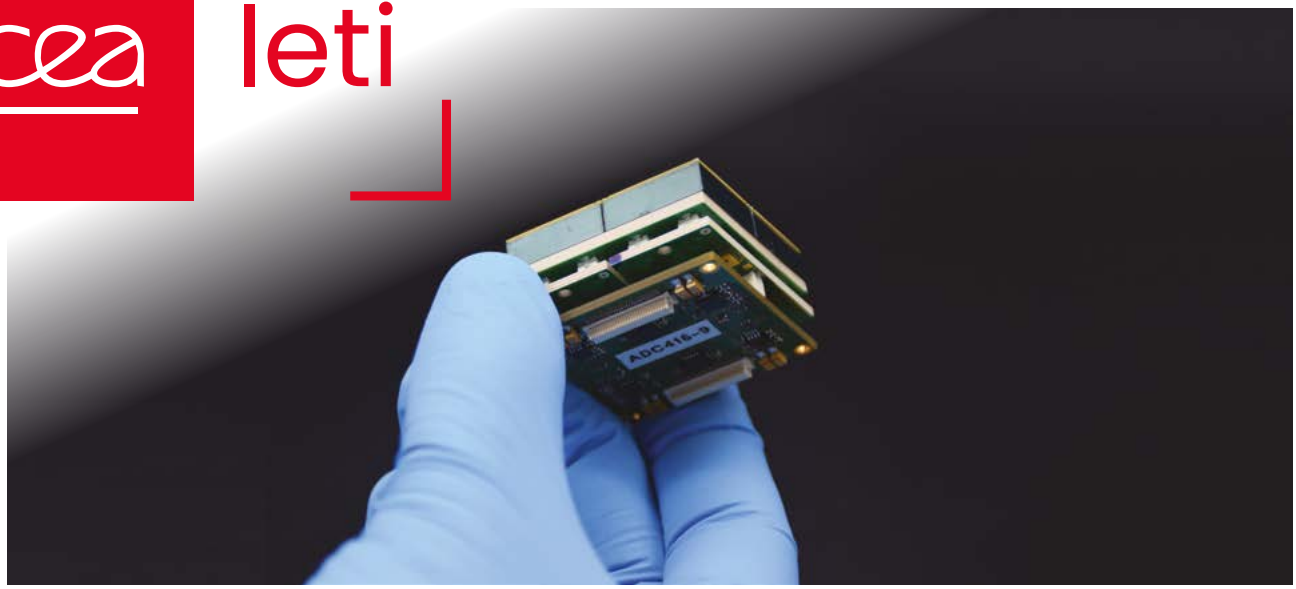
FRANÇAIS ENGLISH

cea leti



HiSPECT

PATENTS 9 PATENTS

Sensitive multi-isotope gamma-ray imaging detection module at low-cost

What is HiSPECT?

HiSPECT, CEA-Leti's technology for a gamma-ray imaging detection module, offers improved spatial and energy resolution. This four-side-buttable 40×40×6 mm^3 CdZnTe-based module leverages electronic signal processing on existing components for low-cost manufacturing.

Main features:

- Room-temperature operation from 10 keV to 1.4 MeV,
- **High spectral resolution**: 2% FWHM at 122 keV with a low-noise multi-channel IC (CEA-Irfu),
- **High sensitivity**: depth-of-interaction, induction and charge sharing correction embedded in a field programmable gate array (FPGA),
- **High spatial resolution**: 300 µm with a sub-pixel positioning signal processing on a standard CZT geometry with a 2.5 mm pixel pitch addressed by 256 readout electronic channels embedded in a FPGA.

Applications

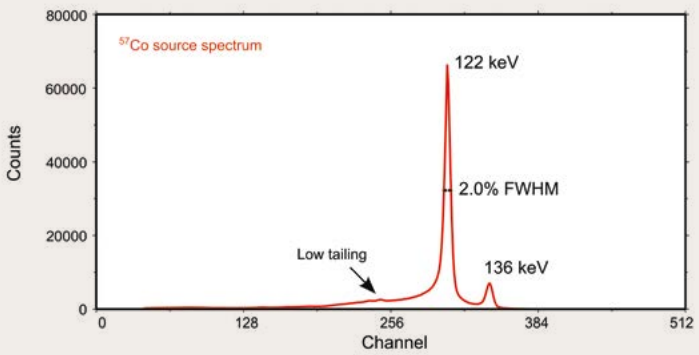
This detection module enables multi-isotope imaging and different gamma-ray imaging techniques such as the collimator oversampling technique to improve sensitivity. CEA-Leti's detection module supports various new applications in:

- Nuclear medicine
- Nuclear energy
- Environment
- Homeland and airport security
- Scientific applications

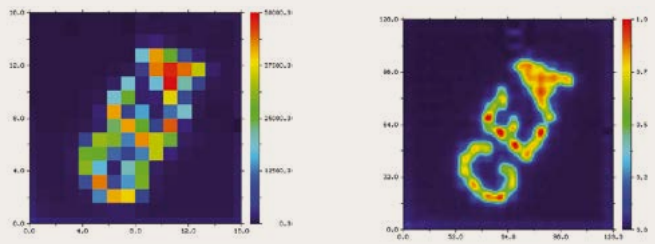
What's new?

The compactness HiSPECT gamma-ray imaging detector module enables the use of highly sensitive collimators for up to a 10× gain in system sensitivity, leading to a significant reduction of medical scan time while producing the same image quality compared to current existing solutions.
HiSPECT also opens possibilities in simultaneous multi-isotope imaging.

ENERGY RESOLUTION



SPATIAL RESOLUTION



w/o sub-pixel positioning
SR = 2.5 mm

with sub-pixel positioning
SR = 0.3 mm

Best scientific poster award

"Advancements in Nuclear Instrumentation Measurement Methods and their Applications", April 2015, Lisbon

What's next?

CEA-Leti works with gamma-ray system manufacturers to build prototyping capability, taking into account the systems' mass-production constraints. The institute offers fast technology transfers and reduced time to market with a clear patent policy.

Interested in this technology?

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Research for industrial innovation