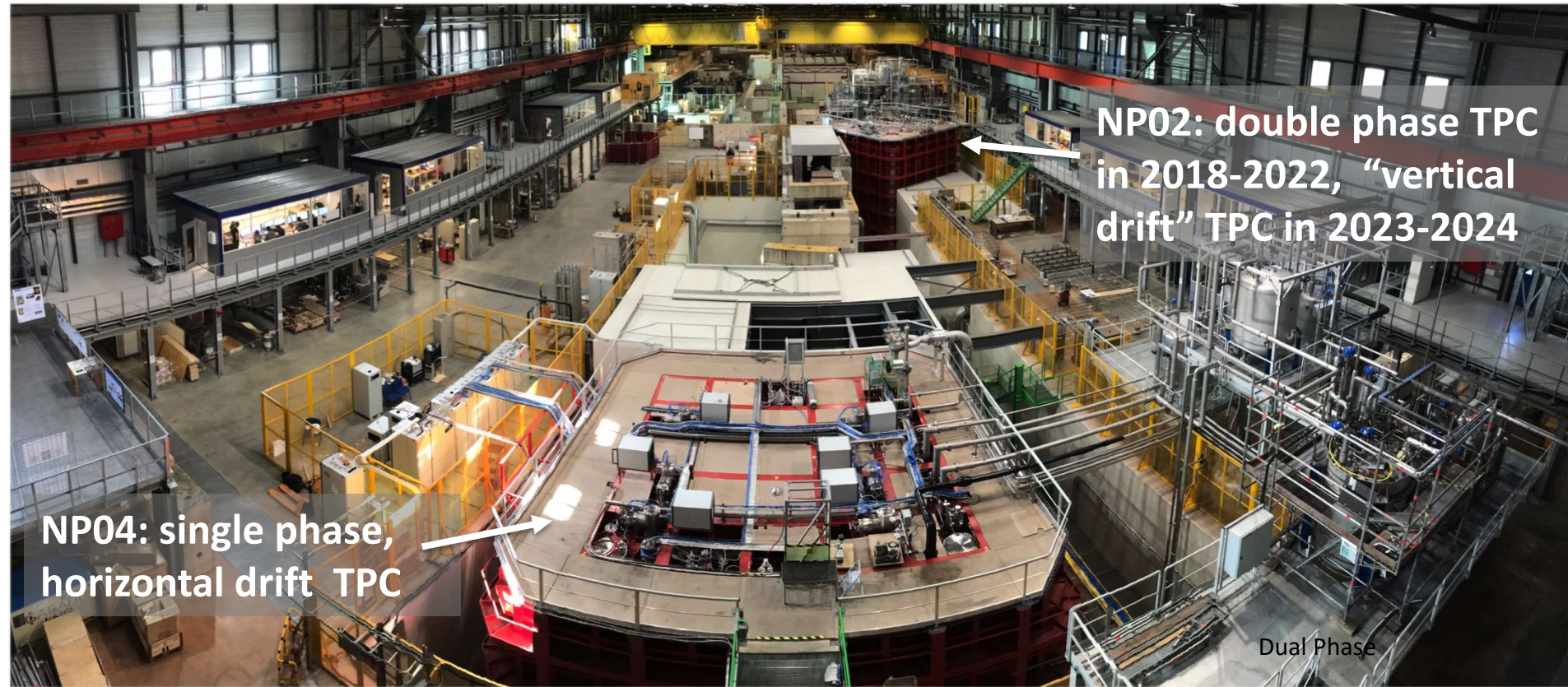
The Short Baseline Near Detector (**SBND**) is getting ready for installation:

<= Cathode, anodes, field-cage are ready.

The cryostat, based on the membrane technology, is a CERN contribution and is being completed =>



The ProtoDUNE detectors



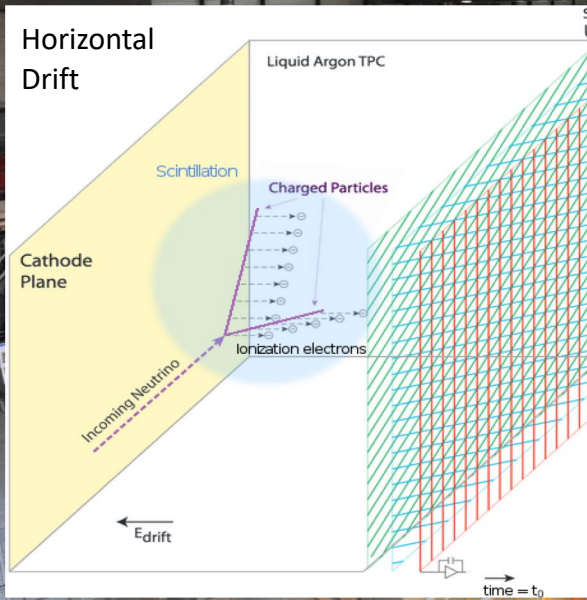
NP02: double phase TPC in 2018-2022, “vertical drift” TPC in 2023-2024

