



*Om agnim ile purohitan
yajnasya devam rtvijam
hotaram ratnadhatamam*

Rig Veda, I, 1

AGILE in orbit

M. Tavani

**on behalf of the AGILE
Team**

**TeV Particle Astrophysics
Conference
Venezia, Aug. 31, 2007**

AGILE in orbit...

- **ASI Scientific Mission dedicated to gamma-ray and X-ray astrophysics**
- **First 1830 orbits, August 31, 2007.**
- **Healthy Scientific Instrument**
- **Satellite Commissioning Phase completed (May-June)**
- **Science verification phase and in-orbit calibrations (July-September)**
- **Very promising scientific performance**

AGILE



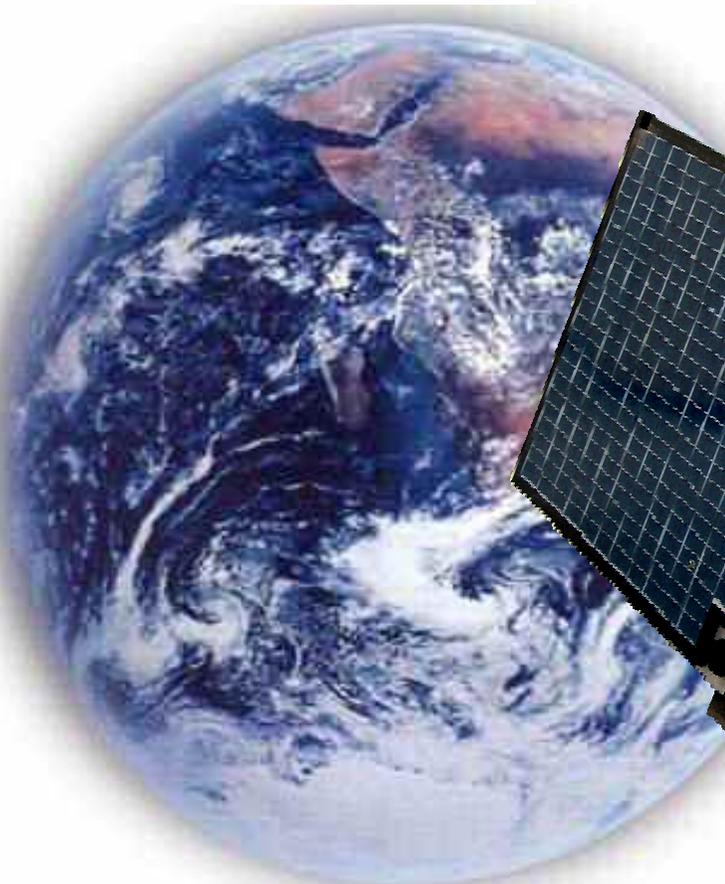
INAF



Carlo Gavazzi Space SpA



ENEA



Scientific Institutes involved in the development of AGILE

- INAF-IASF Milano
- INAF-IASF Bologna
- INAF-IASF Roma
- INFN- Sez. Trieste
- INFN- Sez. Roma I
- INFN- Sez. Roma II
- Università di Trieste
- Università di Roma “Tor Vergata”
- Università “La Sapienza”
- CIFS - Consorzio Interuniversitario per la Fisica Spaziale (Torino)





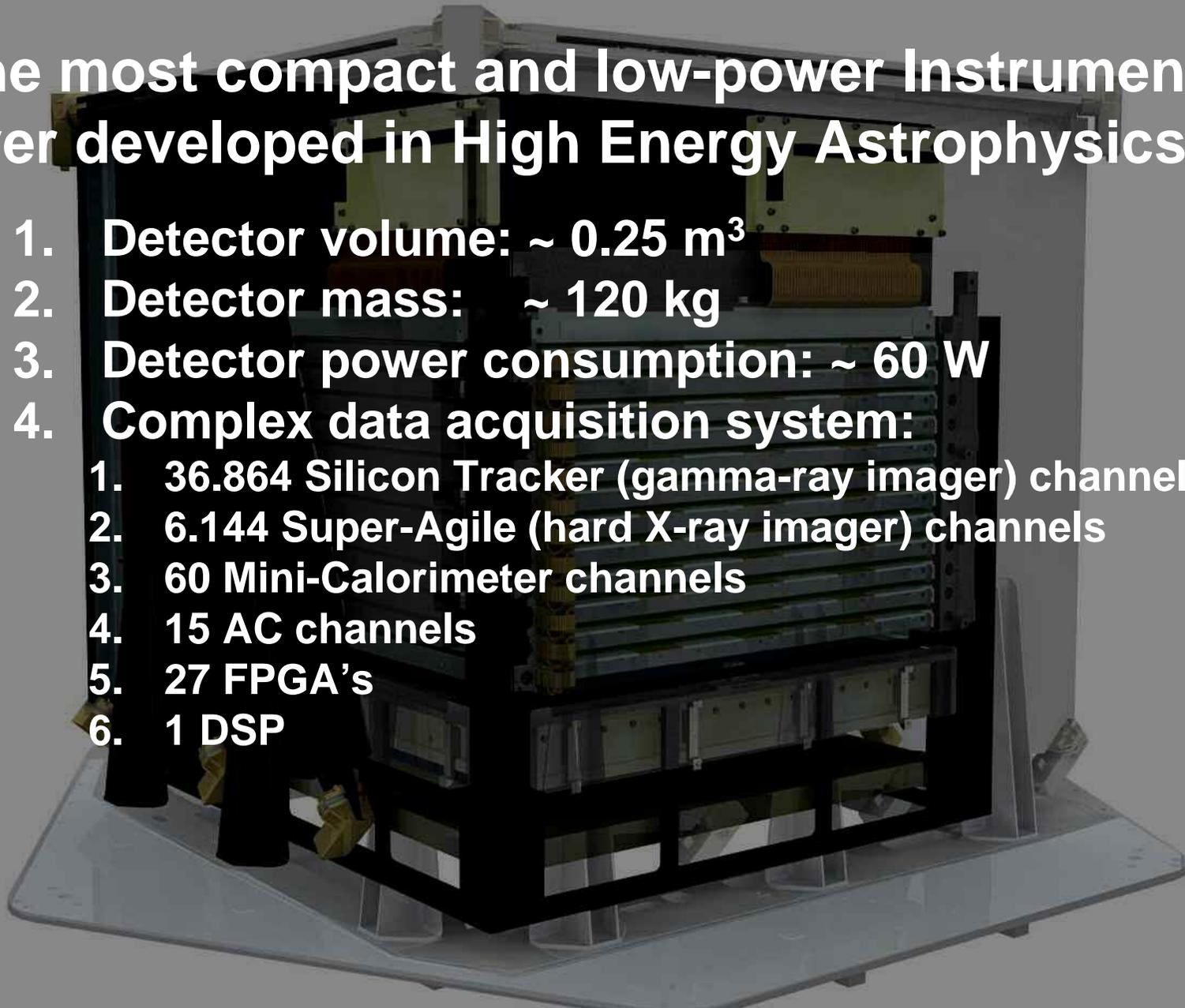
The AGILE Payload: the most compact instrument for high- energy astrophysics

It combines for the first
time a **gamma-ray
imager (30 MeV- 30 GeV)**
with a **hard X-ray
imager (18-60 keV)** with
large FOVs (1-2.5 sr) and
optimal angular
resolution

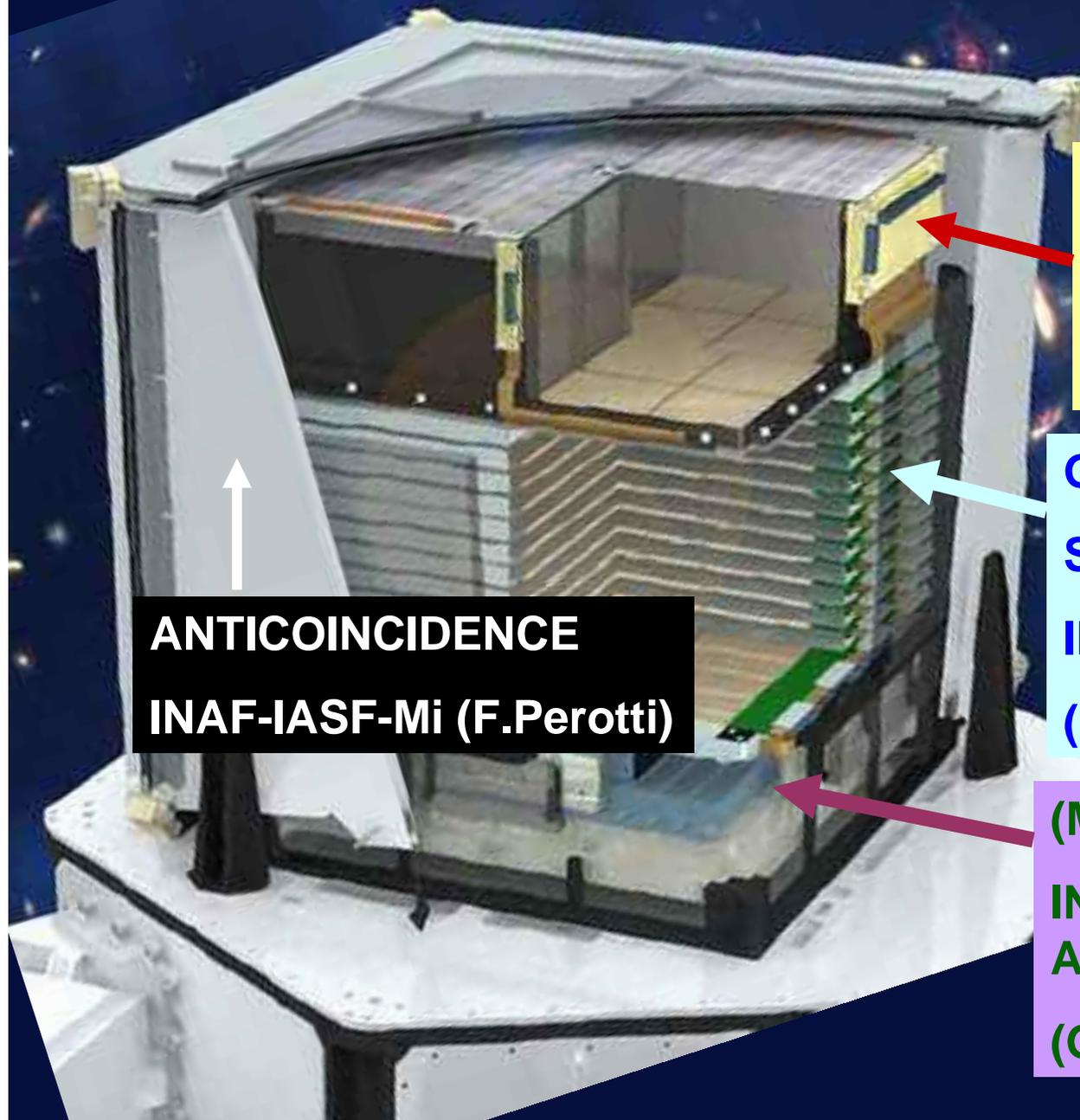
The AGILE Instrument

The most compact and low-power Instrument ever developed in High Energy Astrophysics:

1. Detector volume: $\sim 0.25 \text{ m}^3$
2. Detector mass: $\sim 120 \text{ kg}$
3. Detector power consumption: $\sim 60 \text{ W}$
4. Complex data acquisition system:
 1. 36.864 Silicon Tracker (gamma-ray imager) channels
 2. 6.144 Super-Agile (hard X-ray imager) channels
 3. 60 Mini-Calorimeter channels
 4. 15 AC channels
 5. 27 FPGA's
 6. 1 DSP



AGILE: inside the cube...



**HARD X-RAY IMAGER
(SUPER-AGILE)**

**INAF-IASF-Rm
(E.Costa, M. Feroci)**

**GAMMA-RAY IMAGER
SILICON TRACKER**

INFN-Trieste

(G.Barbiellini, M. Prest)

**ANTICOINCIDENCE
INAF-IASF-Mi (F.Perotti)**

(MINI) CALORIMETER

**INAF-IASF-Bo, Thales-
Alenia Space (LABEN)**

(G. Di Cocco, C. Labanti)

The challenge of AGILE...

- **Optimal gamma-ray imaging PSF (30 MeV-30 GeV) and large FOV (~2.5 sr) combined with simultaneous hard X-ray imaging (18-60 keV, ~1 sr FOV).**
- **Microsecond time-tagging (PPS) and wide GRB search dynamic range (18 - 60 keV, 0.3-10 MeV)**
- **The most compact instrument ever built for high-energy astrophysics above 30 MeV, combining 3 different detectors with no interference, 27 FPGA's.**

all this with...

- **only ~100 kg of Payload**
- **only ~100 W of PL absorbed power**
- **only 350 kg of satellite...**

AGILE scientific goals

- cover $\frac{1}{4}$ of the entire gamma-ray sky with good sensitivity and excellent angular resolution.
- combine a **gamma-ray imager** and a **hard X-ray imager** for simultaneous long-timescale observations.
- use microsecond time tagging of gamma-rays for ultra-fast timing studies of cosmic phenomena.

