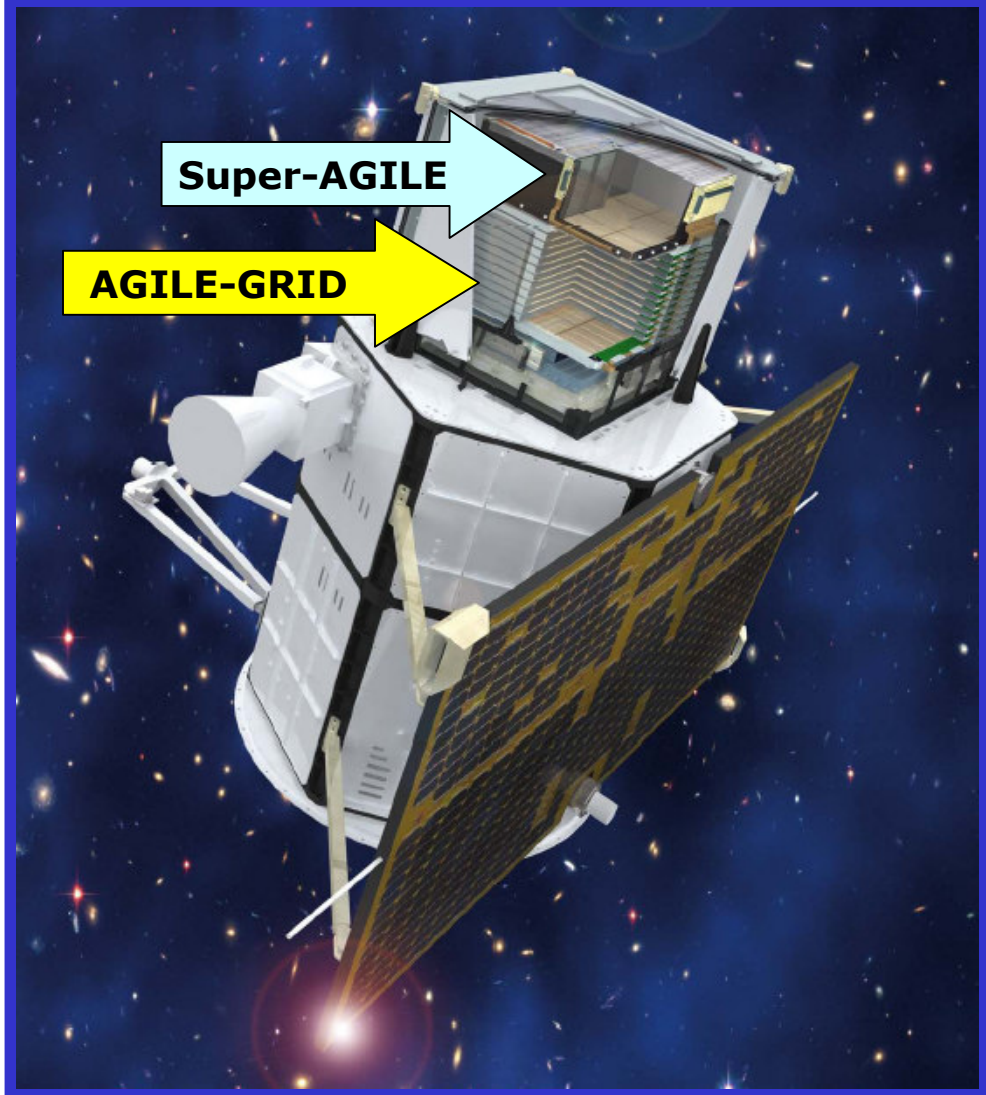
AGILE Highlights

Stefano Vercellone

and

the AGILE Team at IASF Milano

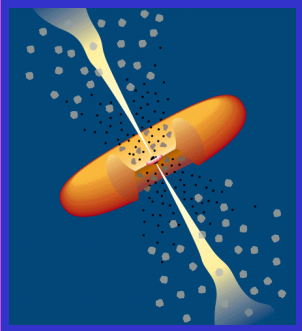
AGILE in a nutshell

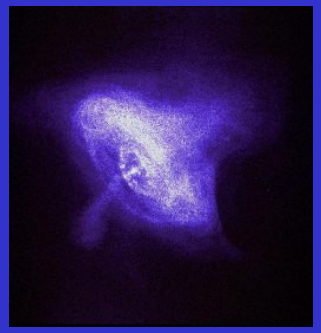


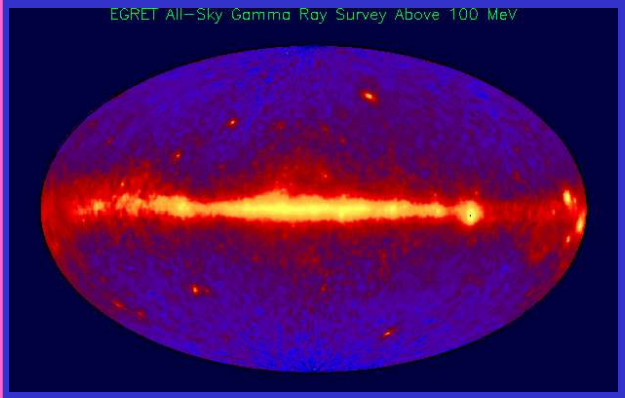
The AGILE Payload: the most compact instrument for high-energy astrophysics

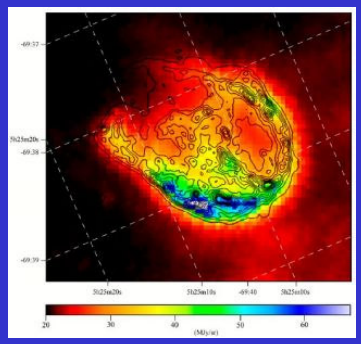
For the first time it combines a gamma-ray imager (30 MeV- 30 GeV) with a hard X-ray imager (18-60 keV) with large FOVs (3 - 1 sr) and optimal angular resolution