NP04: single phase, horizontal drift TPC

Dual Phase

The EHN1 hall of the CERN Neutrino Platform

The ProtoDUNE detectors



NP04: single phase, horizontal drift TPC

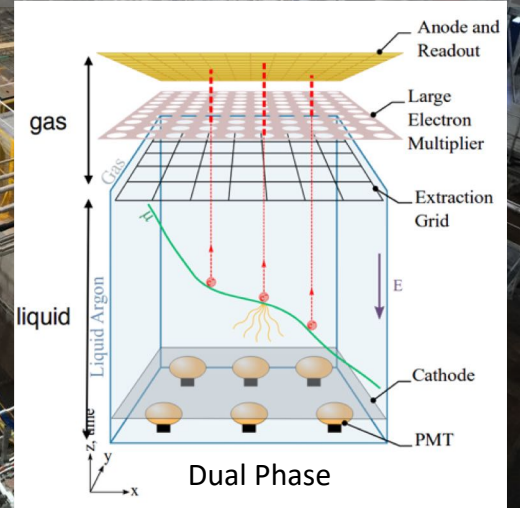
NP02: double phase TPC in 2018-2022, "vertical drift" TPC in 2023-2024

The EHN1 hall of the CERN Neutrino Platform

The ProtoDUNE detectors

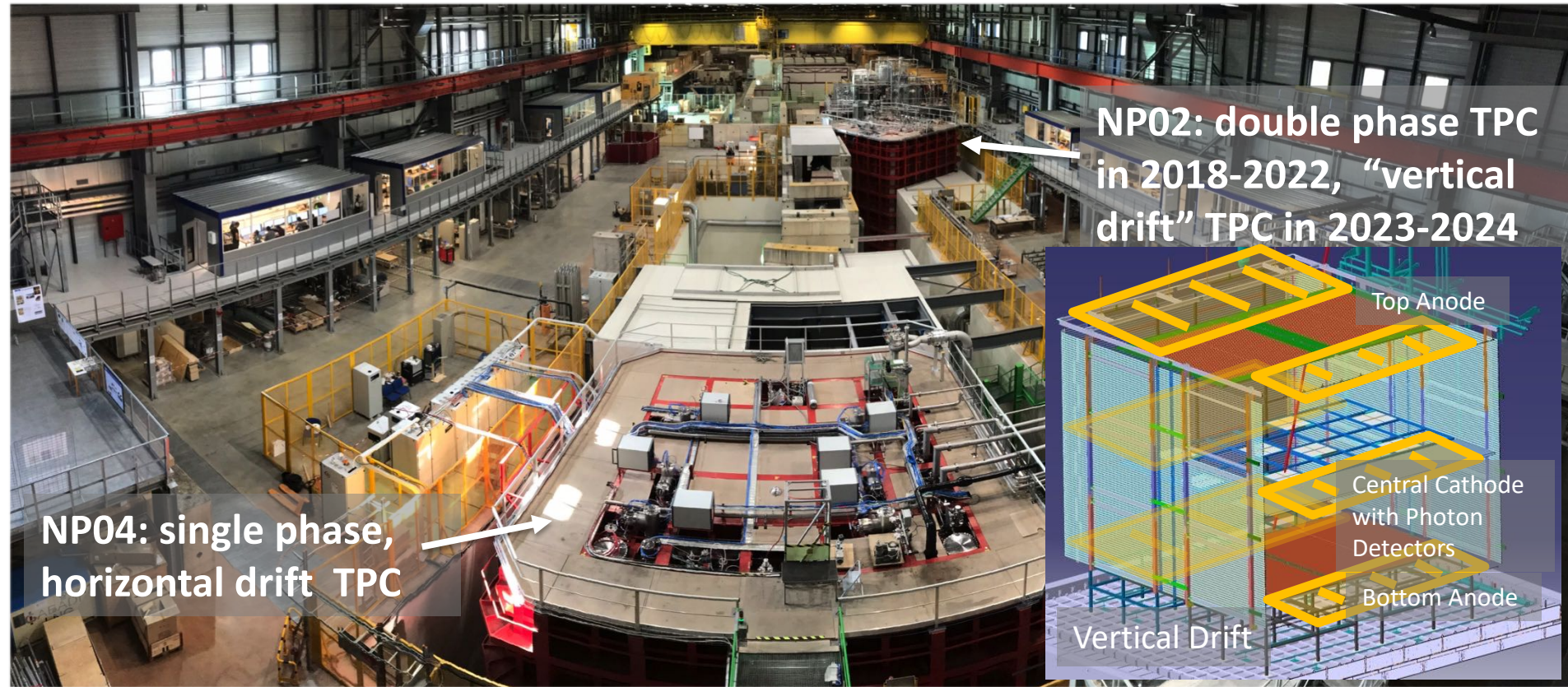
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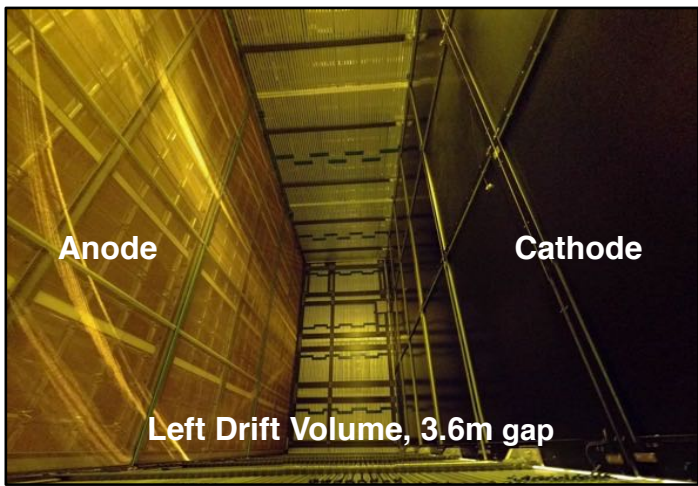