After the first 4 months with preliminary data:

- **AGILE demonstrates the covering of $\sim 1/4$ of the entire gamma-ray sky with nominal sensitivity.**
- **AGILE shows a nominal performance of all its detectors. In particular, its **gamma-ray** and **hard X-ray** imagers are working together as expected.**

Summary

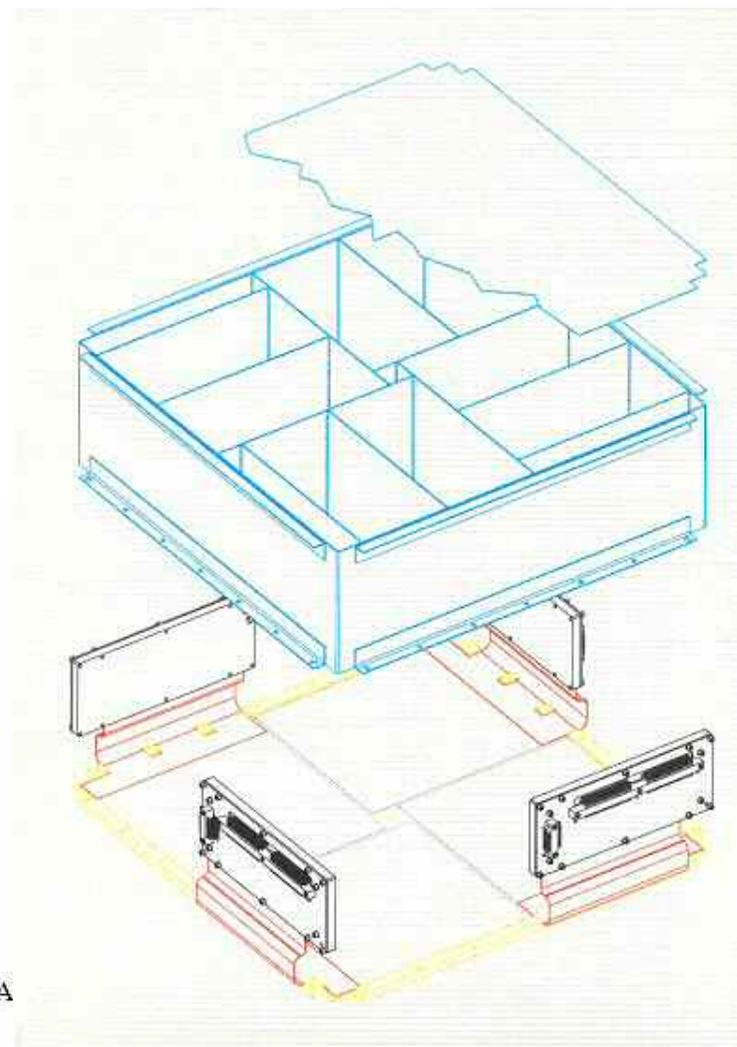
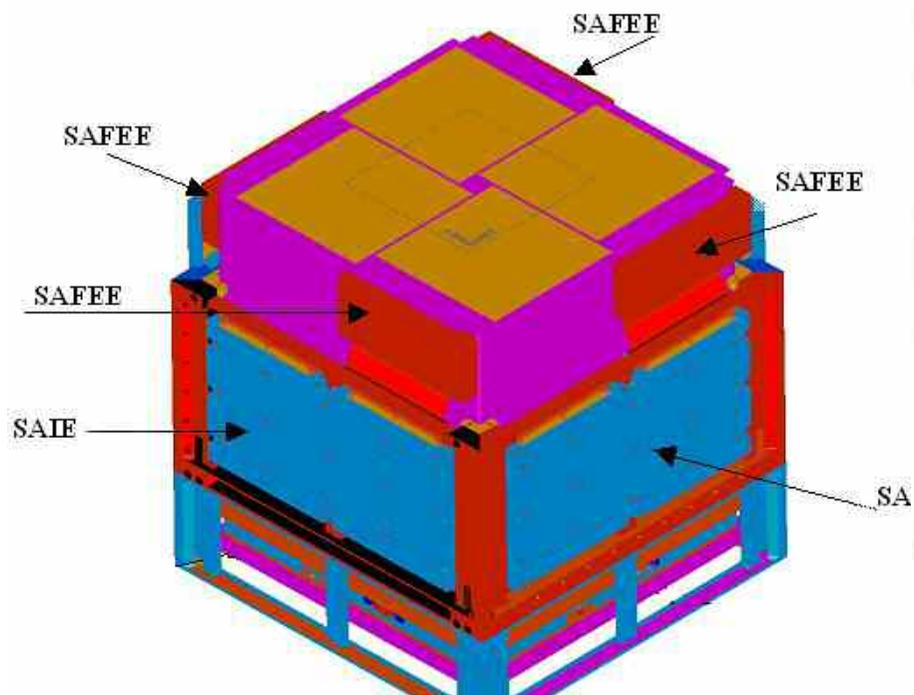
- **The Instrument**
- **Early and preliminary data**
- **First GRBs**
- **First blazar detections**
- **The AGILE scientific program**

The AGILE instrument

- **AC**
- **Super-Agile (18-60 keV)**
- **Silicon Tracker (30 MeV-30 GeV)**
- **Mini-Calorimeter (0.350 – 100 MeV)**

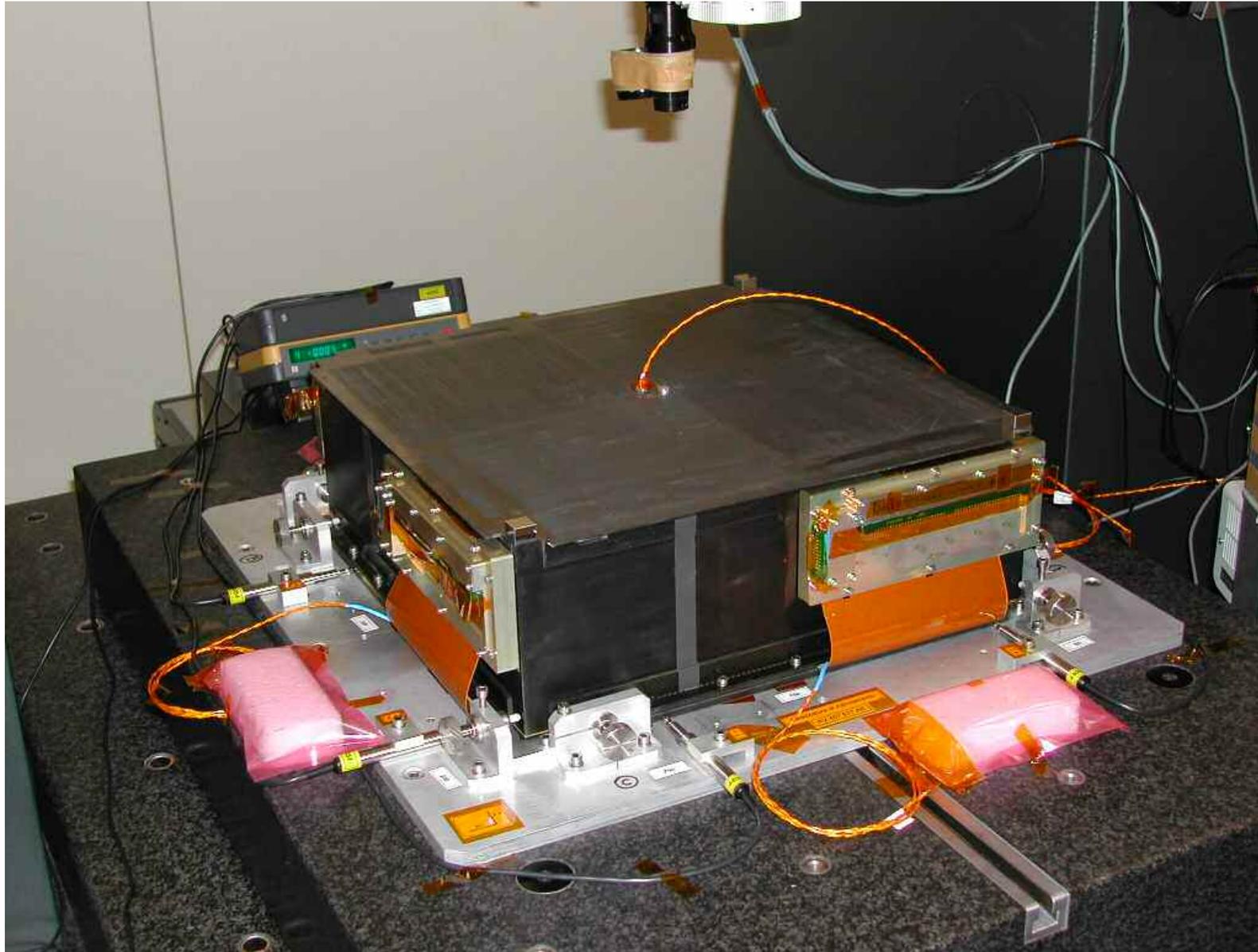
SUPER-AGILE

(hard X-ray imager,
18-60 keV)

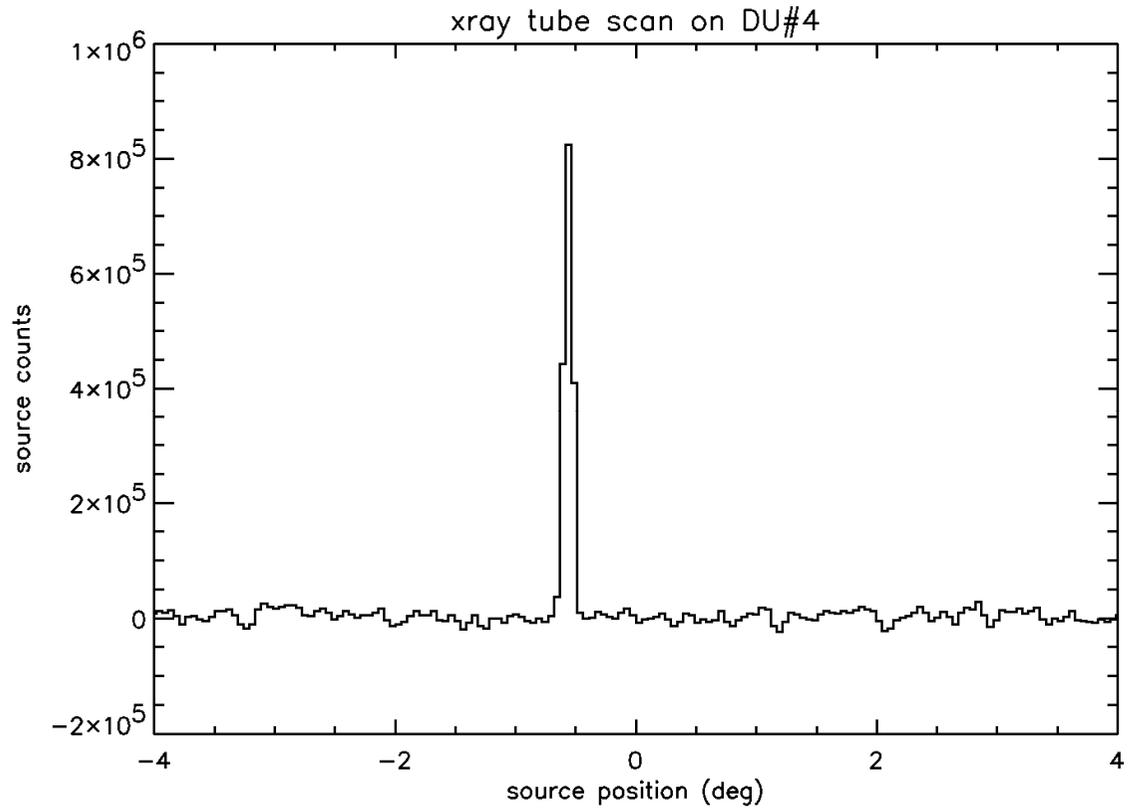




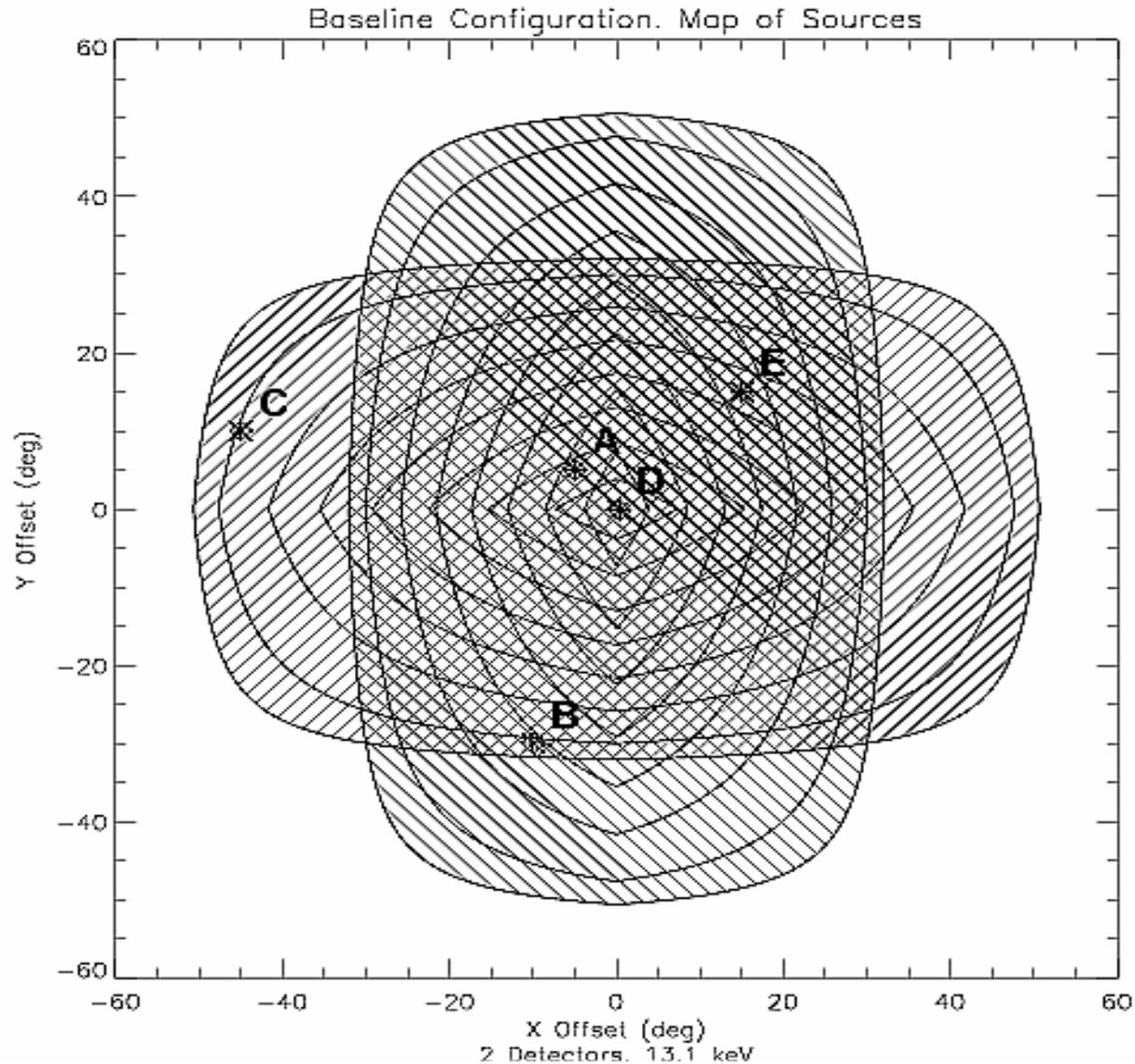
Super-Agile: INAF-IASF Roma (Costa, Feroci et al.)



