

## **Fabrication of large area 10B MultiGrid detectors: conclusion of the CRISP project**

*Tuesday 17 March 2015 11:55 (25 minutes)*

Most of the Neutron Scattering facilities are committed in a continuous program of modernization of their instruments, requiring large area and high performance thermal neutron detectors. Time Of Flight instruments are using  $^3\text{He}$  PSDs mounted side by side to cover tens of  $\text{m}^2$ . As a result of the so-called “ $^3\text{He}$  shortage crisis”, the volume of  $^3\text{He}$  needed to build one of these instruments is not accessible anymore. The development of alternative techniques without  $^3\text{He}$ , has been given high priority to secure the future of neutron scattering instrumentation. One of these alternatives is the Multi-Grid introduced at the ILL in 2009. A Multi-Grid detector is composed of several independent modules mounted side by side in air or in a vacuum TOF chamber. One module is composed of segmented boron-lined proportional counters mounted in a gas vessel; the counters, of square section, are assembled with Aluminium grids electrically insulated and stacked together. Prototypes of different configurations and sizes have been developed and tested. The largest one, with a sensitive area of  $0.8 \text{ m} \times 3 \text{ m}$ , has been studied during the CRISP project; it contains 1024 grids, and a surface of isotopically enriched  $\text{B}_4\text{C}$  film close to  $80 \text{ m}^2$ . Its size represented a challenge in terms of fabrication and mounting of the detection elements. Another challenge was to make the gas chamber mechanically compatible with operation in a vacuum TOF chamber. Optimal working condition of this detector was achieved by flushing  $\text{Ar-CO}_2$  at a pressure of 50 mbar, and by applying 400 Volts on the anodes. This unusual gas pressure allows to greatly simplifying the mechanics of the gas vessel in vacuum. Experimental results will be presented.

**Presenter:** GUERARD, Bruno (ILL)