AGILE facts







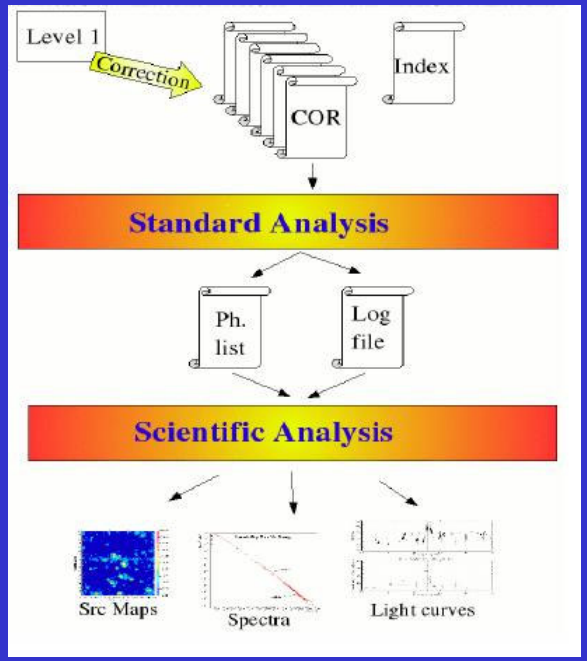


The AGILE Team at INAF-IASF Milano

Permanent: Caraveo, Mereghetti, Perotti, Pellizzoni, Vercellone [since January 2008]

Non-permanent: Chen, Giuliani, Fiorini

AGILE at IASF Milano

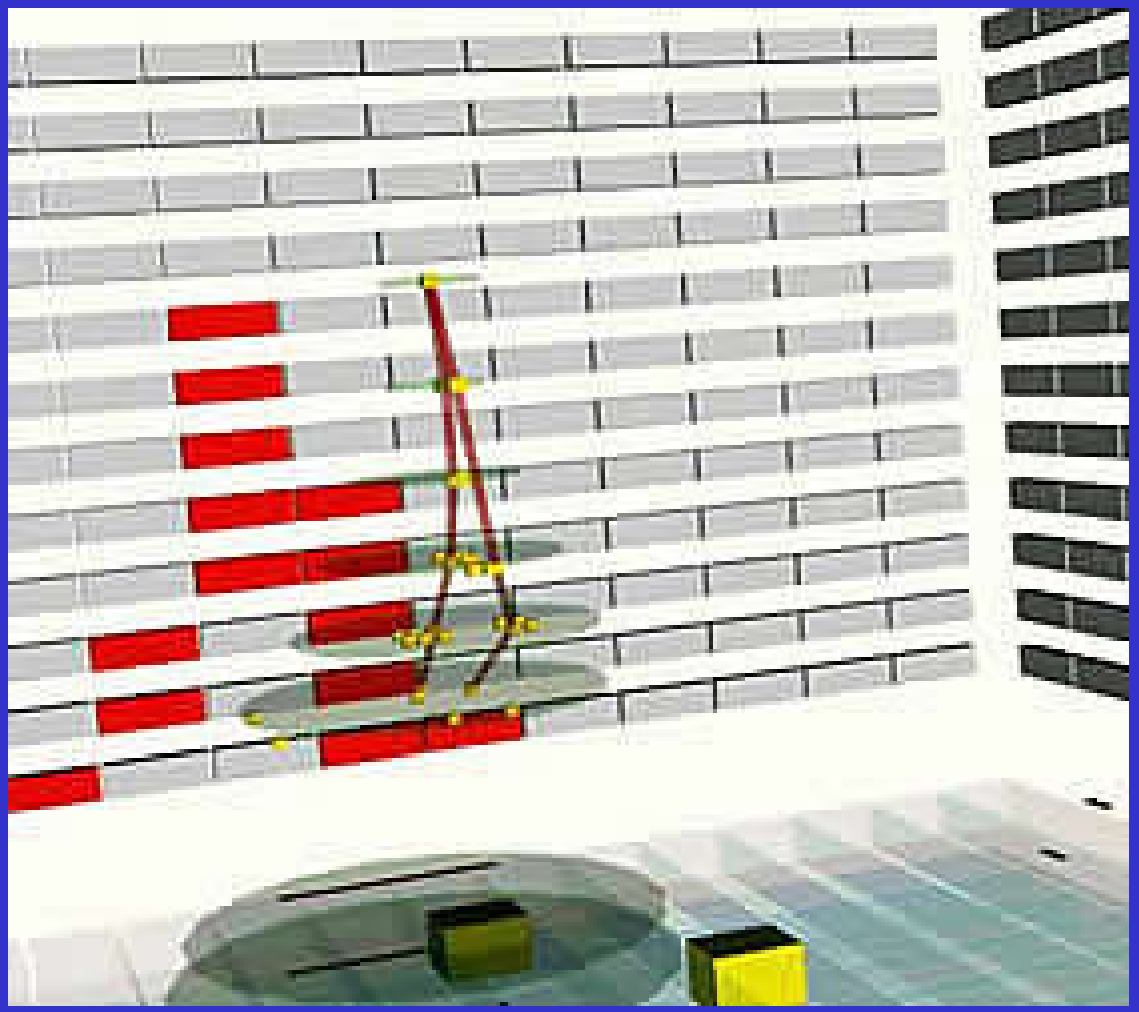


The "*AGILE Lads*"

Since 1998, most of the activities and scientific results have been carried out and obtained by long-term non-permanent researchers working in this Institute, whose contribution has been fundamental for the AGILE success.