SA Pencil Beam Calibration

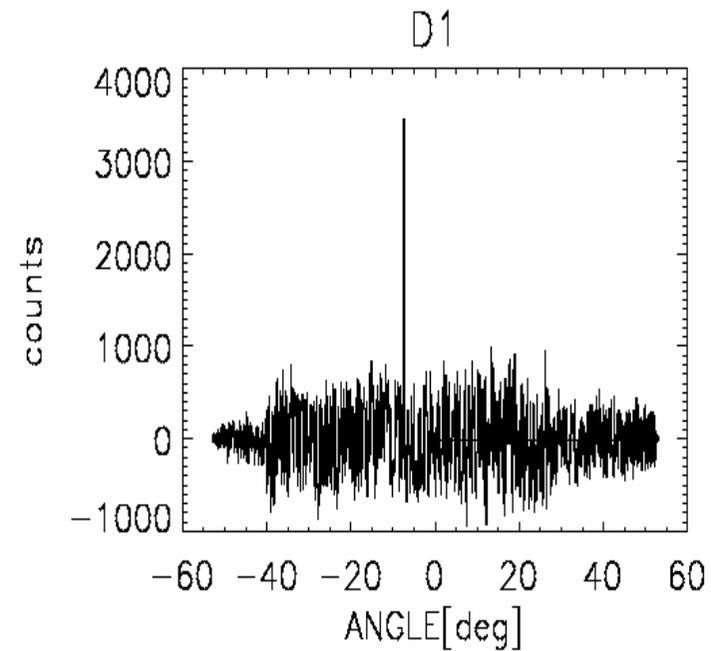
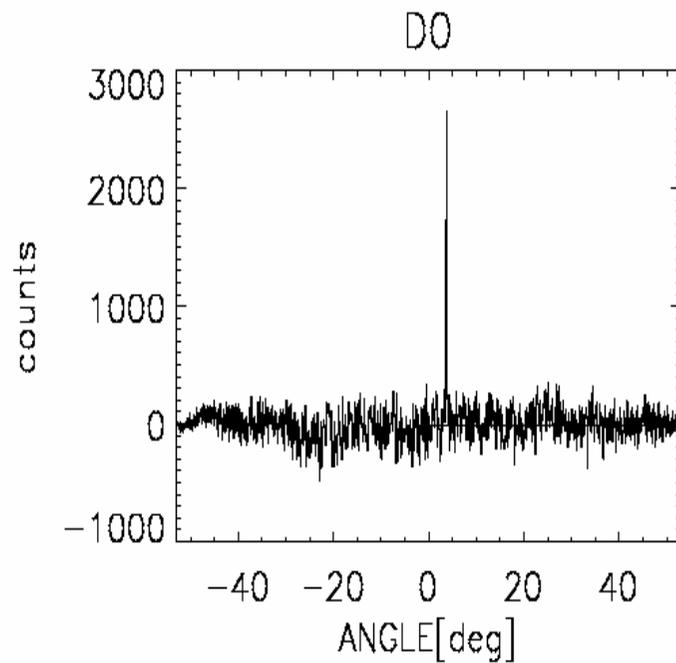


Super-Agile Field of View (~1 sr) (on-axis 1-day sensitivity: ~10 mCrab @18 keV)

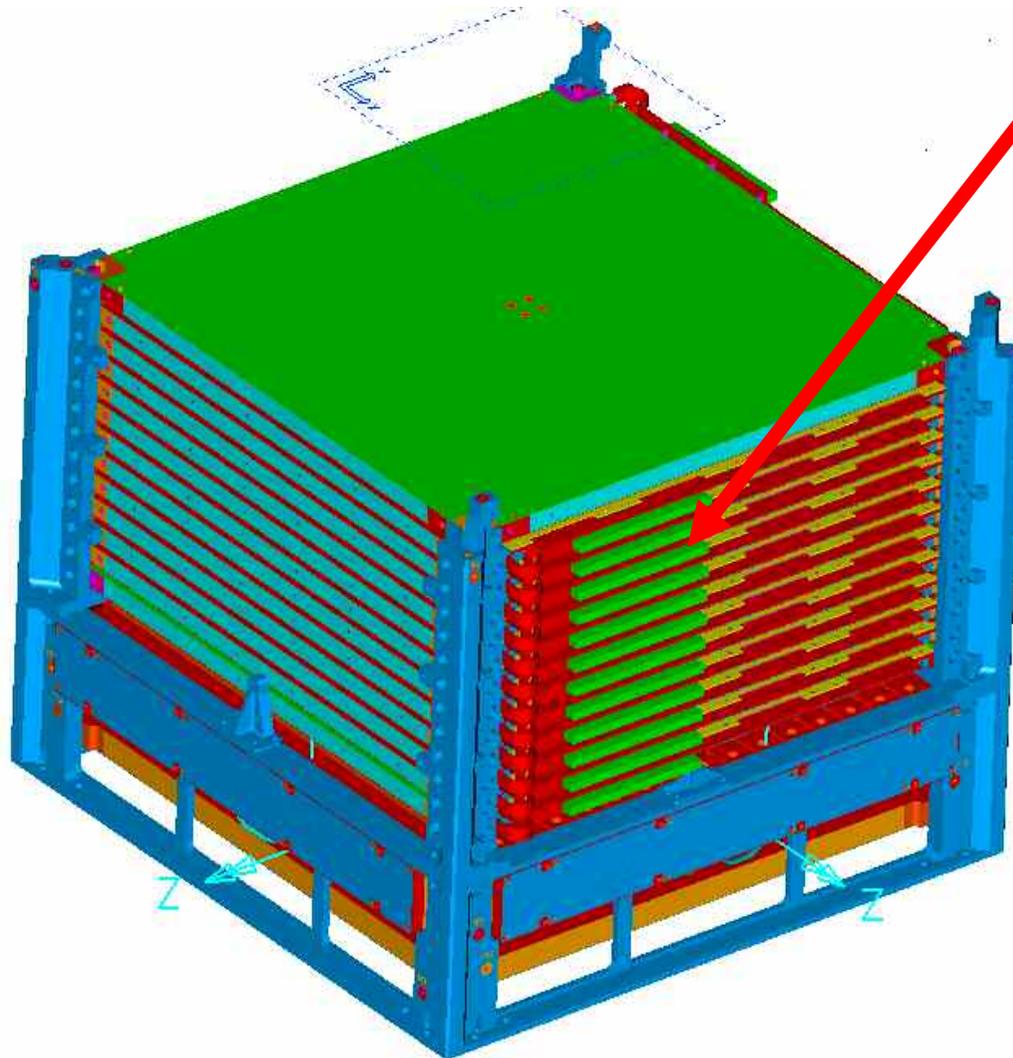


SA GRB pre-launch testing (IABG, Munich)

•	Run	Det-Z	Det-X	θ_x	θ_z	Analysis
•	7369	0	1	-7.492	+3.663	On-board Software
•	7369	0	1	-7.486	+3.663	Ground Software
•	7370	2	3	-11.527	-0.504	On-board Software
•	7370	2	3	-11.527	-0.513	Ground Software



SILICON TRACKER

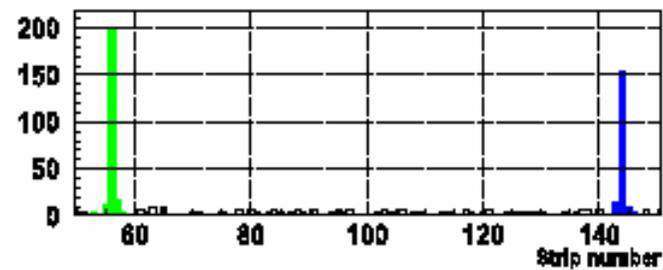
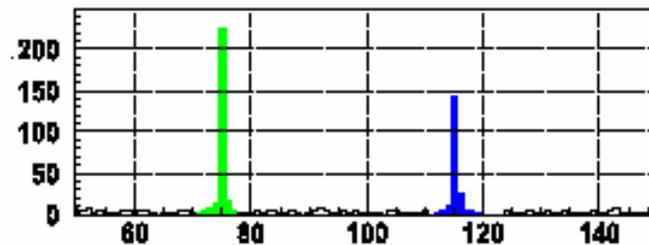
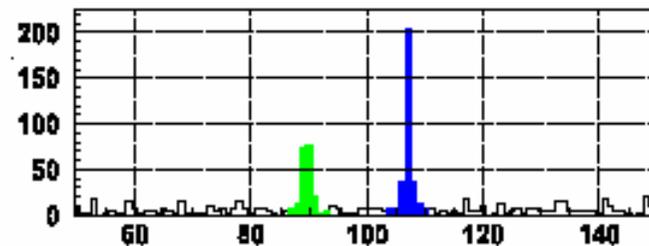
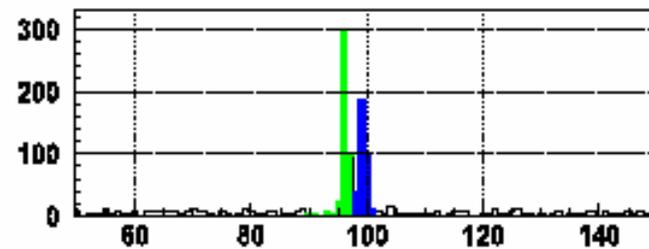
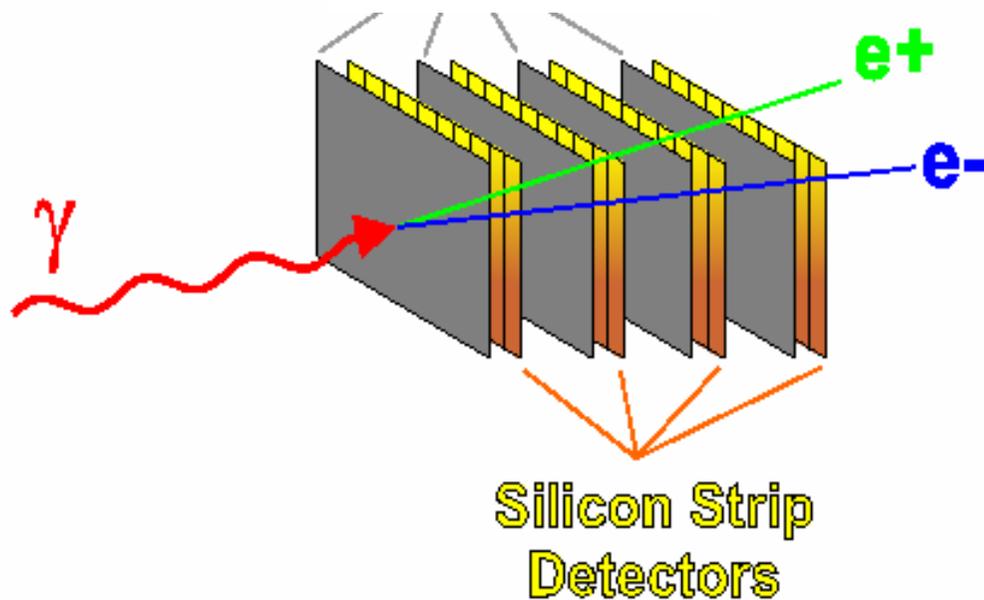


