



LUPIN BF3-NP

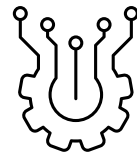
NEUTRON REM COUNTER FOR PULSED FIELDS



Modular electronics,
high sensitivity



Only detector worldwide
efficiently working in PF



Fully customizable for
specific requirements

From thermal up to 10 GeV
or up to 20 MeV (LITE)

Energy response fitting
ICRP74 conversion curve

Unaffected by signal pile-up

Max $H^*(10)$ per burst in
pulsed fields: 2 μSv

Excellent gamma rejection
($< 0.5 \mu\text{Sv/h}$ @ 50 mSv/h)

Connectable to a SATURN

LUPIN BF3-NP is an environmental monitoring unit for neutron $H^*(10)$ measurements, with unique excellent performance for neutron detection in pulsed fields.

The rem counter is composed of:

- BF_3 neutron proportional counter
- Cylindrical moderating assembly
- Built-in power supply, signal management and control electronics

The electronics processes the signal coming from the detector and elaborates the instantaneous $H^*(10)$ rate value every second.

If required, the radiation sensitive electronics can be housed in a separate rack, thanks to the modularity of the instrument components. An accessory IP54 version is also available

The data are sent to the connected SATURN ratemeter acquisition and control unit, which locally displays the instantaneous $H^*(10)$ rate and the integrated values and compares them to the pre-set alarm thresholds.

A **LUPIN BF3-NP LITE** version is also available, featuring a lighter build and a narrower energy range, suitable for all the applications that do not require to detect neutrons with energy above 20 MeV.

Papers published in international scientific journals:

- M. Caresana, M. Ferrarini, G.P. Manessi, M. Silari and V. Varoli, LUPIN, a new instrument for pulsed neutron fields, *Nuclear Instruments and Methods in Physics Research Section A* 712 (2013) 15-26.
- M. Caresana, C. Cassell, M. Ferrarini, E. Hohmann, G.P. Manessi, S. Mayer, M. Silari and V. Varoli, A new version of the LUPIN detector: improvements and latest experimental verification, *Review of Scientific Instruments* 85 (2014) 065102.

TECHNICAL SPECIFICATIONS

General characteristics

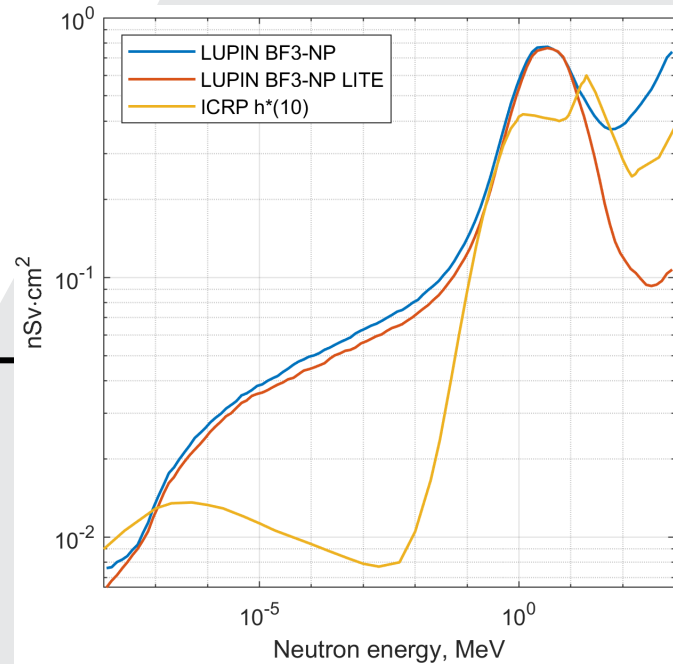
- Temperature range: $0^{\circ} \div 50^{\circ} \text{C}$
- Dimensions: $\varnothing = 250 \text{ mm}$, $H = 425 \text{ mm}$
- Weight: 18 kg; 15 kg (LITE version)
- Cylindrical BF_3 detector, 0.26 atm
- Energy range:
 - from 0.025 eV to 10 GeV (standard version)
 - from 0.025 eV to 20 MeV (LITE version)
- $H^*(10)$ rate range: from 10 nSv/h to 100 mSv/h
- Max $H^*(10)$ per burst in pulsed fields with underestimation $\leq 10\%$: 2 μSv
- Neutron sensitivity: 0.6 cps/ $\mu\text{Sv/h}$
- Gamma sensitivity: $< 0.5 \mu\text{Sv/h}$ at 50 mSv/h, 662 keV
- Angular dependence: $< 20\%$

Built-in electronics

- Watchdog: good functioning circuit control
- Available communications: serial RS232 (default), serial for long distance RS485/422, Ethernet up to 1 km



Rack for radiation sensitive electronics



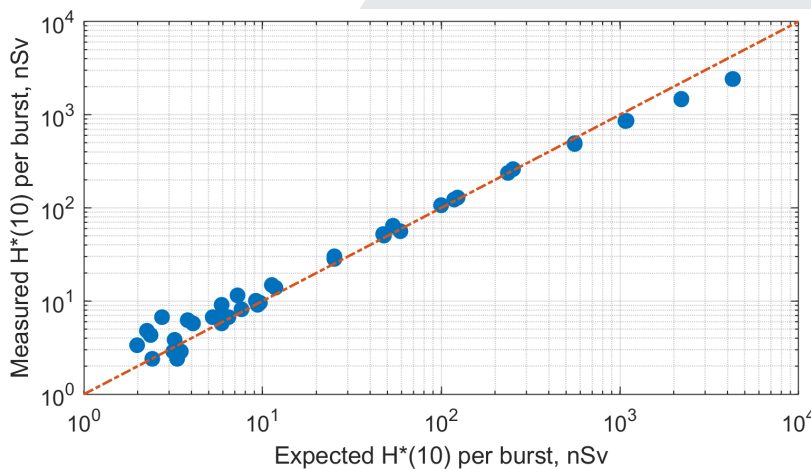
LUPIN rem counters response function VS ICRP

OPTIONS

- Lighter version and narrower energy range (LITE version)
- Radiation sensitive electronics installed in a separate rack
- Ultra-fast response (alarm signal in 50 ms): dual use as neutron rem counter – beam loss monitor

ACCESSORIES AVAILABLE UPON REQUEST

- Traceable calibration
- Trolley kit: bare/unwired trolley for wheeled transport
- IP54 configuration
- Flight case
- Warranty extension from 12 months to 24 months



LUPIN BF3-NP performance in neutron pulsed fields

(from: "A new version of the LUPIN detector", Rev. Sci. Instrum. 85, 065102, 2014)