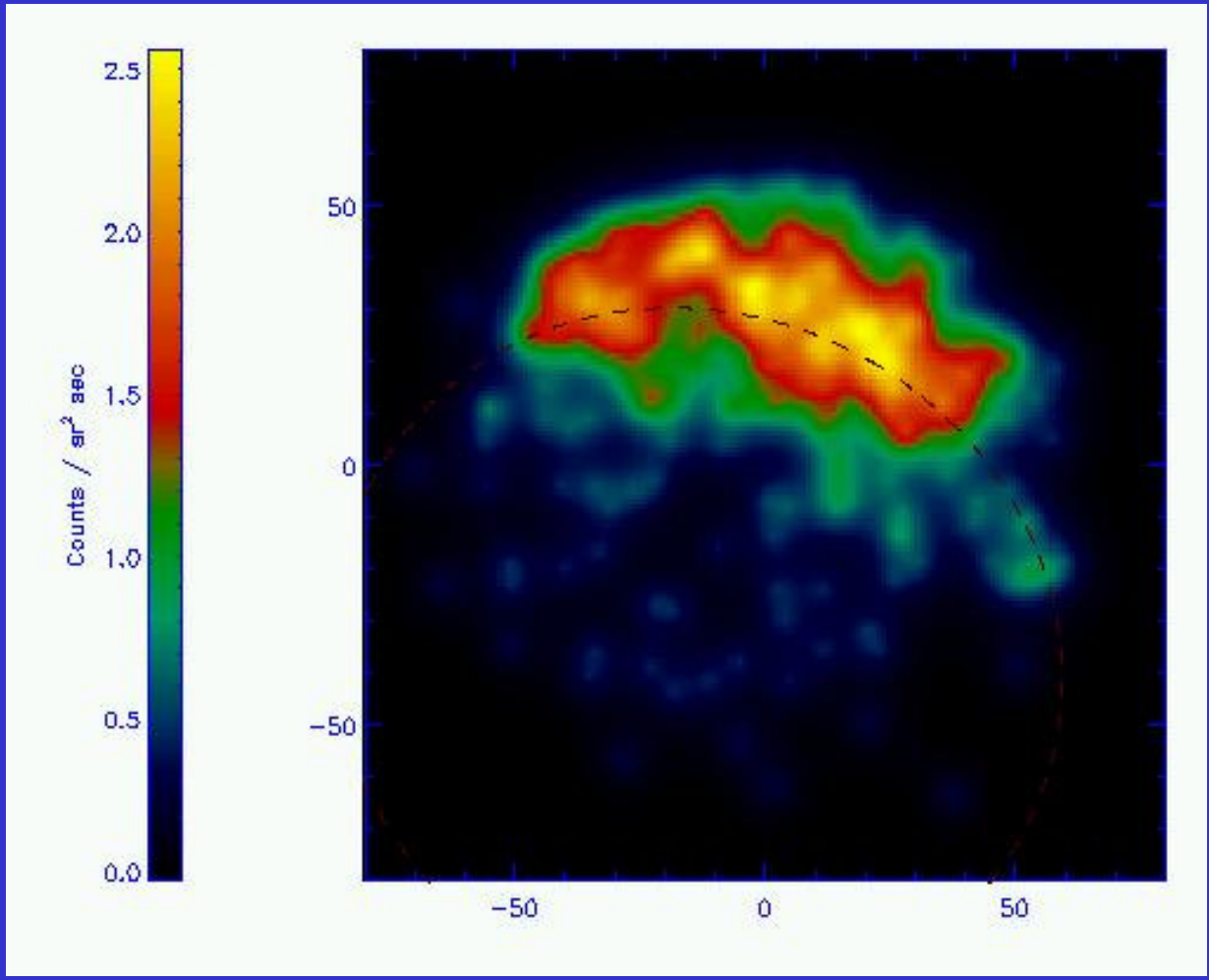
All of us are currently Coordinators of an AGILE Scientific Group (AGNs, PSRs, UNIDs, Diff. Emiss.)

The first photon [09-05-07]



The Earth !

Gamma-ray emission from the Earth atmospheric limb



Active Galactic Nuclei

The "*Fabulous Four*"

During the Science and Performance Verification Phase, AGILE obtained important results on flaring AGNs:

Four AGNs detected at high significance:

