

NEWS from the TPC

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Where we are :

Almost 2 decades of R&D carried out by institutions in Asia, the Americas and Europe:

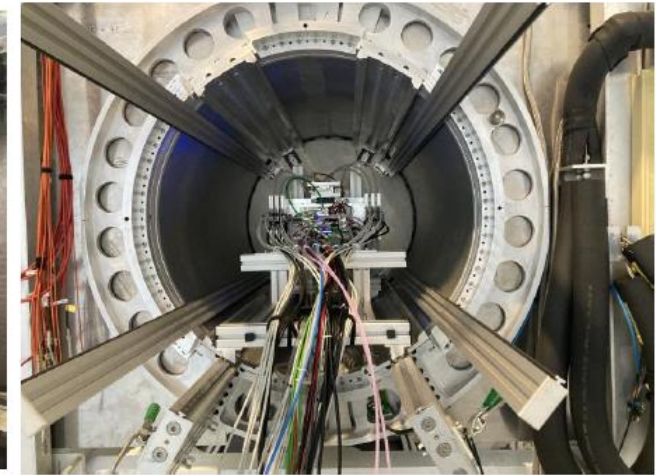
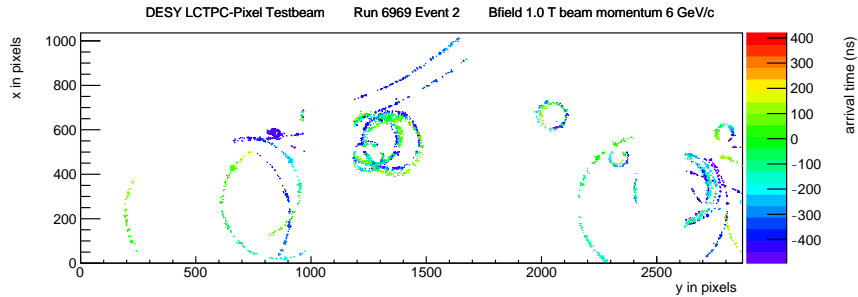
- all options for the gas-amplification technology tested:

GEM, MicroMegs with resistive anode and GridPix were selected,

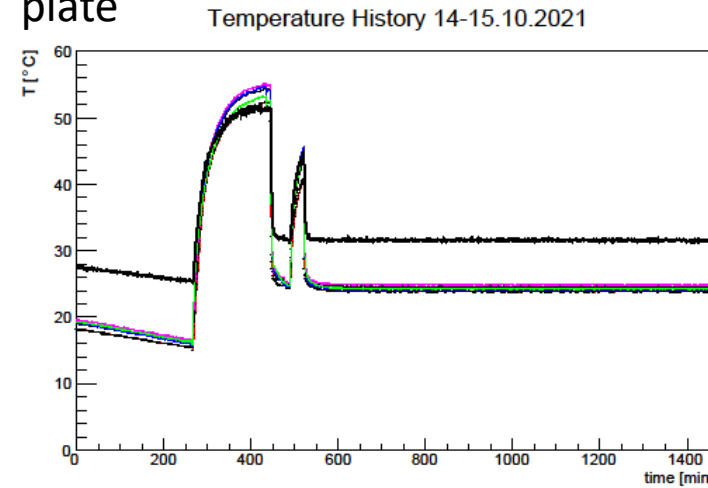
- the best drift gas was selected.
- CMOS pixel readout technology demonstrated and being developed
- dE/dx resolution confirmed
- design of a gating device successful

TPC activities since June 2021:

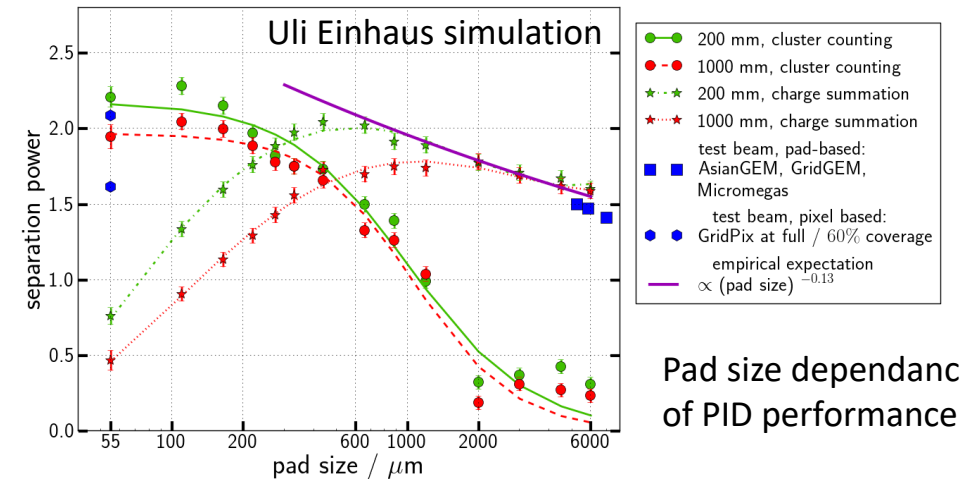
- Bonn-Nikhef beam test of a GridPix 8-quad module in DESY in June with a silicon telescope



Saclay successful 2-phase CO₂ cooling test of a Micromegas module at DESY mid-October with a 3D-printed cooling plate



Preparation of a new stripped foil for the Large-Prototype field cage (DESY, CERN)



Pad size dependance of PID performance

Presentations in conferences and various meetings:



ILCX in October :

- Yumi Aoki : Study of spatial resolution in the time direction for ILC-TPC (followed by discussions in LCTPC on shaping impact on the z resolution)
- Paul Colas : Test of a 3D-printed cooling plate for a TPC using 2-phase CO₂
- Peter Kluit : Towards a Pixel TPC

CEPC meeting in November

- Peter Kluit 'Pixel TPC technology'
- Huirong Qi

Snowmass white paper in progress (Alain Bellerive)

2021 IEEE NSS MIC RTSD conference in October

Maxim Titov, Huirong Qi

LCTPC speaker's bureau re-activated (chair : Maxim Titov)

3 theses defended :

- Uli Einhaus (DESY) on «High Granularity dE/dx PID from Hardware to Physics »
- Kees Ligtenberg (Nikhef) on pixel TPC
- Paul Malek (DESY) on GEM TPC analysis

Future

Collaboration meeting 3 half days in January 2022 by zoom. Topics : R&D, Common module in view of Technology choice, strategy -> enlarge scope behind ILC.

Difficulties to face :

Front-end electronics development. Low-consumption and/or power pulsing, 'real estate' improvement needed.

NIKHEF situation is difficult: 1 PhD student has finished and management decided to end gaseous (TPC) R&D. The detectors, DAQ and setup were moved to Bonn and the laser setup to Nijmegen.

In general it is difficult to have ILC R&D recognized and funded. Attempts to find synergies with T2K/ND280 upgrade, Alice upgrade, CEPC, EIC, until the ILC prelab situation improves.

Solutions coming :

Two presentations on electronics in the LCTPC collaboration meeting (Beijing Saclay Sao Polo) : WASA in Tshinghua, SALSA, 65 nm (following SAMPA, 130 nm) in Saclay - São Paulo
Geovane Grossi Araujo da Souza (São Paulo and Prag) presented a new hybrid card with the SAMPA chip at RD51 last week