

NoAmpTPC, a direct read-out of primary ionization electrons for high pressure gaseous TPC

Tuesday 25 May 2021 10:42 (18 minutes)

Time projection chambers read by gaseous detectors are widely used but the gaseous amplification has several drawbacks: constraints on the gas mixture, energy resolution degradation, ion backflow. The present project proposes to detect directly the primary ionization electrons without gaseous amplification, for several applications: hydrogen TPC as proton active target, search for neutrinoless double-beta decays in Xenon, very low ion backflow TPC, etc... Primary electrons will be read by very low-noise (around 100 electrons) IDeF-X read-out chips developed at CEA Saclay, connected to a read-out plane with an optimized electron collection.

Different electrode geometries were optimized with Garfield++ simulations. A small-scale prototype TPC as well as new front-end cards are presently tested with radioactive sources and different gas mixtures. The performance in terms of noise level, electron collection efficiency, signal to noise ratios, and energy resolutions will be presented.

TIPP2020 abstract resubmission?

Yes, this would have been presented at TIPP2020.

Funding information

Primary author: NEYRET, Damien (Université Paris-Saclay (FR))

Co-authors: VANDENBROUCKE, Maxence (Université Paris-Saclay (FR)); GEVIN, Olivier (Université Paris-Saclay (FR)); MANDJAVIDZE, Irakli (Université Paris-Saclay (FR))

Presenter: NEYRET, Damien (Université Paris-Saclay (FR))

Session Classification: Sensors: Gaseous Detectors

Track Classification: Sensors: Sensors: Gaseous Detectors