3C 279, 3C 454.3, TXS 1510-089, S5 0716+61

Six Astronomer's Telegrams issued

One scientific paper submitted to ApJL

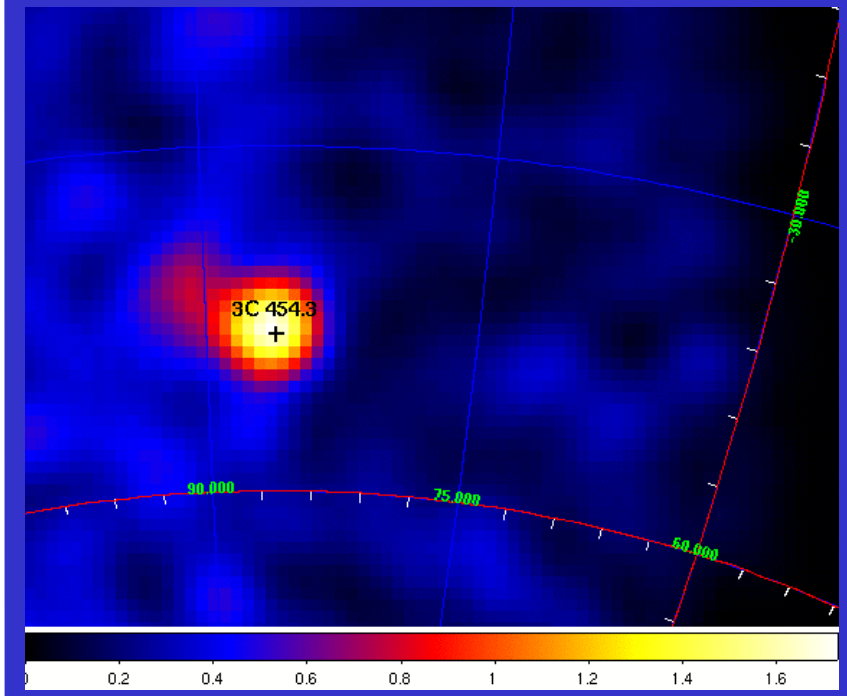
Four multi-λ campaign on-going

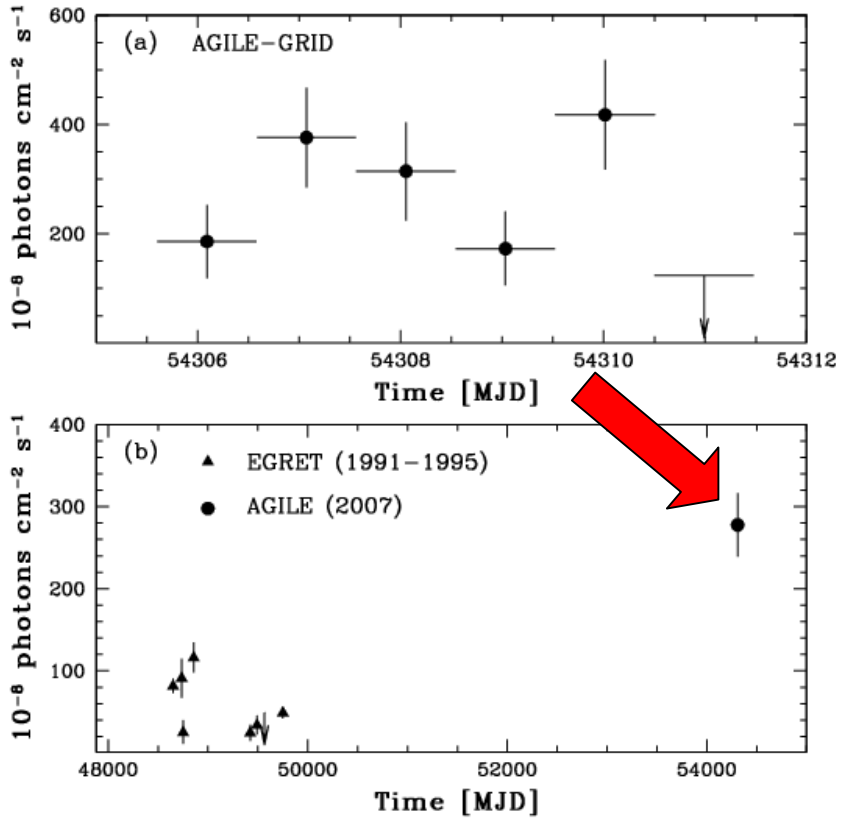
Several ToOs performed and Proposals accepted with INTEGRAL, Swift, RXTE, MAGIC, Suzaku, XMM.

3C 454.3

This source, a.k.a. "*the crazy diamond*", has been very active during all the AGILE pointings (Jul. – Dec.) with recurrent flaring activity.

July 6-day observ.

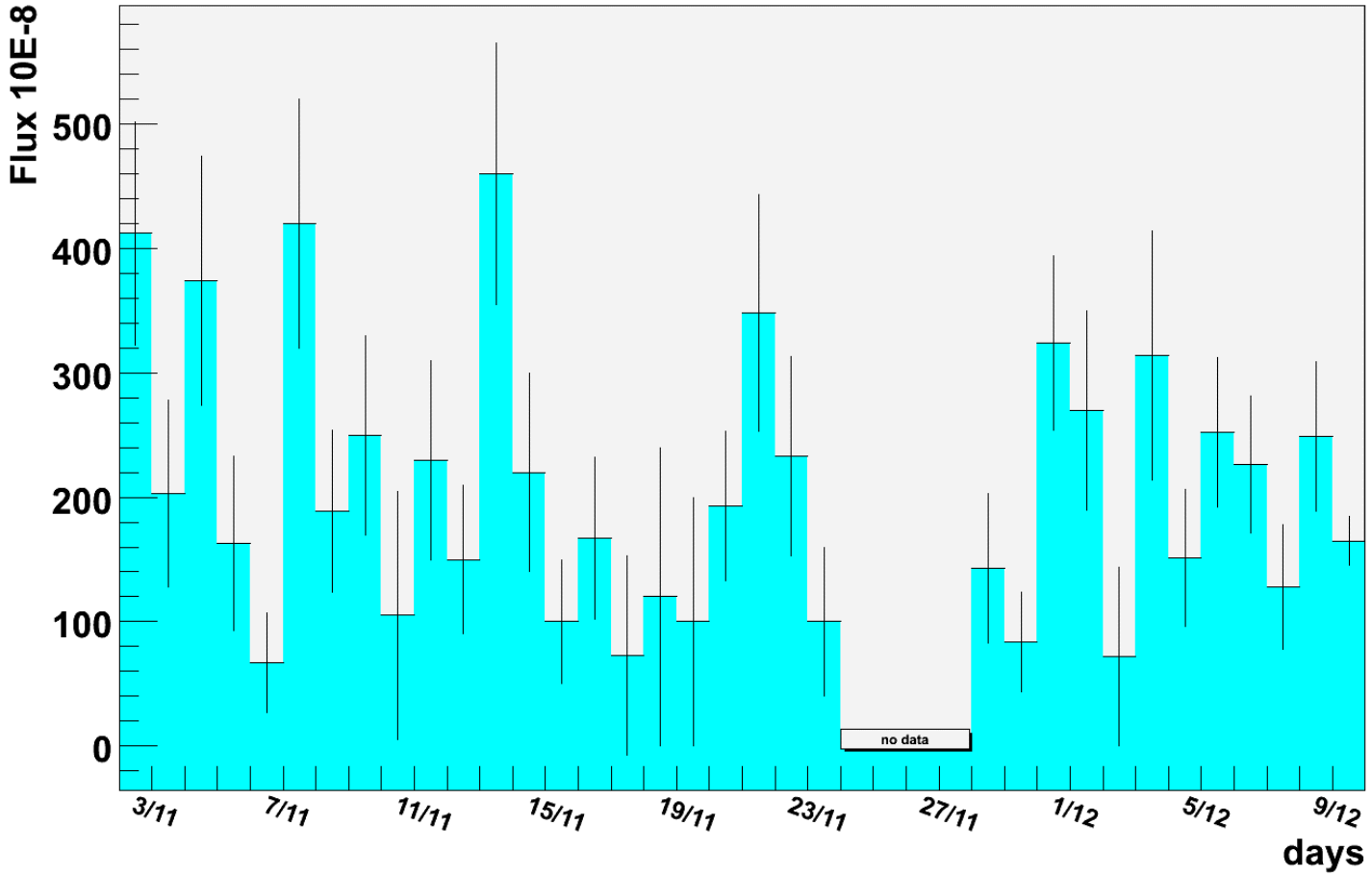




AGNs long-term monitoring

AGILE will allow long-term monitoring of Blazars

3C 454.3 one-month light-curve



Gamma-Ray Pulsars

AGILE and PSRs

COMMISSIONING and SVP activities:

Aug. 2007 - Test of the timing analysis SW.