**10 planes with
* $0.07 X_0$**

*** 40 micron
resolution**

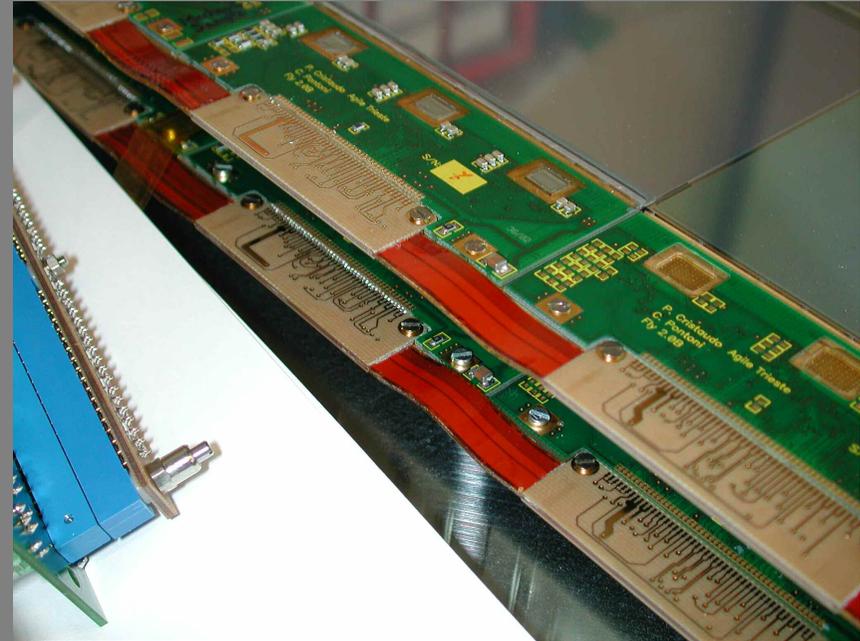
Total: $\sim 0.9 X_0$

Tungsten
absorbers



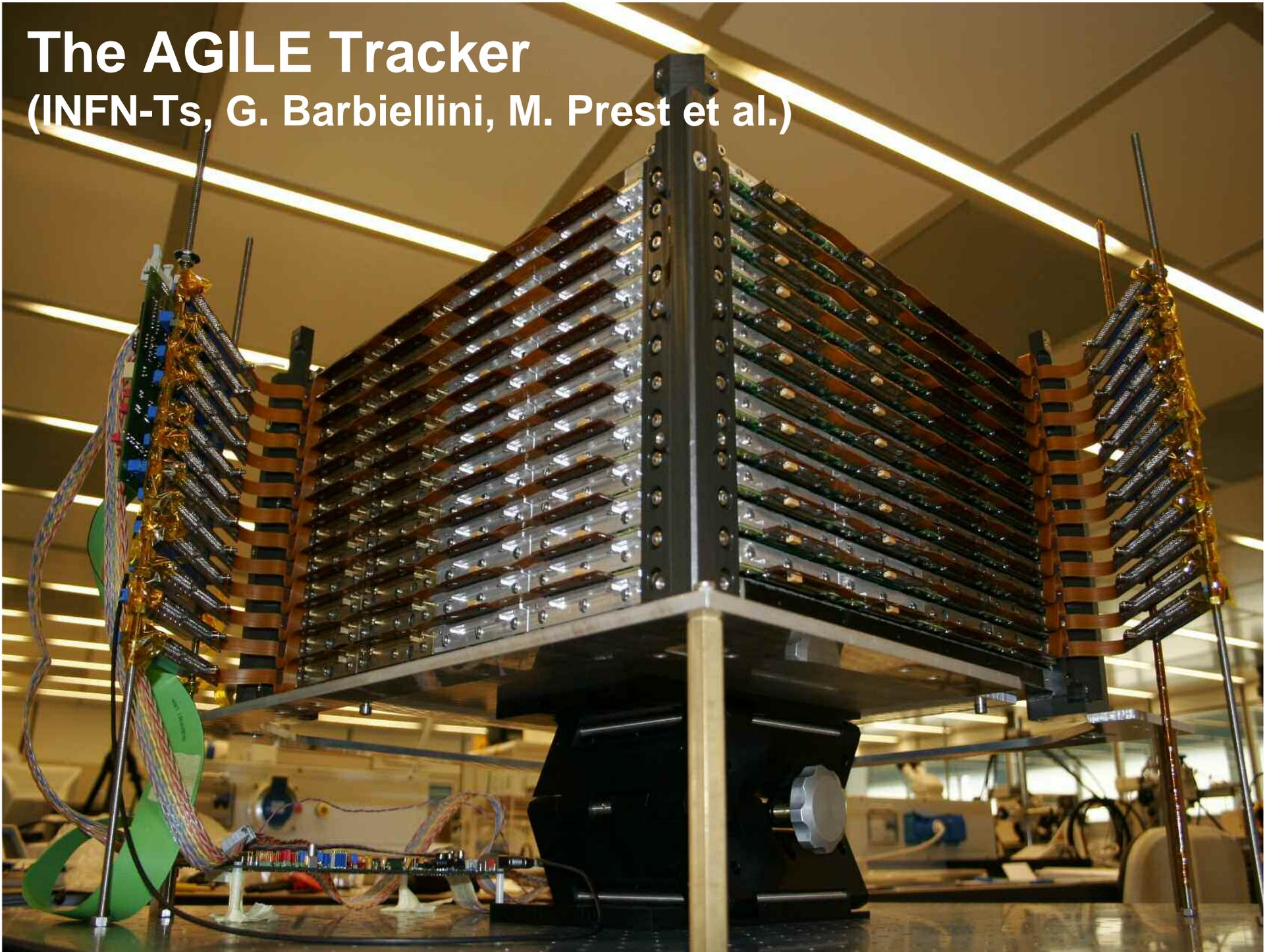
AGILE Tracker trays

(INFN-Ts, G. Barbiellini, M. Prest et al.)

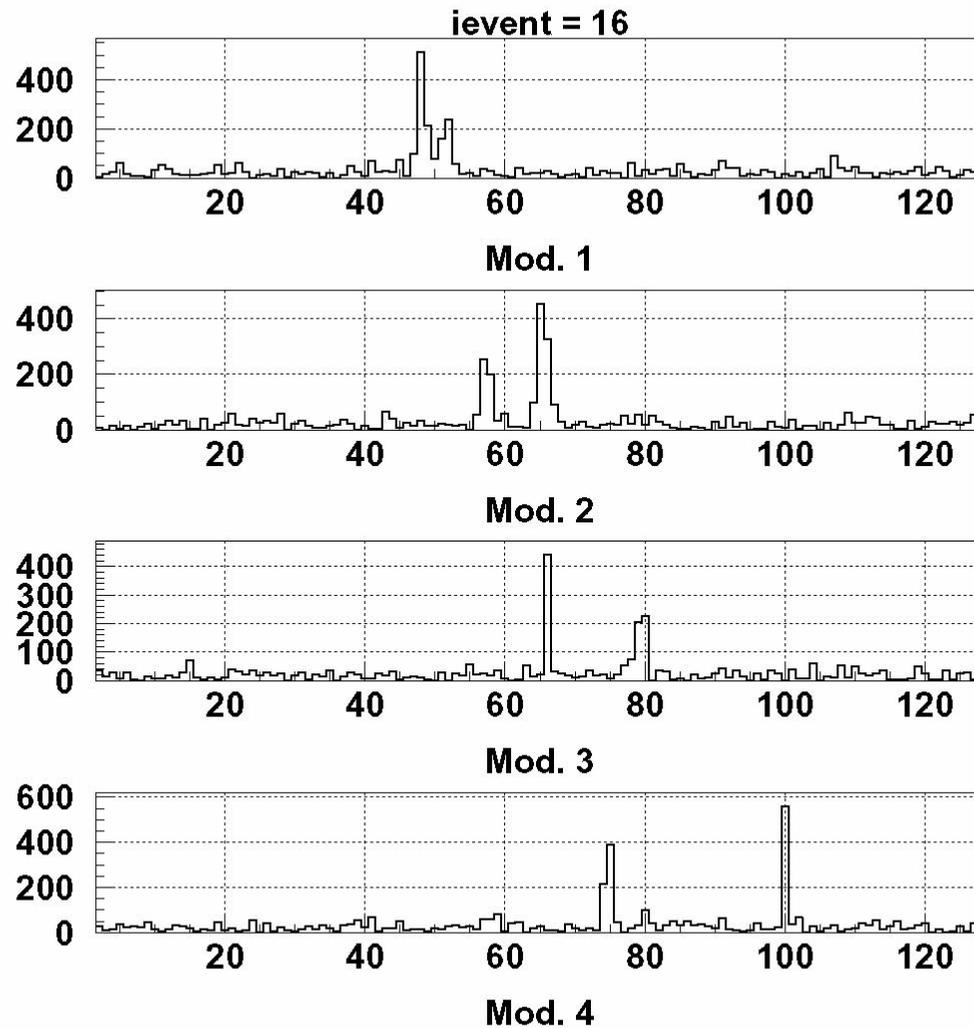


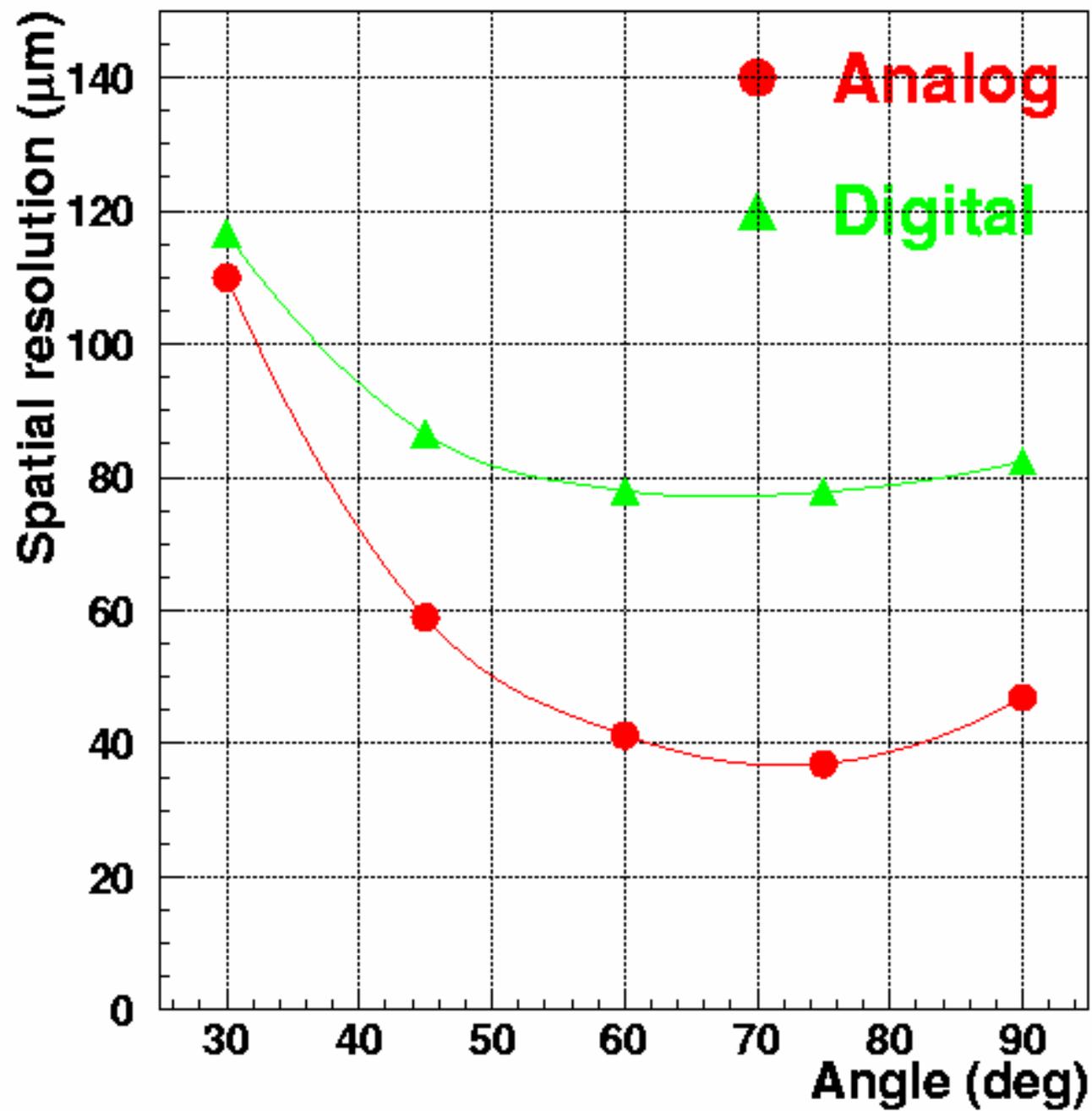
The AGILE Tracker

(INFN-Ts, G. Barbiellini, M. Prest et al.)



