

TEMPORAL δ COMPTON V2

The best γ image you can get above 511 KeV!



A high performance multifunction instrument (image, spectrum, counts)

Our Compton camera: "all in one" instrument

The best Compton **imager** (400 KeV- 3000 KeV), good **spectrometer** (50 KeV-3000 KeV), stable **photon counter** with **dose estimation**. Key advantages:

- **By far the best image quality on the market:**
 - Angular resolution in Compton mode: 6°- 8°
 - Excellent images of extended - multiple sources (Complex equipment contamination even animals)
 - Easy to read optical and gamma FOV (90°X90°)
- **The most sensitive Compton camera on the market (<1 nSv/h)**
 - 30%-50% shorter acquisition time than other cameras
 - Exceptional sensitivity (<1 nSv/h) allowing imaging of natural background.
- **Stable photon counter both energy and spatially resolved allowing quantification.**
- **3D gamma imaging possible.**



Why are Temporal δ cameras unique?

511 KeV Compton Image



Image de souris EANM2020

0.6 Mbq / Acquisition de 10 minutes

<http://damavan-imaging.com/2020/12/03/medical-imaging/>

Temporal δ is a new generation portable Compton gamma camera - spectrometer and imager - based on temporal imaging: a completely new detection concept backed by 9 proprietary patents and software.

Temporal imaging uses both light and time distribution of each scintillation event to localize it very precisely in space (X-Y-Z), time (T) and energy (E).

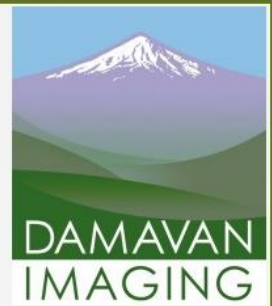
The use of large volume monolithic, high density, high Z_{eff} **CeBr3 crystals** having a low natural radioactivity and fast high yield scintillations guarantees very efficient and clean photon detection by Digital Si-PM.

Our asymmetric Compton concept, 300 ps time veto, and event selection scheme explain our camera good angular resolution and signal/noise.

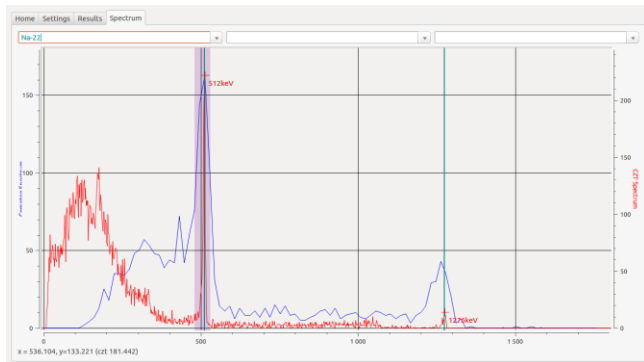
Damavan Imaging was founded in 2014 to develop its Temporal Imaging patents. It won in 2015 a big grant from ANDRA (French Nuclear Waste Agency) to develop a Compton camera able to image low activity waste. In 2018 Damavan has won a H2020 European Award. Camera sales started in 2018.

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Imaging is done in Compton mode from 400 KeV to 3000 KeV overlaid on "natural" (96 x 96°) FOV optical images. Good angular resolution and image quality translates in more details reliably detected. The most precise imaging is obtained in energy-gated mode gating on a specific isotope line.



Energy and spatially resolved quantification of radiation can be done with the Compton head (400 KeV-3 000 KeV)

Usages: new cost & risk reduction possibilities in Waste management

Temporal δ V2 can be used in **Medical imaging and research** when radiation other than 511 KeV is to be imaged (^{131}I , ^{90}Y , ^{223}Ra ...) or if a camera with a wide FOV at 511 KeV is needed.

Good images at energies as high as 2.2 MeV have been obtained. This camera is also suited for 3D tomographic imaging using specific tools.

It is uniquely designed to image very low intensity sources, (final release of decontaminated objects, field contamination...). Resolved images could be obtained from larger distance than with conventional cameras, thus **limiting the risks and the dose** for the operators. Temporal δ being a stable photon counter allows estimating **the mass of the source**, for ex. the mass of Uranium in a plugged pipe.

Specifications

Field of view	96 x 96 flat field	Timing Resolution	300 ps @ 511 KeV
Sensitivity High Flux	3mR/h < 1 mn	Angular Resolution	< 10 degrees (full spectrum) < 6 degrees (energy gated)
Sensitivity Low Flux	3 kBq ^{137}Cs @ 1 m in 10 h	Sensors	CeBr3 + CZT

Operating temperature	-20°C to 40°C	Spectral Resolution	8% @662 KeV
Energy Range	50 KeV – 3 MeV (spectroscopy) 400 KeV – 3 MeV (imagery)	Weight	3.9 kg
Count rate limit	1 mSv/h	Power Source	110 – 220 V (mains)
Dimension	21 x 29 x 16 cm	Communication	Ethernet to laptop Wi-Fi option possible

Miscellaneous characteristics:

- Hand held camera (<4 kg)
- Interface through laptop 12' (supplied)
- Motorized or standard tripod in option
- 4π source sensing
- Dose estimation
- Telemeter distance ranging
- Water tight (IP65) decontaminable upper half
- Battery Life : 4 hours with 1.2 kg external batteries kit
- Energy resolved photon counting