Vela PSR: ***detecting PSRs with AGILE***

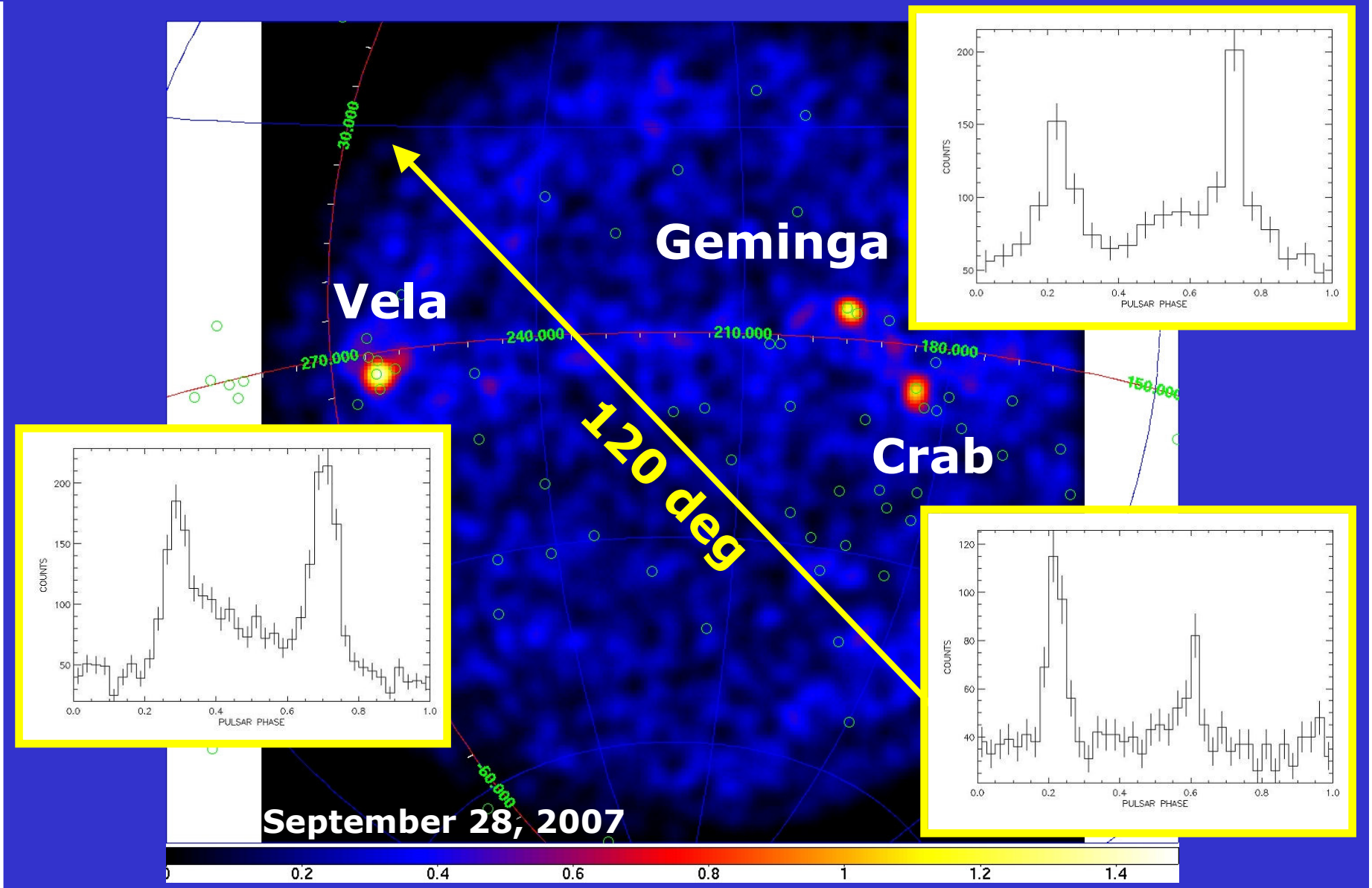
Sept.-Oct. 2007 - Calibration of the timing analysis SW.

Geminga PSR: ***detecting PSRs with AGILE at the right frequency***

Nov.-Dec. 2007 - Phasing radio and X-rays

Crab PSR: ***detecting PSRs with AGILE at the right frequency and phase***

The "*Pulsating Triplet*"



The AGILE contribution

Long term monitoring of known gamma-ray pulsars

Discovery of gamma-ray emission from **near and young pulsars** discovered after the end of CGRO.

Gamma-ray emission from **millisecond pulsars** (beyond J0218+4232...).

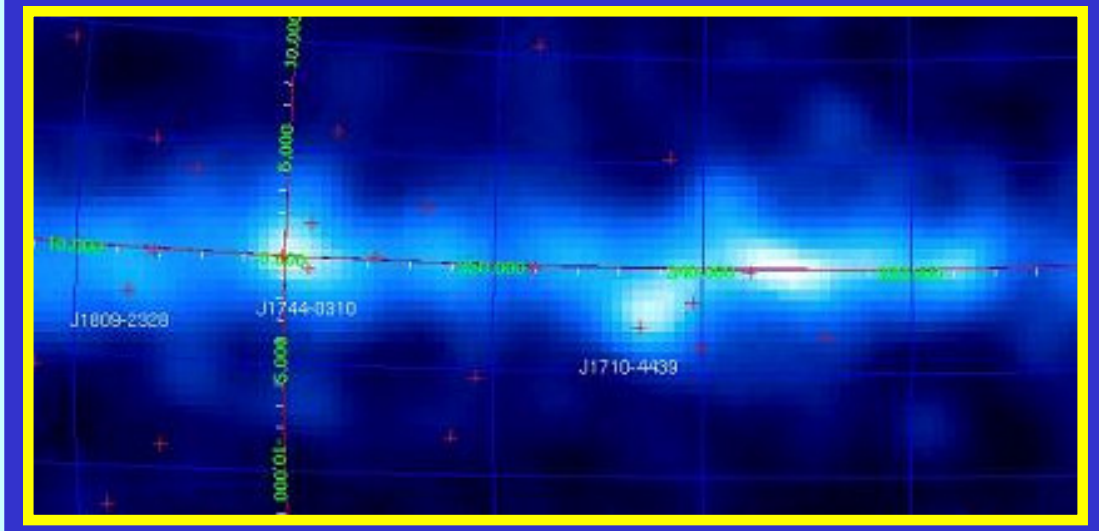
Unidentified non-variable EGRET sources (better positioning, secular variability, period searches). **How many radio-quiet pulsars**?