gamma-ray detected by the AGILE Tracker



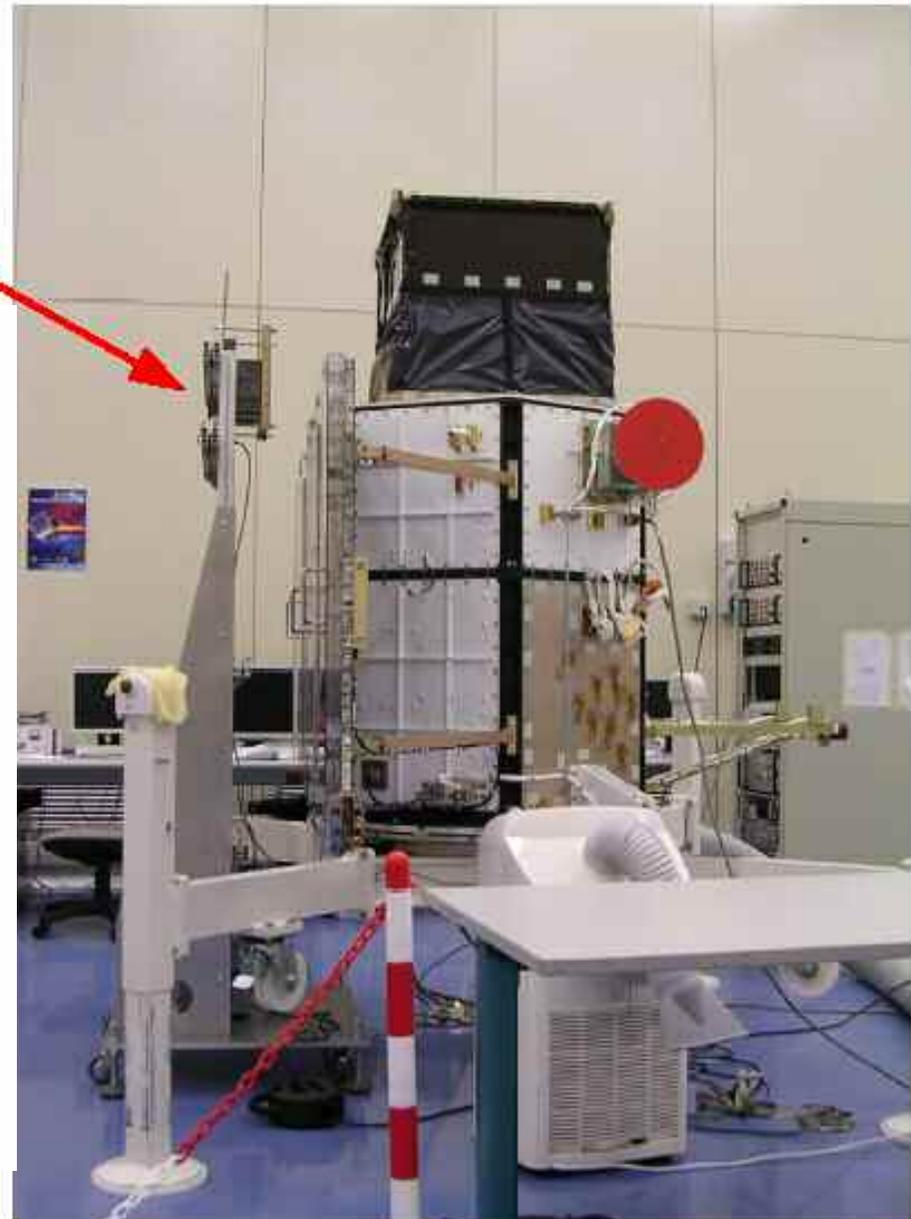
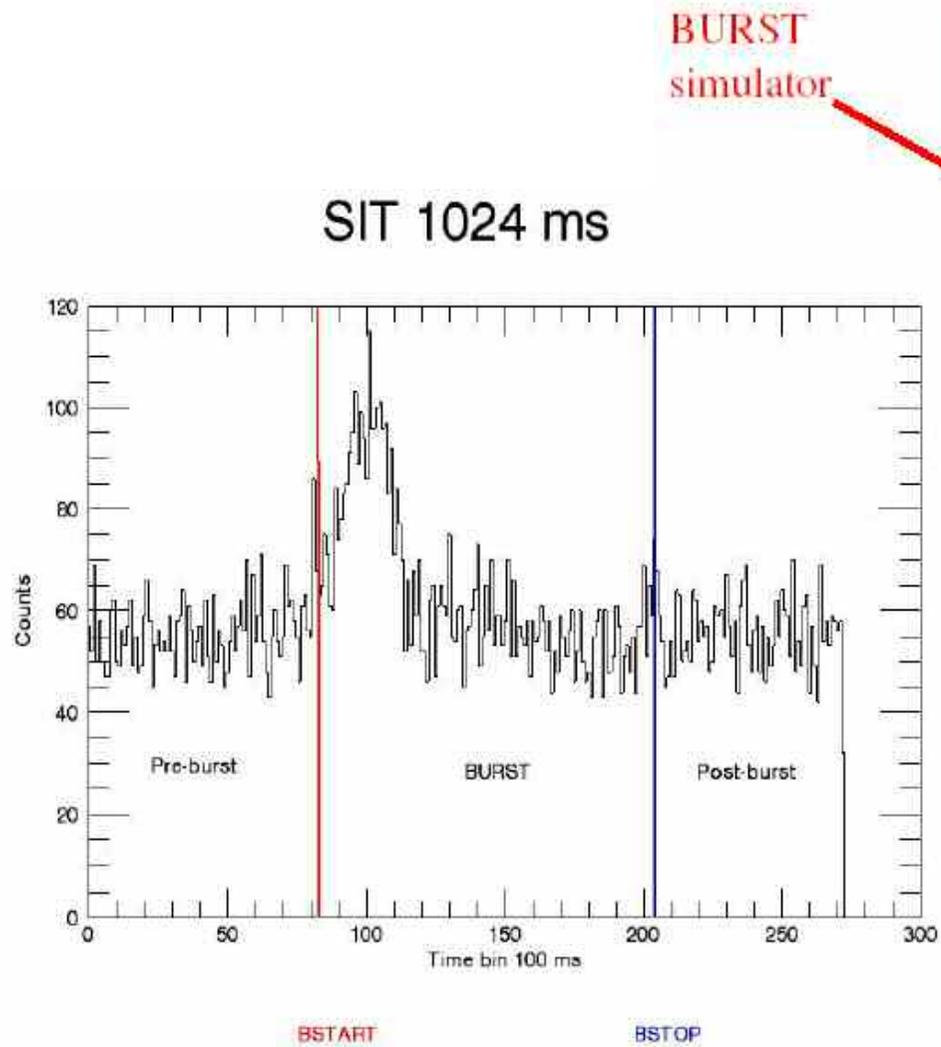


The AGILE Mini-Calorimeter

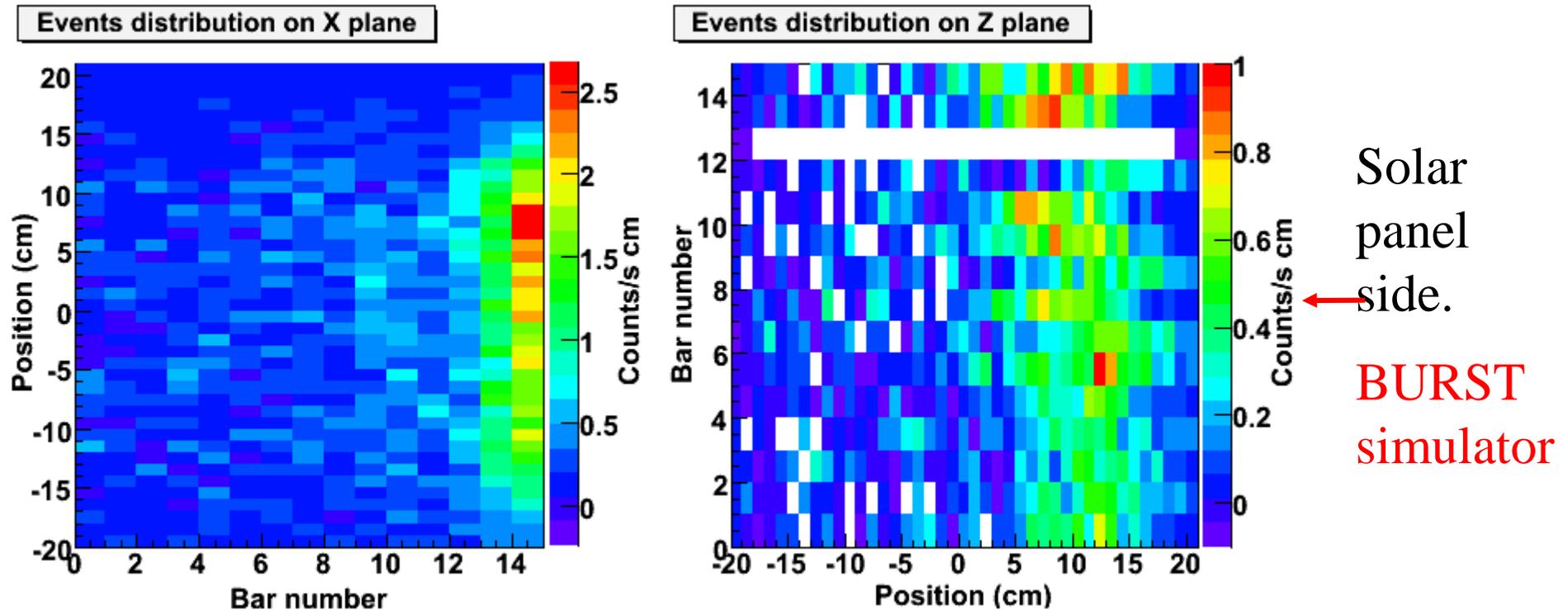
(Thales-Alenia Space – Laben,
scient. supervision by G. Di Cocco, C. Labanti et al.)



MCAL GRB search testing (Tortona, June 2006)

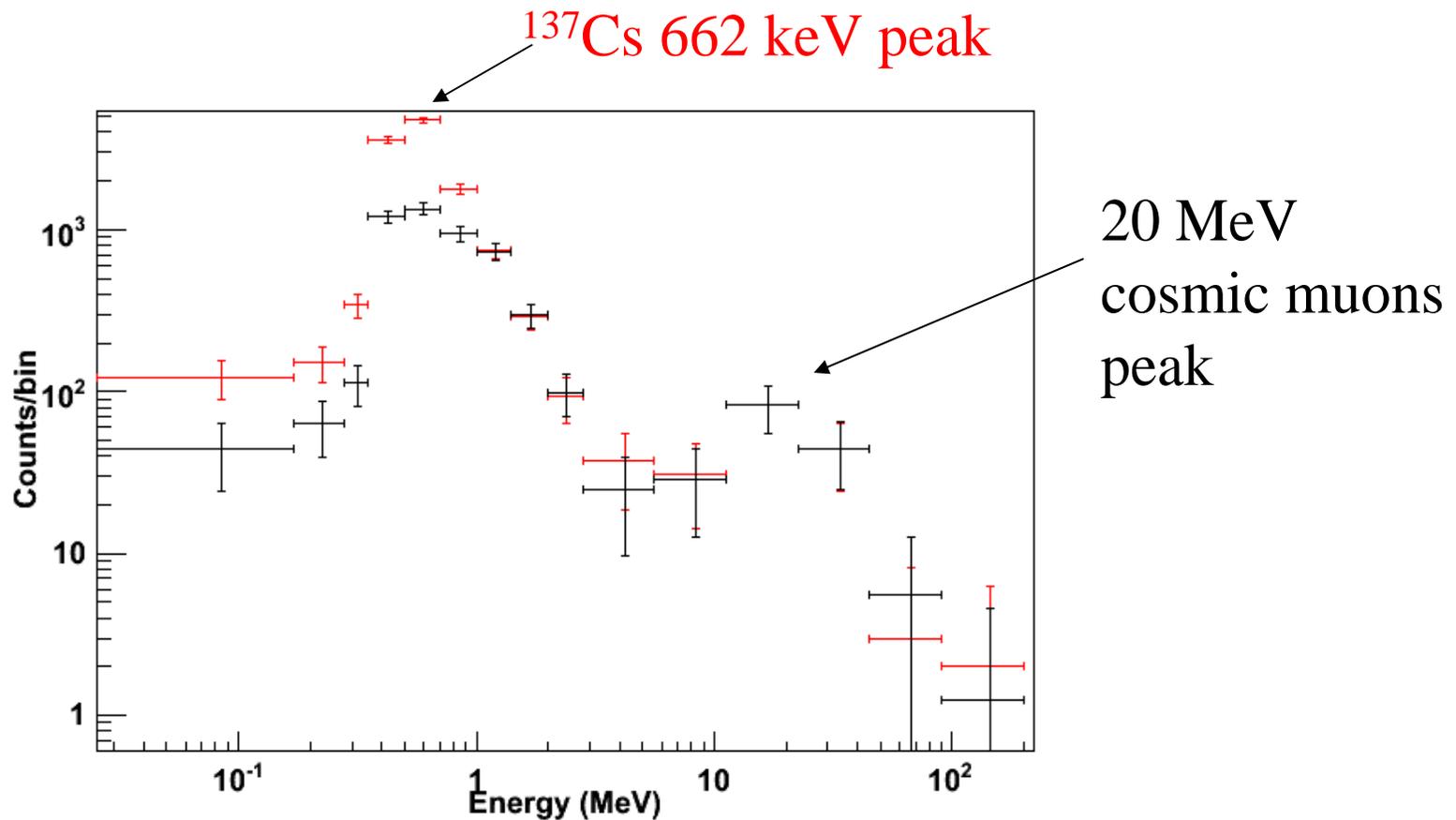


MCAL BURST “imaging” capabilities



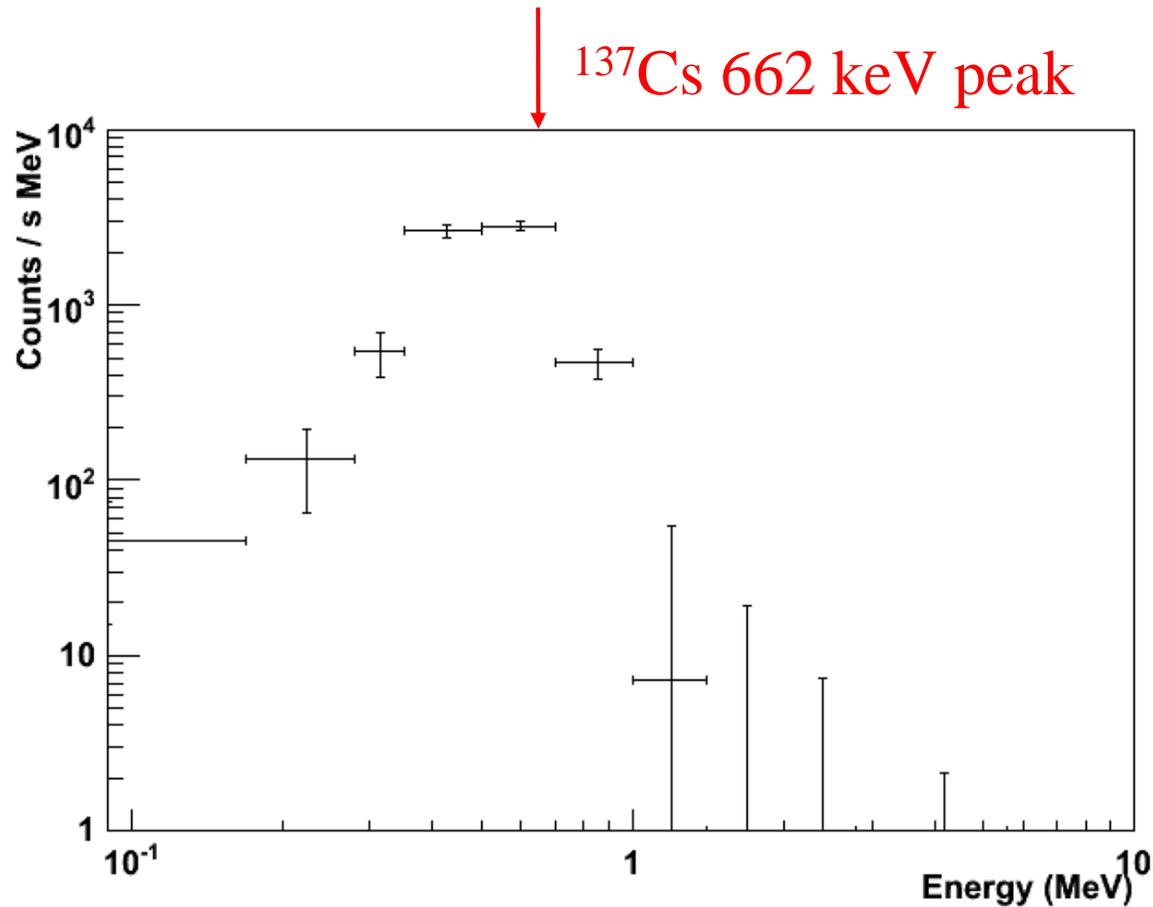
Top view of MCAL planes of 3 bursts obtained with the burst simulator and a $25\mu\text{Ci}$ ^{137}Cs source exposed for a total time of 18 seconds, after background subtraction (burst: run 13643, background: run 13642, FFT in IABG, 5/3/2007). **This type of positional signature is the one expected for solar flares.**

