



Nuclear Physics



Labs and Education



Environmental  
monitoring



## KEY FEATURES

- ◆ All-in-one detector, and electronics for **Gamma-Neutron Discrimination**
- ◆ Based on a **SiPM** area up to nearly 1 inch<sup>2</sup>
- ◆ 20-80 V Integrated High Voltage for SiPM biasing
- ◆ Assembly with **EJ-276 Plastic Scintillation Crystal** (1 inch)
- ◆ PSD performances: FoM  $\sim$  2.60 in 1÷1.5 MeV range and FoM  $>$  2.3 in 500÷1000 keV range.
- ◆ Realtime Pulse Shape Analysis running onboard
- ◆ Tube-like compact form factor :  
Ø 60 mm, h 135 mm
- ◆ Ethernet connectivity
- ◆ Web-based interface with spectrum analysis tools and PSD scatterplot
- ◆ C# and Python open-source libraries available

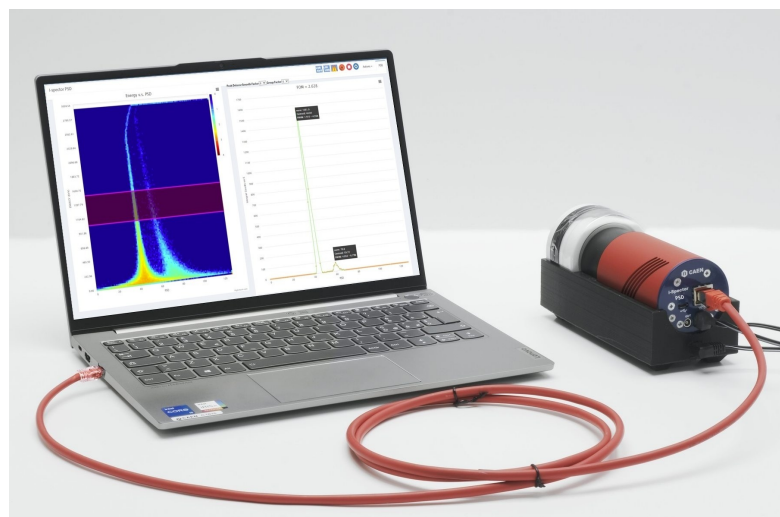
## DESCRIPTION

The i-Spector PSD is a fully-integrated, tube-like **Neutron Detector System** designed to deliver complete, real-time Neutron/Gamma Discrimination in a compact and portable form factor. Purpose-built for users who demand high-performance pulse shape discrimination without compromising on size, weight, or power consumption, it brings laboratory-grade detection capabilities to **many portable applications**.

The i-Spector PSD combines a 24×24 mm<sup>2</sup> **SiPM** area with a fast **EJ-276** plastic scintillation crystal, a high-bandwidth preamplifier stage, an integrated temperature-compensated HV power supply for SiPM biasing, a 250 MSps 12-bit ADC, and a dedicated onboard microcontroller for real-time pulse shape analysis, all in a single, self-contained unit. The output includes an analog amplified signal, a 1k-channel energy spectrum, and a PSD scatterplot, all computed onboard with no external processing required.

The i-Spector PSD can be connected through Ethernet and controlled through a **Web Interface**, to configure and monitor the device, with the possibility to access the energy spectrum and the PSD scatterplot, process them online, and perform energy calibration and peak Gaussian fitting.

Multiple i-Spector PSD units can be simultaneously connected and controlled from a single PC via Ethernet, using simple HTTP requests and JSON vectors, making it straightforward to scale up to distributed detection networks.



*i-Spector Digital in assembly version is used as a complete readout system to acquire a <sup>60</sup>Co spectrum*

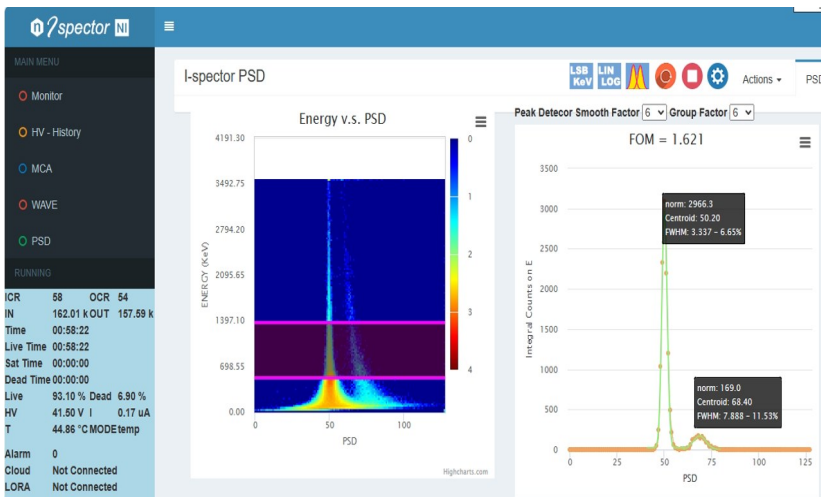
## Web Interface

The i-Spector PSD comes with a dedicated web-based graphical interface, accessible directly from any modern browser, that lets the user **configure the module and immediately visualize the acquired energy spectrum and PSD results**. No software installation required.

The spectrum view features a fully interactive plot with **analysis tools**: cursors and ROIs can be placed on any peak of interest to perform real-time Gaussian fitting with automatic calculation of centroid, FWHM, counts, and other key statistics. Linear background estimation and energy calibration, using linear or higher-order fit models, are available directly from the interface.

PSD results are displayed as a live Energy vs. PSD scatterplot, from which the **Figure of Merit (FoM)** can be extracted through Gaussian fitting. The pulse tail integration gate is fully user-configurable, giving complete control over the discrimination algorithm.

An internal circular memory buffer continuously stores up to one hour of voltage, current, and sensor temperature data, available for download at any time via the web interface.



## SDK

For users who need deeper integration, the I-Spector PSD offers a fully documented SDK based on JSON data and standard HTTP POST, compatible with every modern programming language and operating system (Windows/MacOs/Linux/Android/iOS). Whether building automated workflows, custom dashboards, or multi-sensor acquisition systems, the SDK provides **complete programmatic access** to all device features.

## TECHNICAL SPECIFICATIONS

Supply Voltage	8-13V (12 V typ.)
Power consumption	3W max.
Preamplifier bandwidth	>1GHz
Preamplifier gain	x 5
Shaping time	180 ns
Output signal	- 4 ... +4 V , 170 mA
SiPM area	24x24 mm <sup>2</sup>
SiPM Manufacturer	Hamamatsu
SiPM Model	S14160-6050HS
HV Power supply	20-80 V (10mA)
HV accuracy	1 mV
Thermal feedback accuracy	0.01°C - 1mV
MCA nr. of channels	4096
Connectivity	Ethernet
Working Temperature	-20 ... +50°C
ADC	12 bit, 250 MS/s
Assembly Size	∅ 60 mm (2.40 in.) h 135 mm (5.32 in.)
Weight	ASSEMBLY: 500g (17.6 oz.)

## Performances with EJ-276 crystal

Figure of Merit (FoM) obtained with <sup>252</sup> Cf source placed in direct contact with the i-Spector lower face, energy calibration performed with <sup>137</sup> Cs source	~2.60 in 1÷1.5 MeV range > 2.3 in 500÷1000 keV range
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## Ordering Option

Ordering code	Description
WS2590CXAAAA	S2590C i-Spector PSD 24x24 mm <sup>2</sup> – ASSEMBLY