Galactic Sources

AGILE and Galactic Sources

They are difficult to detect if faint and steady.

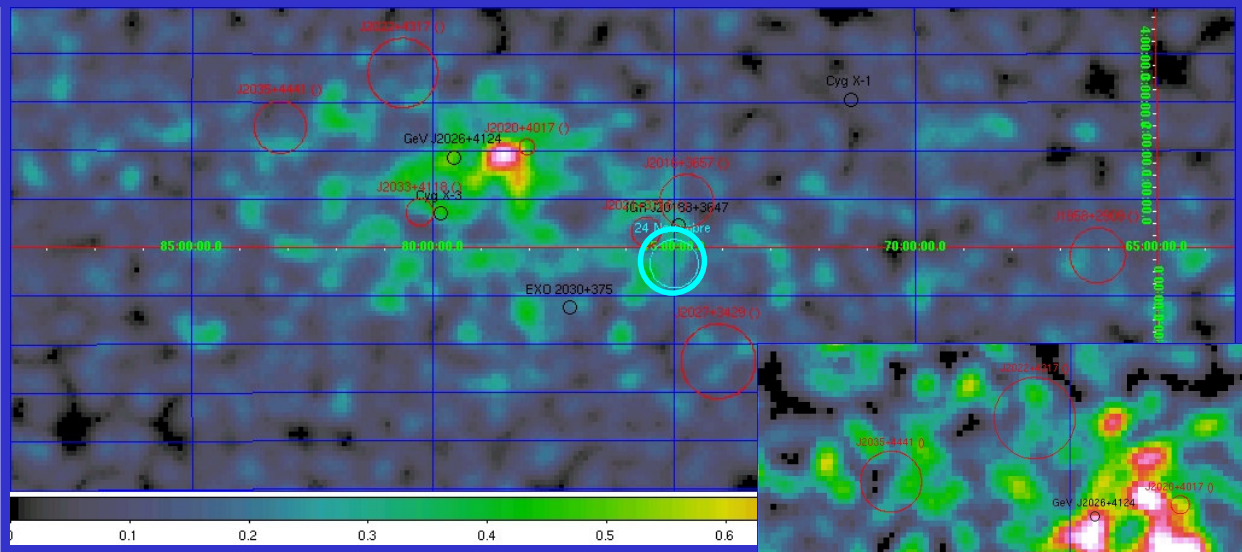
They require long integration time and very accurate data analysis procedures.



The most important result is:

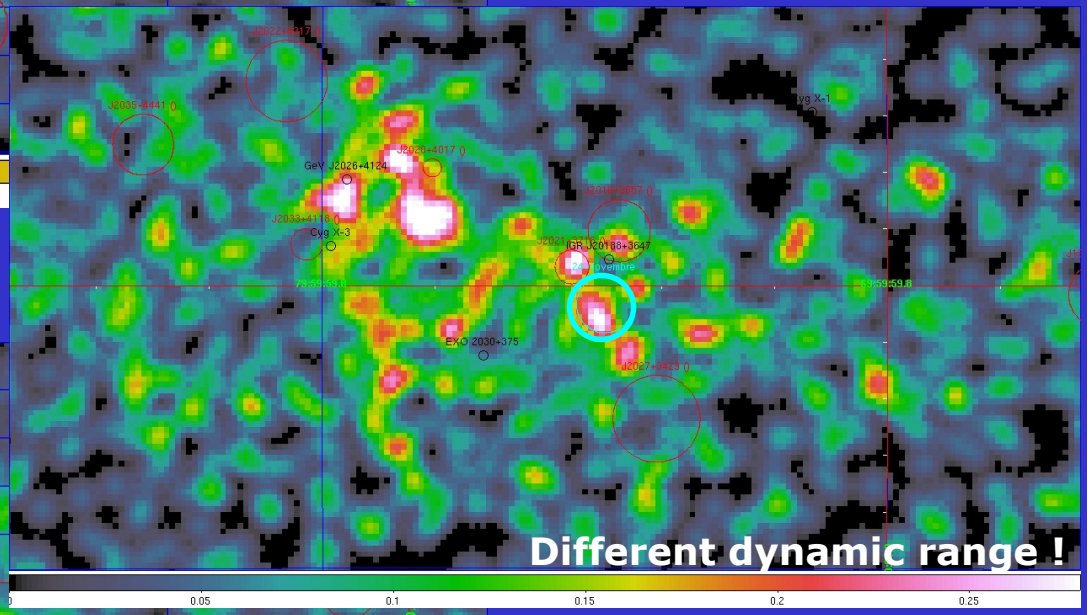
- detection of a **fast transient in the Cygnus region** for which we issued an Astronomer's Telegram