MCAL BURST Spectrum



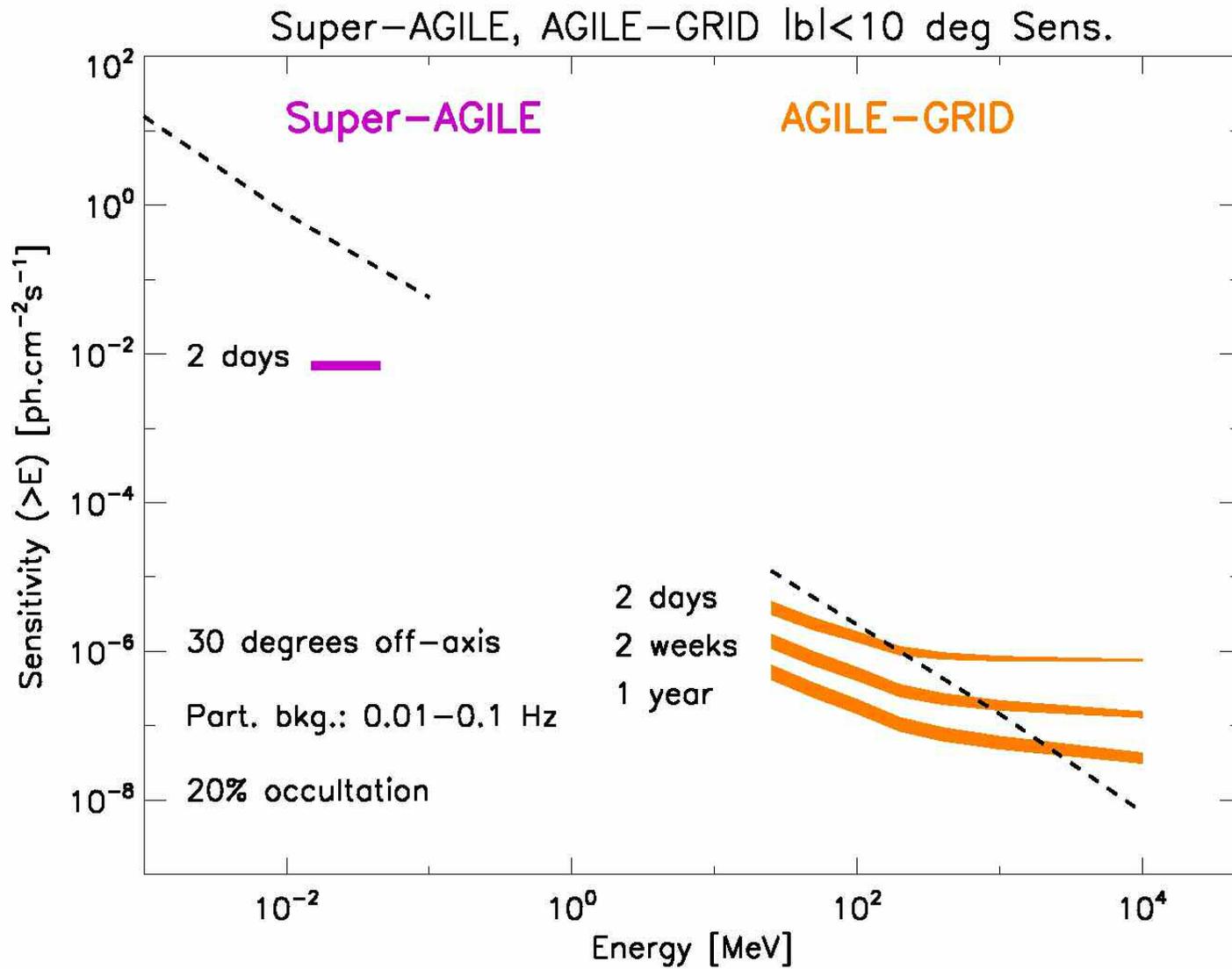
Red line: spectrum of a burst obtained with the burst simulator and a $25\mu\text{Ci } ^{137}\text{Cs}$ source exposed for a total time of 6 seconds. Black line: background spectrum (burst: run 13643, background: run 13642, FFT in IABG, 5/3/2007). Error bars are 3σ . Sensitivity below 300 keV is achieved.

MCAL BURST background-subtracted spectrum

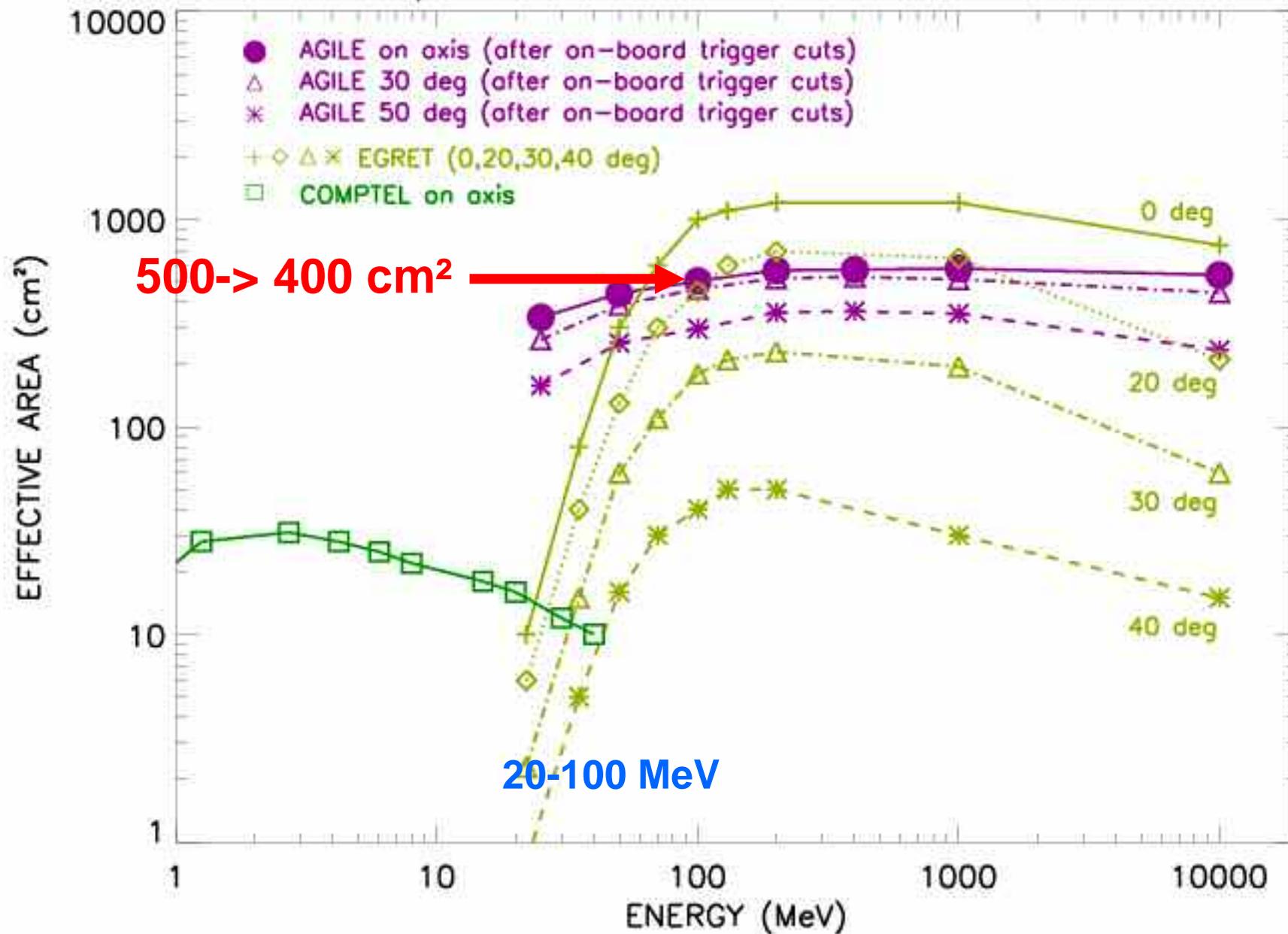


Burst spectrum shown in previous page after background subtraction (burst: run 13643, background: run 13642, FFT in IABG, 5/3/2007).

