



Contribution ID: 412

Type: Poster

## Development of a large-area curved Trench-MWPC $^3\text{He}$ detector for D16 neutron diffractometer at ILL

*Monday, 20 March 2023 16:00 (2 hours)*

The D16 instrument is a versatile cold-neutron diffractometer operating at the ILL. It benefited from a number of upgrades over the years, such as the installation of a large-area  $^3\text{He}$  Multi-Wires Proportional Chamber (MWPC) in 2014. This detector provides a resolution of  $1 \times 1 \text{ mm}^2$  over an area of  $32 \times 32 \text{ cm}^2$ . After 8 years of operation, the detector is now being replaced by a new curved detector covering a wider active area while still maintaining a high spatial resolution. Its  $86^\circ$  angular coverage will make it possible to perform time-resolved experiments with a large  $q$ -range. This new detector is based on the Trench-MWPC detector technology developed at the ILL. In the Trench-MWPC design, cathode electrodes consist in curved aluminium blades with teeth machined along one side of the blade. These blades are stacked on top of each other to form trenches inside which anode wires are stretched. In the D16 Trench-MWPC, 6 modules are mounted side by side in an  $^3\text{He}$ -filled curved vessel. Each module consists of 192 cathode blades spaced with a pitch of 2 mm and 192 anode wires with a pitch of 1.5 mm. The radius of curvature of the cathode blades is 1150 mm providing a parallax-free resolution of  $0.075^\circ$  horizontally along the  $86^\circ$  angular coverage of the 38 cm high detector. The various fabrication and mechanical inspection steps of the D16 Trench-MWPC detector modules and pressure vessel are presented as well as experimental results obtained during the characterisation with neutrons.

**Primary author:** MARCHAL, Julien (ILL)

**Co-authors:** BUFFET, Jean-Claude (ILL); PENTENERO, Jerome (ILL); SARTOR, Nicolas (ILL); CUCCARO, Sylvain (ILL); GUERARD, bruno (ILL)

**Presenter:** MARCHAL, Julien (ILL)

**Session Classification:** Poster Session MONDAY

**Track Classification:** Neutron Instrumentation, Optics, Sample Environment, Detectors, and Software