The Cygnus Transient

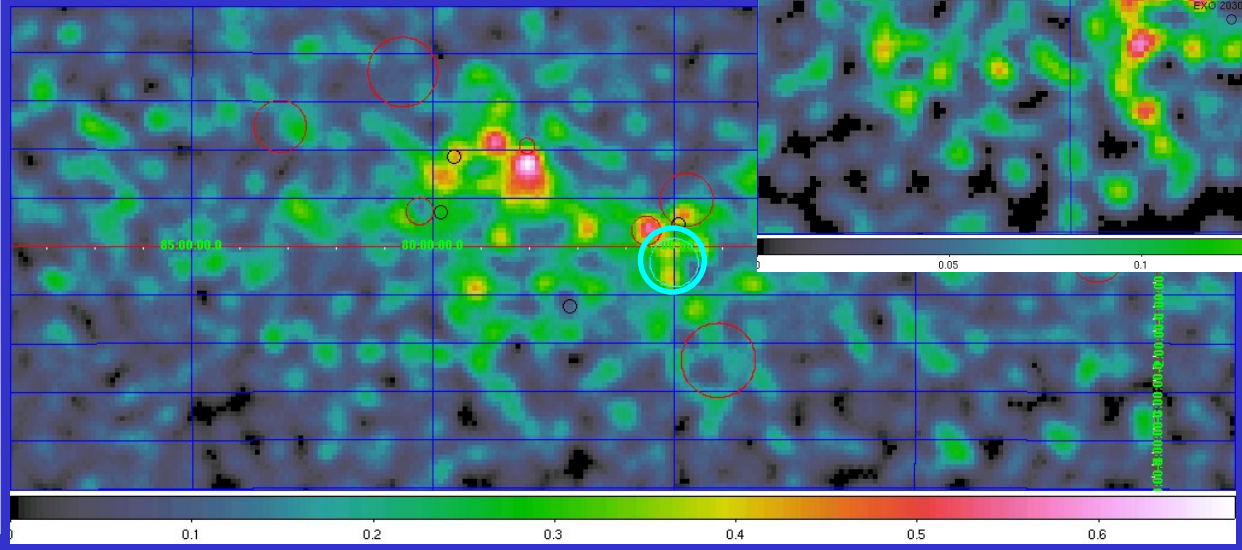


2 Nov. – 18 Nov.

18 Nov. – 28 Nov.



Different dynamic range !

