

Li-Foil Multiwire Proportional Counter (MWPC) Neutron Detector



Li-Foil MWPC Neutron Detector Technology

Li-Foil Multi-wire Proportional Counter (MWPC) Neutron Detectors provide an affordable large-area alternative to the ^3He -based detectors, maintaining a high thermal-neutron detection efficiency, at a comparable volume, mass, voltage, and power required. The Li-Foil MWPC are being integrated into existing electronics technology prepared originally for ^3He -based detectors. There is a strong demand for light-weight, large-area, and high efficiency neutron detectors to be integrated into systems as a direct ^3He replacement. Li-Foil offers a light-weight solution while maintaining high neutron detection sensitivity and ruggedness that is known of ^3He -based detectors. The Li-Foil MWPC technology has the flexibility to easily adjust available detection area to customer specifications with a 20% to 70% (40% standard) thermal-neutron detection efficiency.

Specifications

- γ -reject: $<1:10^8$
- E_{thermal} : 40(\pm 1)%
- CTS/sec/nv: 79.5
- V_{input} : 2.7 – 4.5 V
- V_{output} : TTL or output driven
- Temp. Range: -40°C to 85°C
- Power: \sim 400mW total
- Weight: \sim 1.6lbs
- Standard Size: 19.5" x 2.2" x 1.4"

Cost Comparison

	Li Foil MWPC	BF_3	^3He
Pressure	1.68 atm argon	0.52 atm	1.5 atm
Length (inch)	19.2	21.24	21.24
Active Length (inch)	18	18	18
Width/Diameter	2.2 x 1.4 inch	2 inch Cyl	2 inch Cyl
COTS Pricing	\sim \\$2,000	\\$1,200	\\$5,400
cps/nv	79.5 cps/nv	\sim 55 cps/nv	\sim 85 cps/nv

Pricing

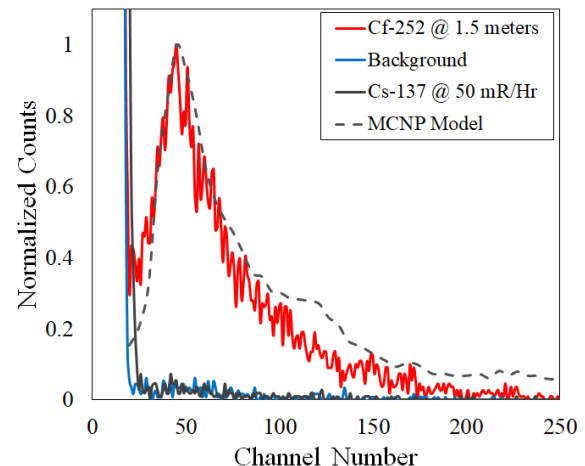
- \\$2500 / device with RDT electronics (low volume order) – compared to an equivalent ^3He device that is commonly quoted at \\$5400 without electronics.
- \\$2000 / device without electronics.

Electronics & Interfacing

- Optional onboard readout electronics provided by RDT includes pulse processing components (e.g. preamp, amp, etc.) with TTL output or output driven signal to interface with customer's GUI.
- Customizable connection interface - i.e. USB, M8, SMA, etc.
- **Microphonics rejection** integrated in the electronics firmware.

Manufacturing

- The dry room facility at RDT allows for the commercial production of the Li Foil MWPC
- Capable of manufacturing 12 devices in a batch – a 2-day build from start to finish.
- Can ship 5 days from order (with in-stock materials).
- Current production of 1300 devices / year.



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