

# TEMPORAL $\delta$ COMPTON

HIGH SENSITIVITY & RESOLUTION COMPTON IMAGING



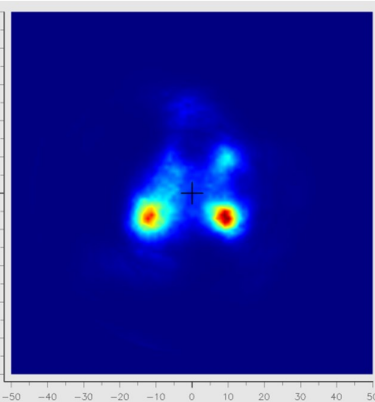
## What is temporal imaging?

**Temporal imaging** is a new concept for gamma ray imaging that uses both light and time distribution of each scintillation event to localize precisely each scintillation event in space (X,Y,Z), time (T) and energy (E).

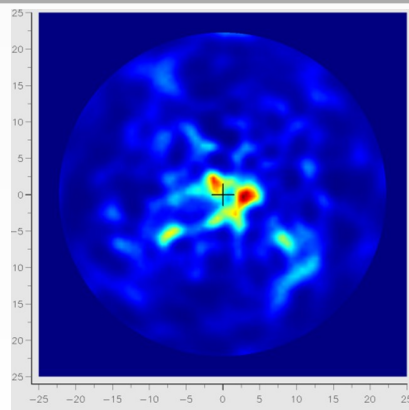


**Temporal  $\delta$**  is the first device to use this new concept. We are now proposing a **portable version** with one  $\text{CeBr}_3$  head, gamma ray and visible imaging and active temperature control. This version is dedicated to energies 300KeV - 2 MeV. This camera has the best angular resolution ( $6^\circ$ ) and timing resolution on the market (300ps). It is also extremely sensitive allowing to image natural radio-elements (1 kBq at 1 meter)

## 1,3 MeV Compton image



- 2 sources  $^{22}\text{Na}$  of 27 KBq each 10 cm from the axis, viewed from 50cm
- 20 mn acquisition



- 2 sources separated by 2 cm
- Sources  $^{22}\text{Na}$  25 cm from the axis
- 20 mn acquisition

## Temporal $\delta$ Compton features

**Temporal  $\delta$  Compton** is composed of a portable unit including a processing unit and one detector unit.

- Temporal imaging read-out electronics.
- 1 calibrated detector module composed of two 32x32 mm  $\text{CeBr}_3$  crystals read-out through Phillips DPC3200 Tile Sensor.
- Embedded software to reconstruct characteristic vector (X,Y,Z,T,E) in real time for each valid scintillation event.
- Image reconstruction from acquired vectors is done at distance on a laptop

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## HIGH SENSITIVITY & RESOLUTION COMPTON IMAGING



Field of view	100 degrees square	Angular Resolution	<10 degrees (full spectrum) <6 degrees (energy gated)
Sensitivity	0.03 $\mu$ R/h in 1hour 1kBq @1m in 2 hours 3 $\mu$ R/h < 1mn	Sensor	CeBr <sub>3</sub>
Timing Resolution	300 ps @ 511keV	Spectral Resolution	<7% @ 662keV
Energy Range	100 keV—3 MeV (Spectroscopy) 250keV-3MeV (imagery)	Battery Life	~1 hours (Laptop battery 18V x 2.5A or 10Vx 2A)
Count Rate Limit	1 mSv/h	Weight	3.9kg
Dimension	22x32x16 cm	Power Source	110-220V (mains)
Operating Temperature	-20°C to +40°C	Communication	Ethernet to laptop Wifi in 2019

### Highlights

Damavan imaging was founded in December 2014 in Troyes (F) as a SAS (Société par Action - Simplified joint stock company). In July 2015, Damavan has won a 4 years research grant from « Investissements d'avenir »: (Investments for the Future Programme conducted by ANDRA), "Temporal" to develop a Compton camera based on temporal imagers. In October 2016 Damavan is issuing the first temporal imager: temporal  $\delta$ .

### Contact us for further information

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