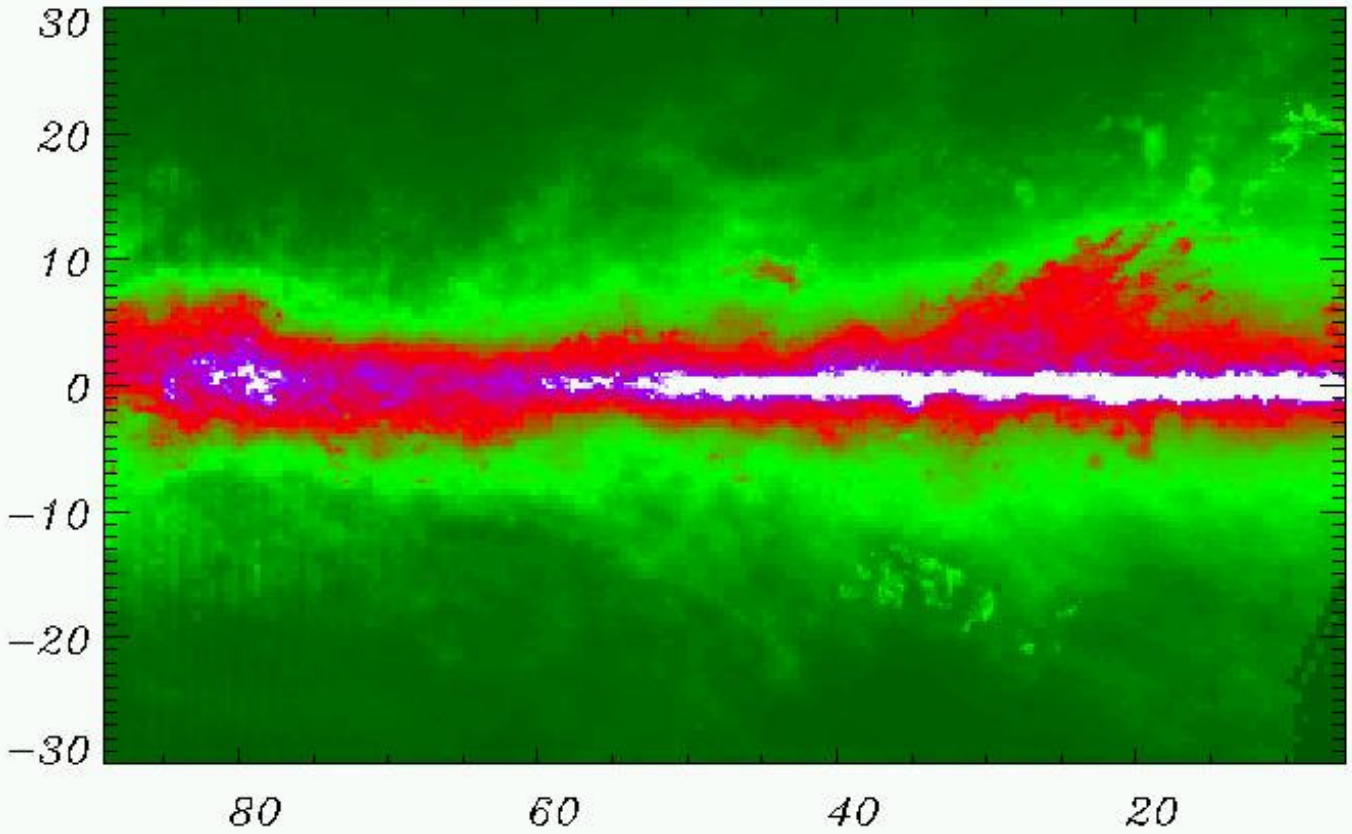


28 Nov. – 7 Dec.

Diffuse Emission

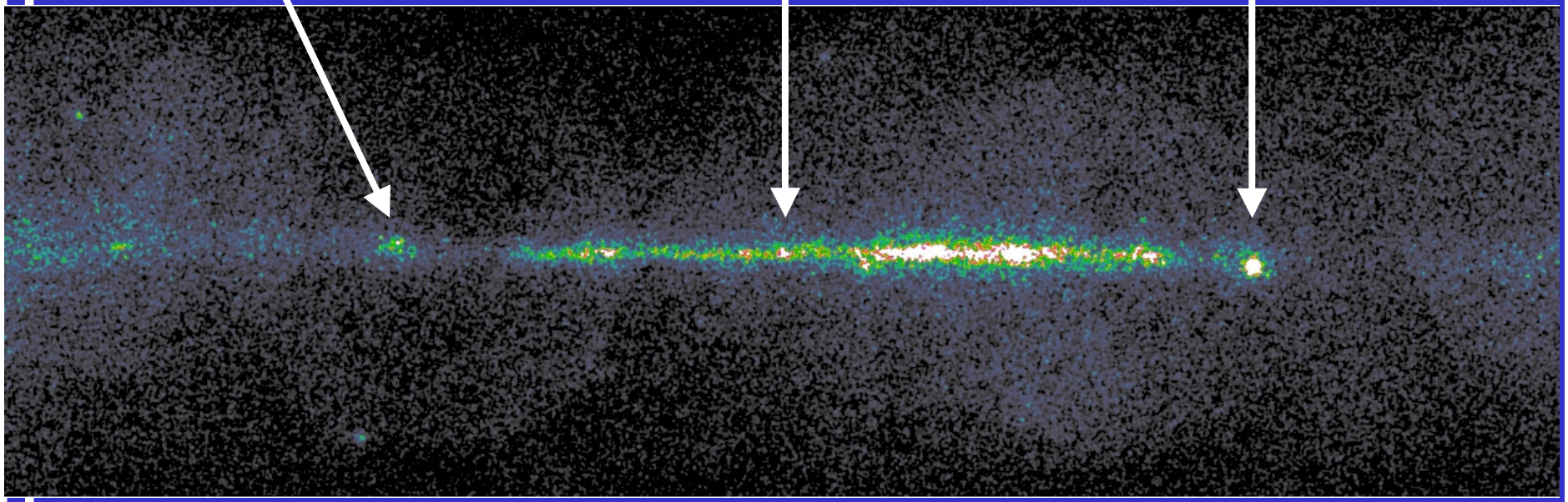
The AGILE Model

Result of a three-year long Ph.D. Thesis



Our Galaxy in Gamma-rays

The Galactic Plane after 6 months



Future Developments

Our achievements & aims

Several **scientific papers** with the AGILE results are in preparation or just submitted.

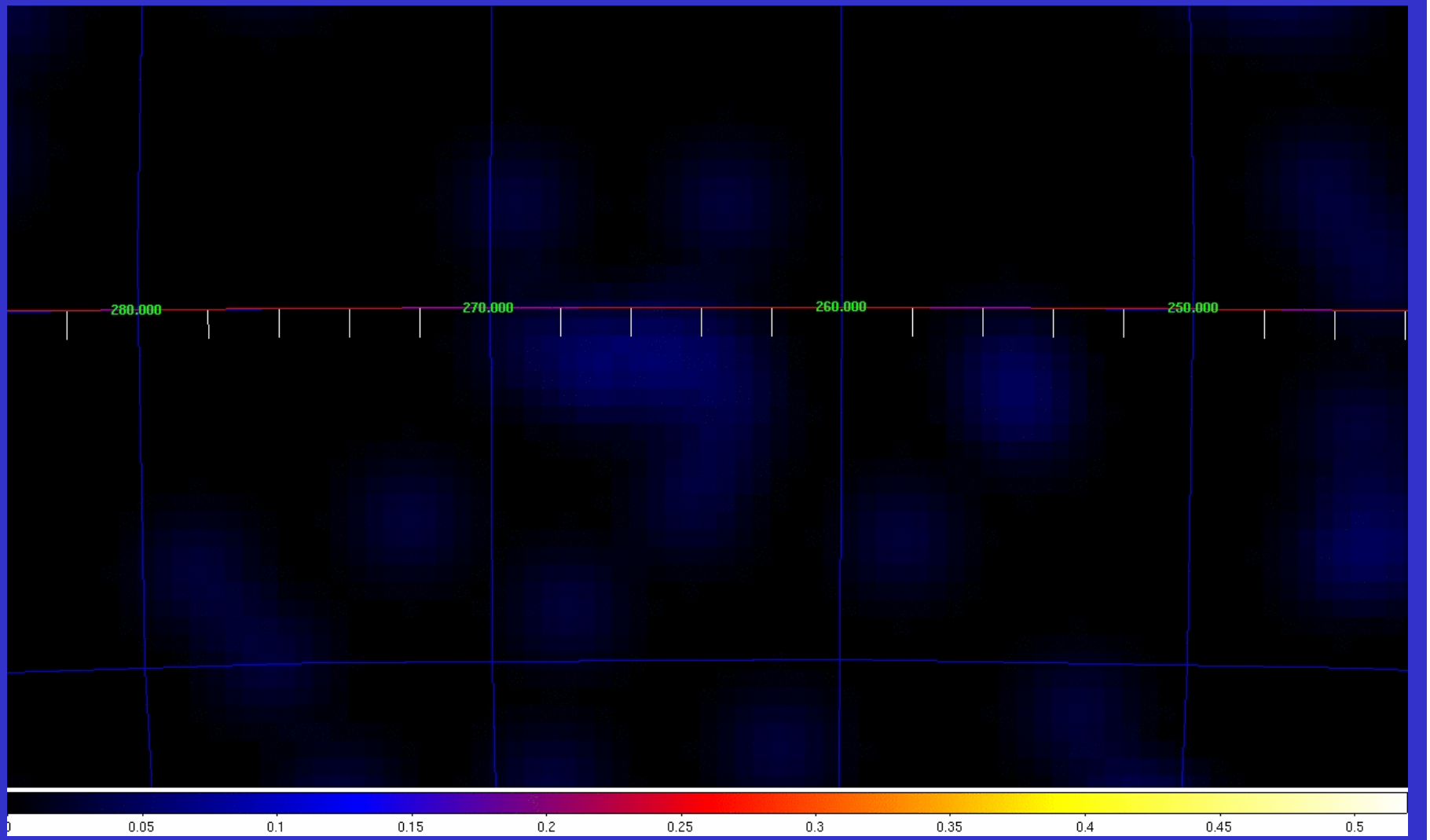
The **AGILE γ-ray group at IASF-MI** is in a strategic position for an optimal exploitation of future gamma-ray mission data (e.g. GLAST).

Most of the **γ-ray Imager Detector** development has been carried out by non-permanent personnel who has thus acquired a considerable **experience in the design, Montecarlo simulation, testing, calibration, and operation** of high-energy space instrumentation.

This technical and scientific **expertise should be capitalized by consolidating our staff** with permanent positions in order to be exploited for future space experiments.

Patiently working, waiting for photons

The Vela Pulsar: 14 orbits (1 day) of integration



The end

THE END