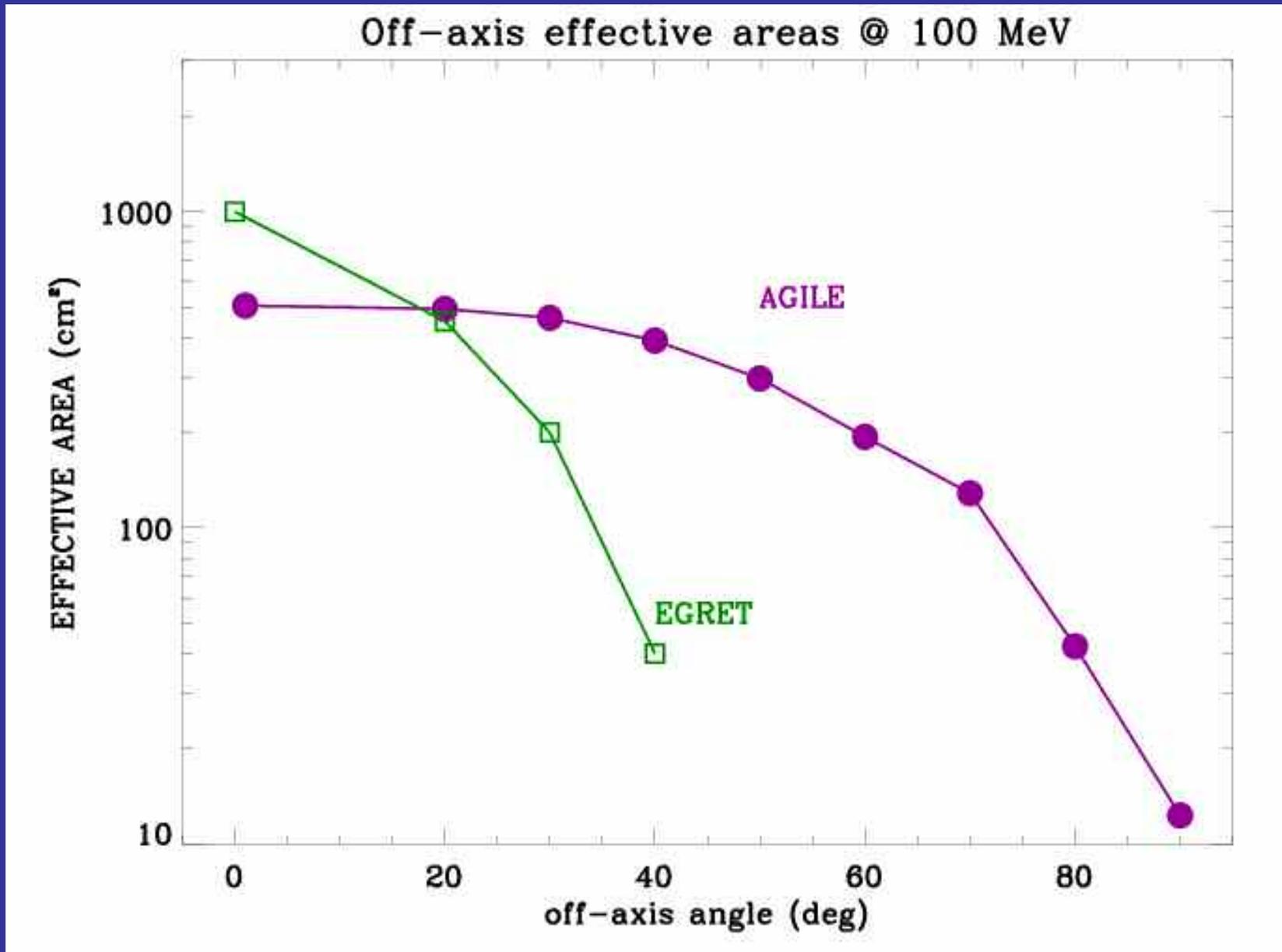
AGILE Sensitivity



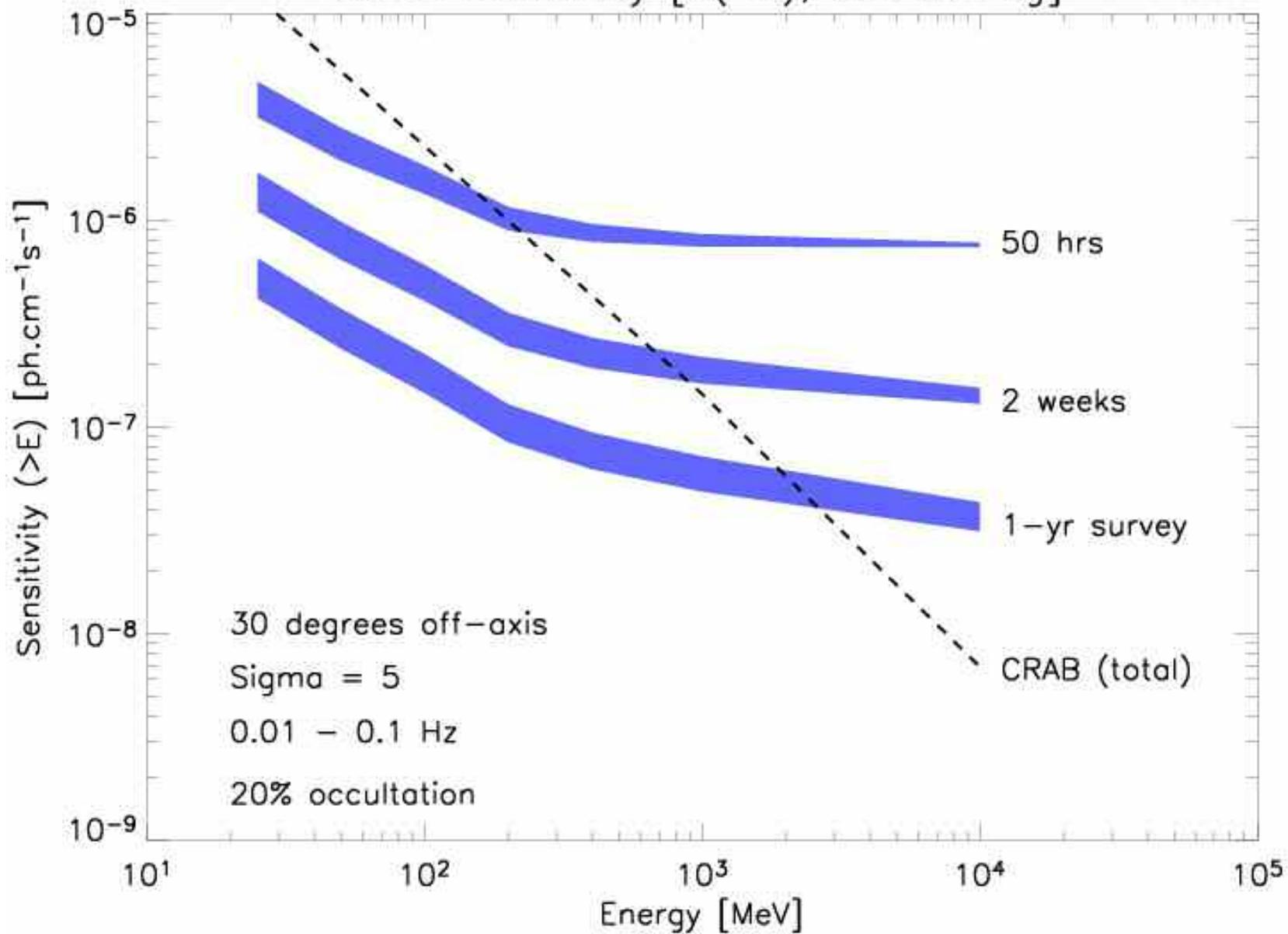
AGILE, EGRET & COMPTEL EFFECTIVE AREAS



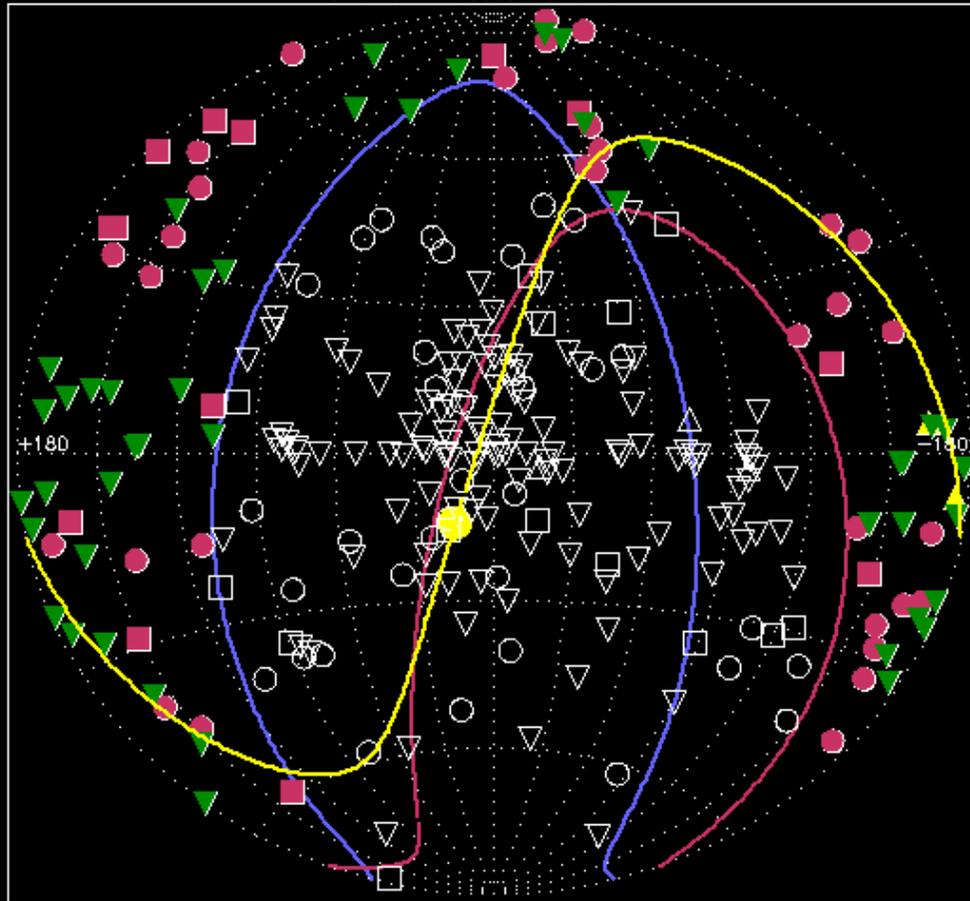
AGILE-GRID angular response vs. EGRET



AGILE Sensitivity [$S(>E)$, $|b| < 10$ deg]



Day (dd/mm/yyyy): 7/1/2002



IDENTIFIED AGNs : 32

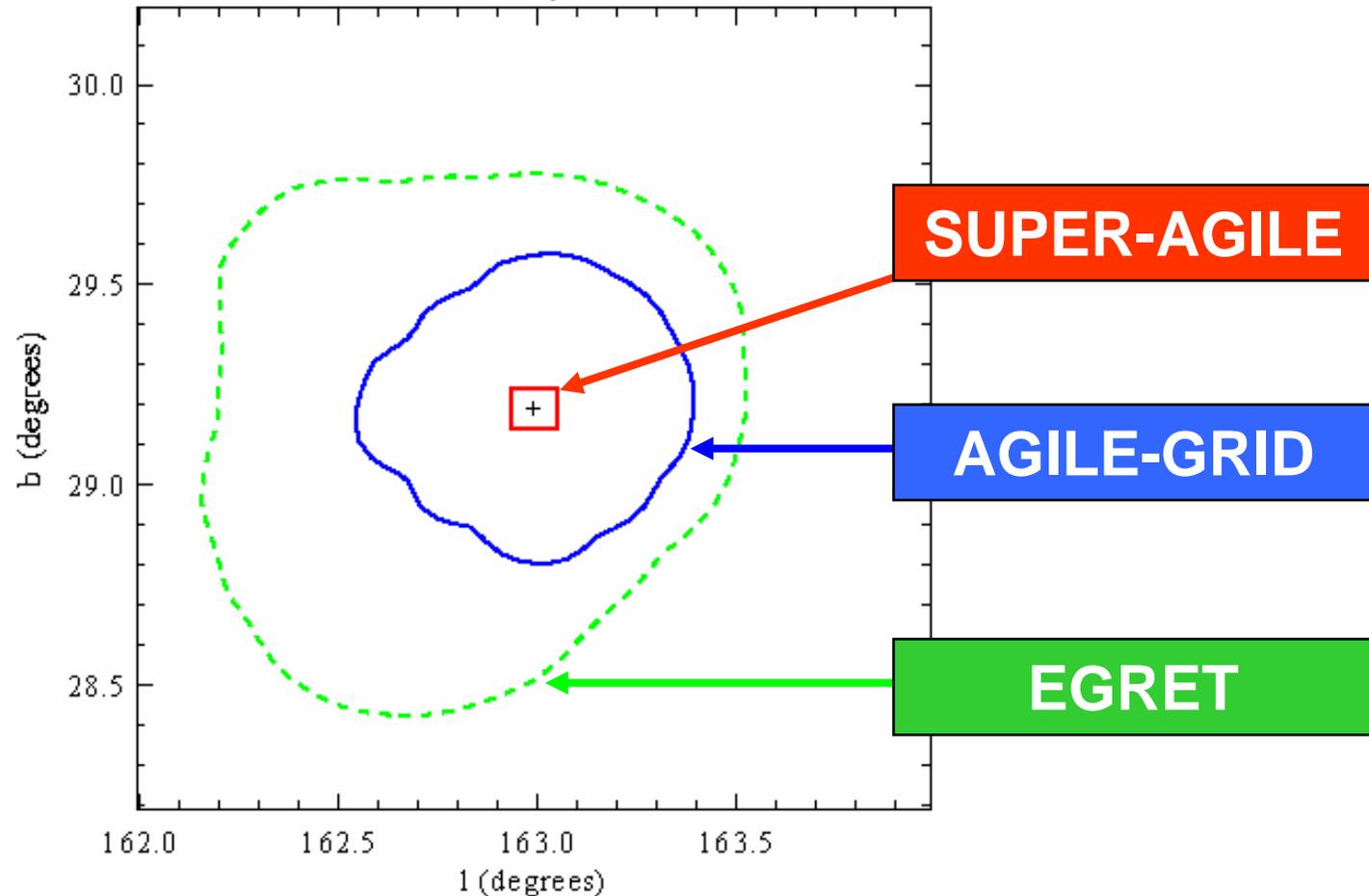
CANDIDATE AGNs : 13

GAMMA-RAY PSRs : 2

UNIDENTIF. SRCs : 45

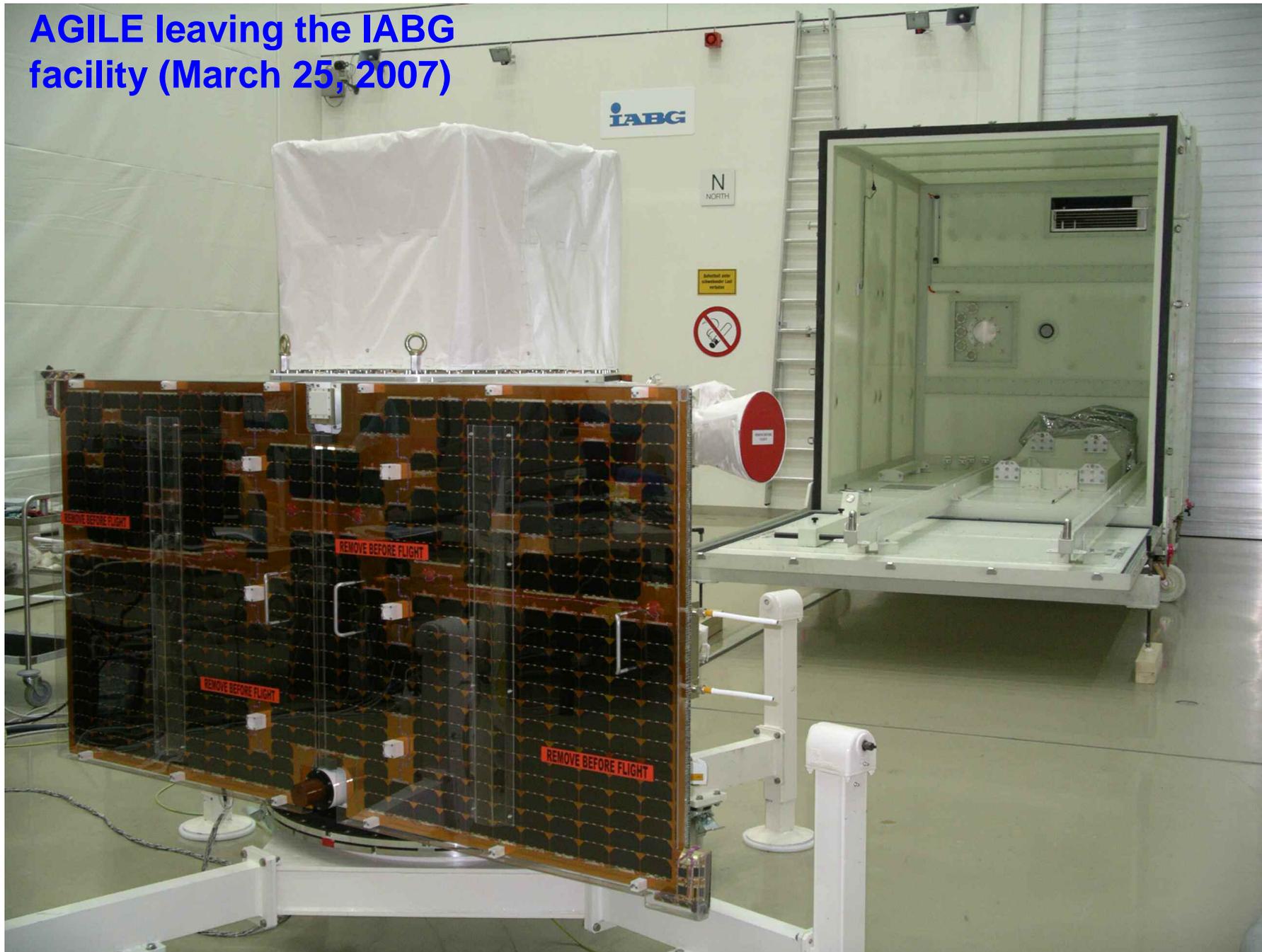
Gamma-ray source positioning (example: off-axis AGN)