The EHN1 hall of the CERN Neutrino Platform

The ProtoDUNE detectors



The EHN1 hall of the CERN Neutrino Platform

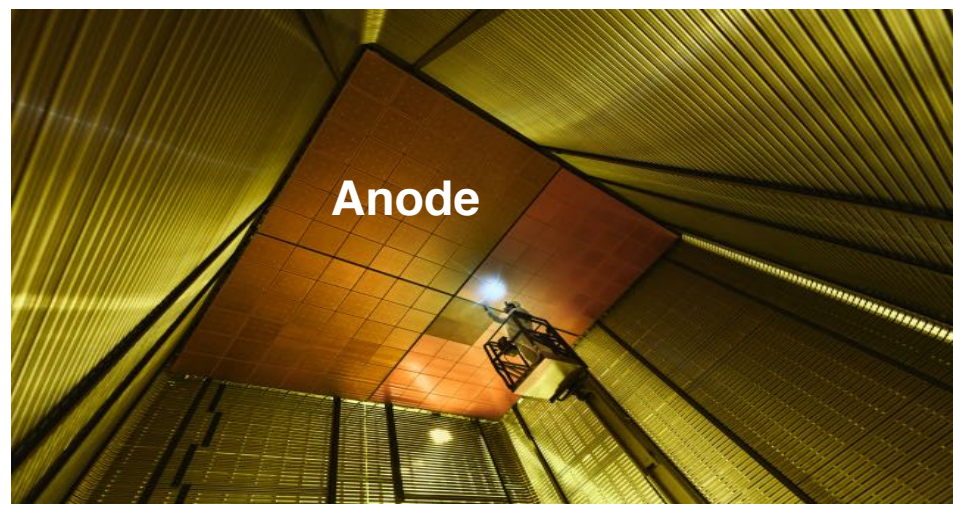
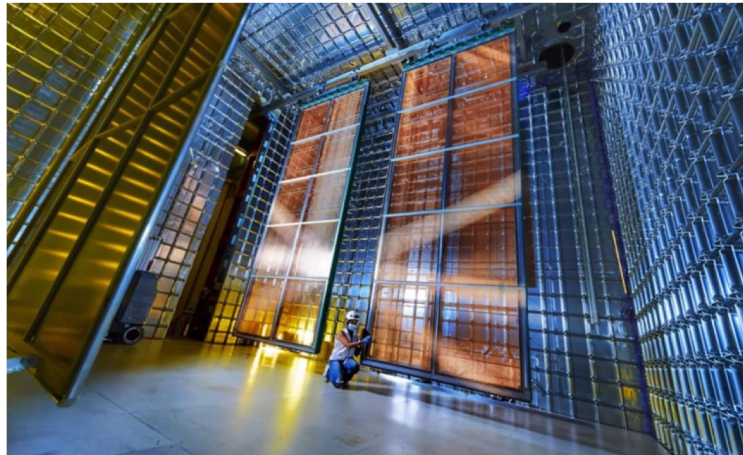


Anode

Cathode

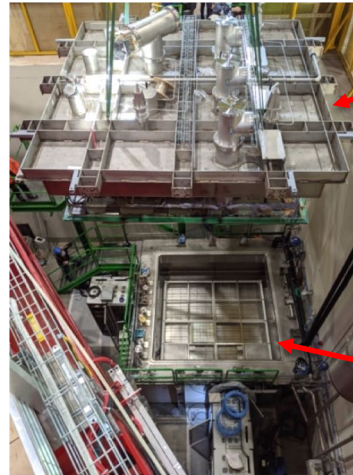
Left Drift Volume, 3.6m gap

Horizontal Drift Prototype, 2018 set up and being prepared for 2022 set up



Anode

Dual Phase Prototype



Cryostat cover supporting anode plane

Components for Vertical Drift Prototype tested in a small cryostat

Cathode plane, with photon detectors, on cryostat bottom

Time delay -->
(2.3 ms, or 3.6 m range)

7 GeV - Proton
(head p-n Interaction,
n emission and interaction)

Run 5203 | Event 1290

ProtoDUNE-HD
LAr TPC data of
unprecedented quality

Longitudinal (z) coordinate (7 m range) -->