Source Location Accuracy - AGN 95% Contours

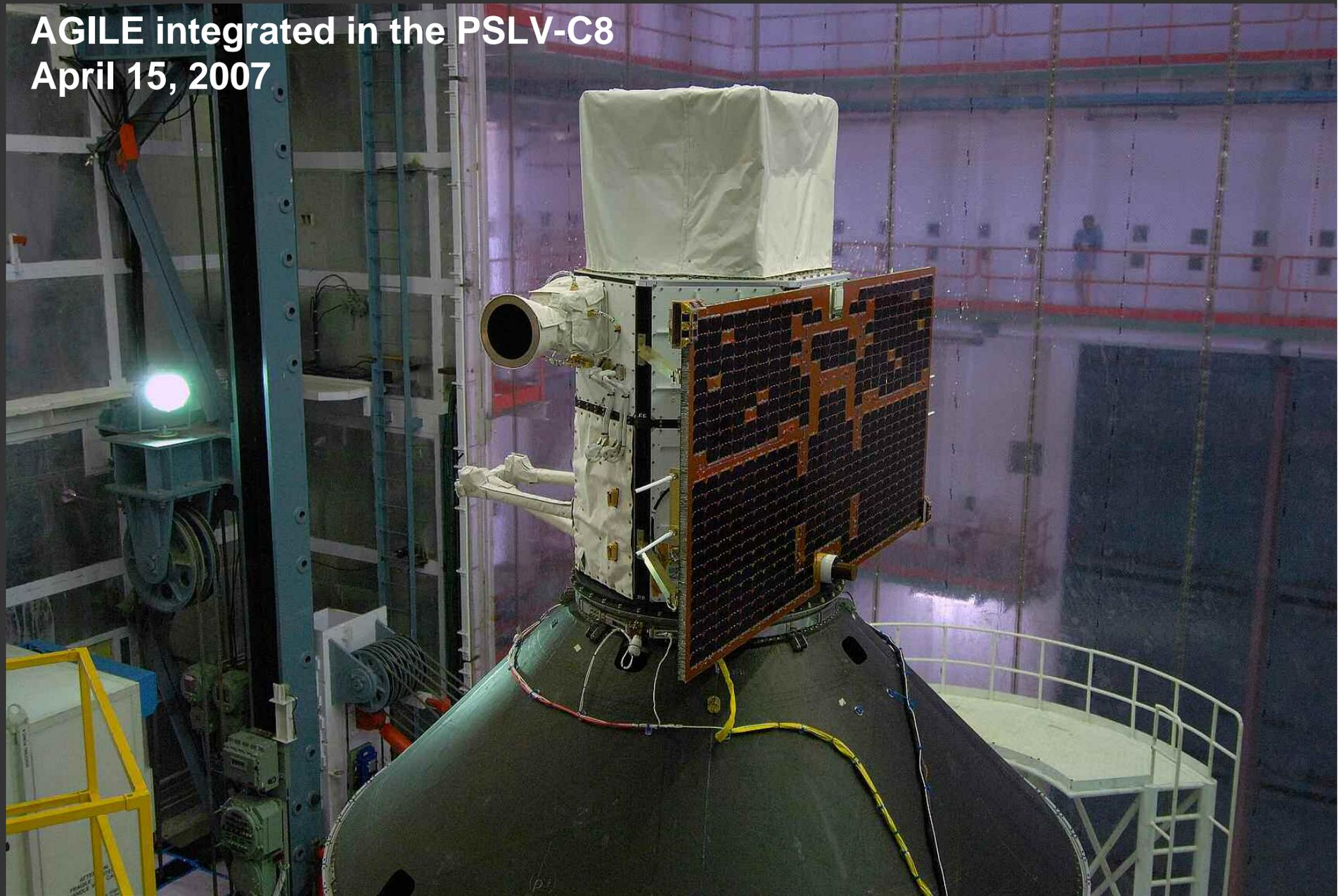


AGILE $a, b = 22.8, 20.9$ arcmin EGRET $a, b = 41.5, 36.4$ arcmin SuperAGILE $a = 6.0$ arcmin

AGILE leaving the IABG facility (March 25, 2007)



**AGILE integrated in the PSLV-C8
April 15, 2007**



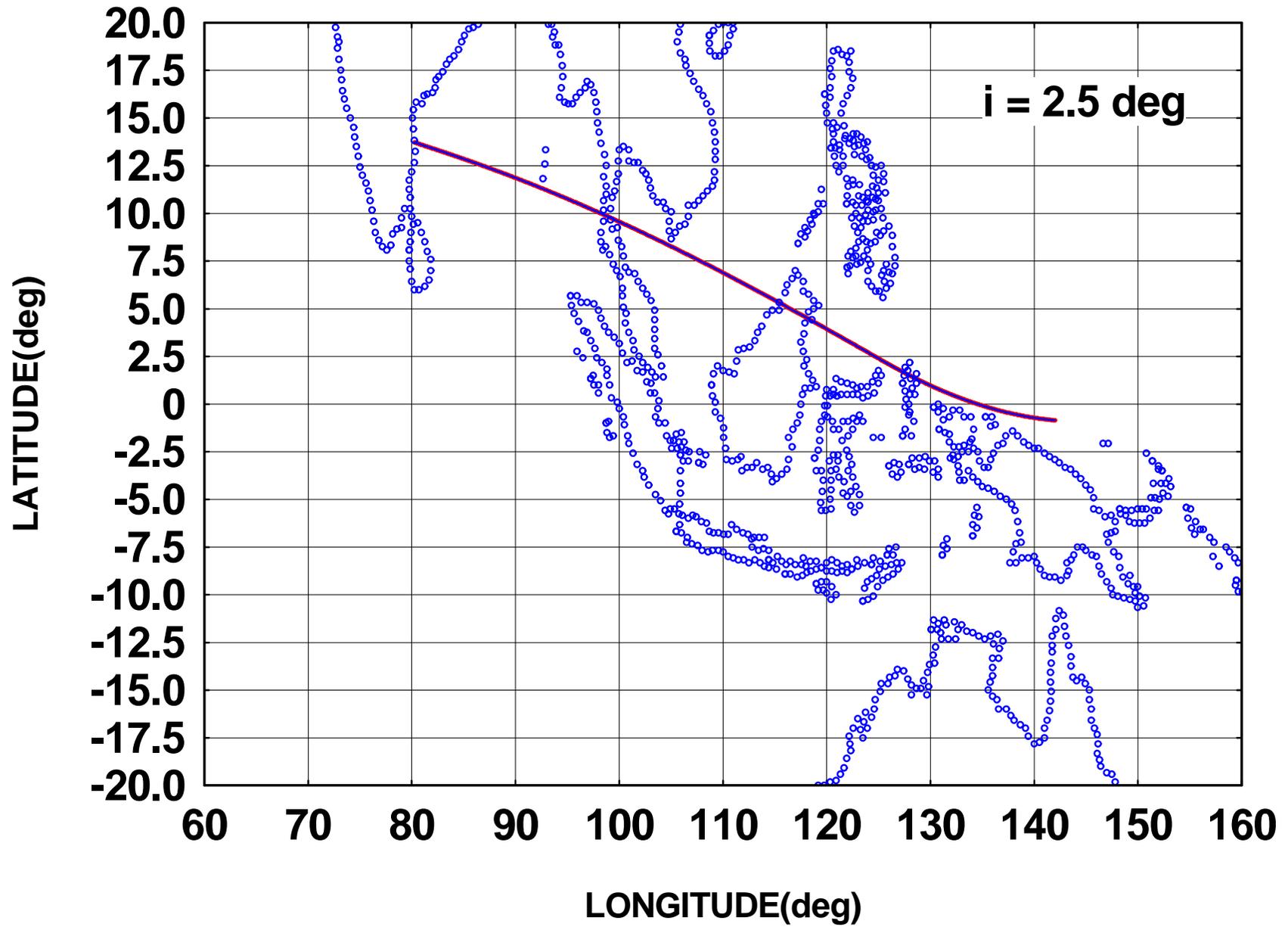
Orbital requirements for AGILE

- Low-Earth Orbit, $h = 550$ km
- Quasi equatorial, $\alpha < 3^\circ$
- minimize particle background
- use of the ASI Malindi ground station

PSLV-C8 launch, 23 Apr. 2007



PSLV C8:

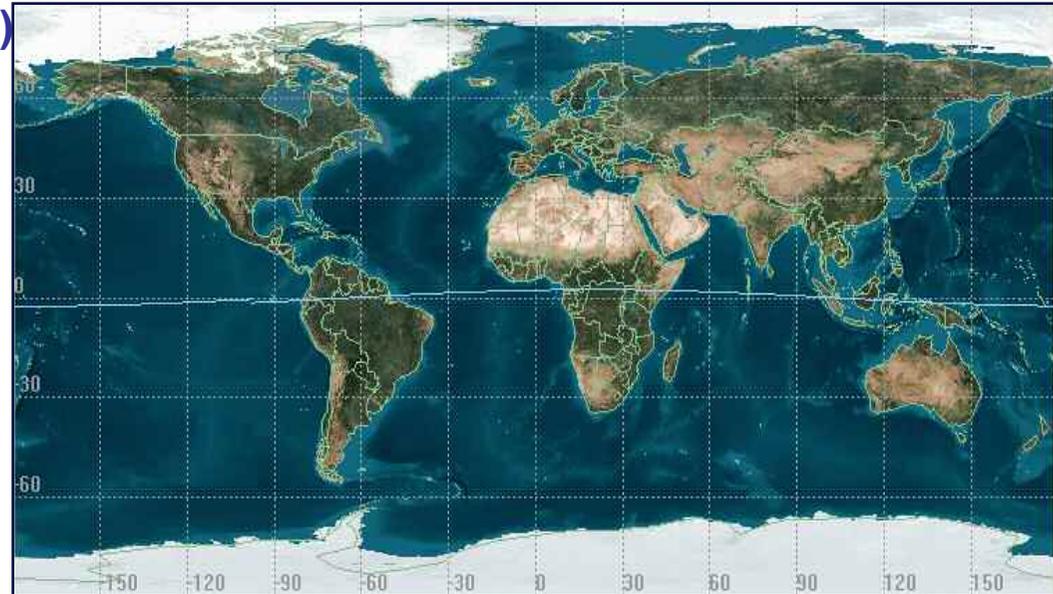


AGILE orbital parameters

Semi-major axis: 6922.5 km (± 0.1 km)
Requirement: 6928.0 \pm 10 km

Inclination angle: 2.48° ($\pm 0.04^\circ$)
Requirement: $< 3^\circ$

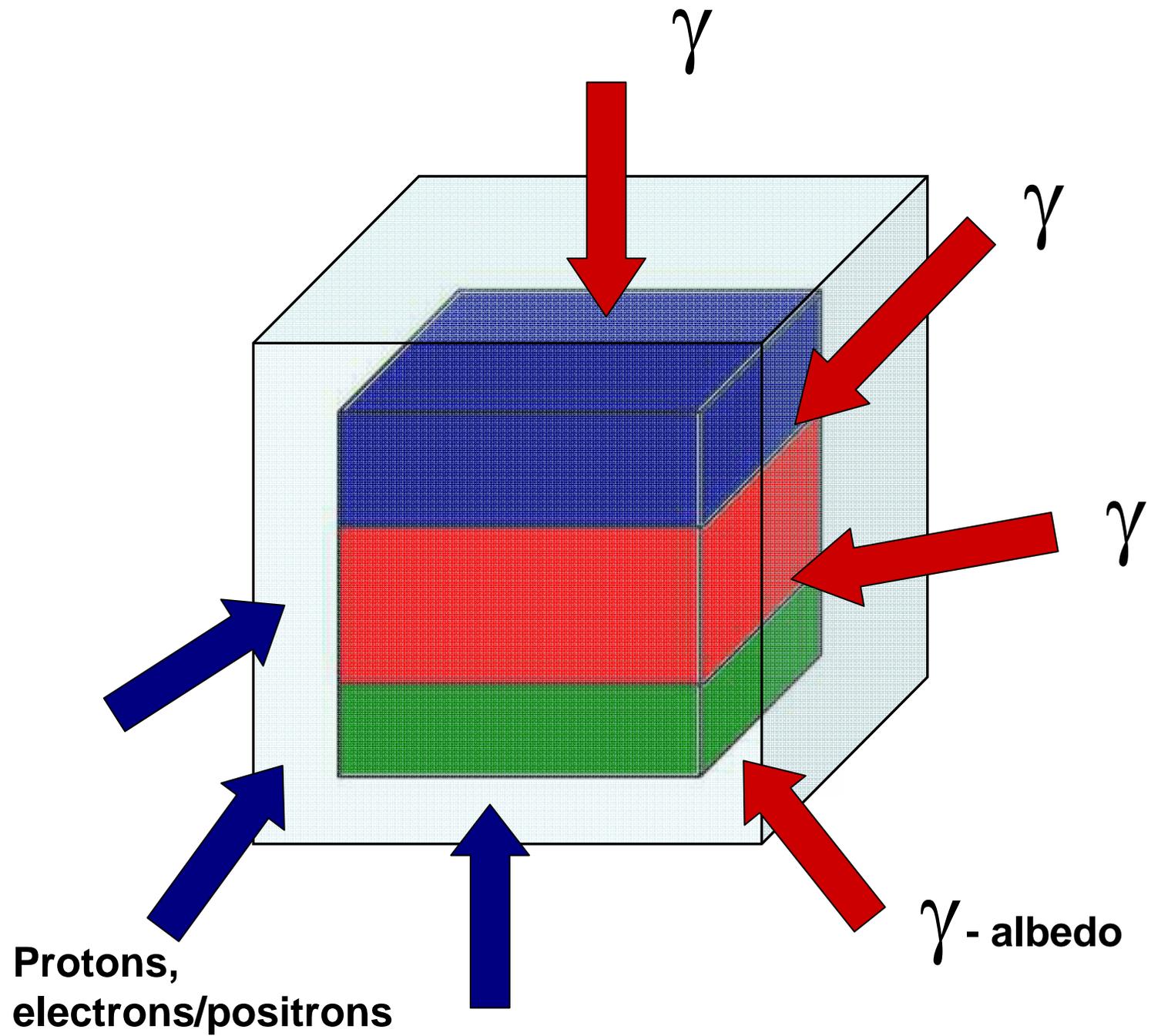
Eccentricity: 0.002 (± 0.0015)
Requirement: $< 0.1^\circ$



- **Perfect launch of the AGILE satellite by ISRO from the SHAR base (Chennai), April 23, 2007**
- **The AGILE orbit is the best for gamma-ray astrophysics**
- **Average height: 540 km**
- **Inclination angle: 2.48 degrees**
- **Low particle background !**

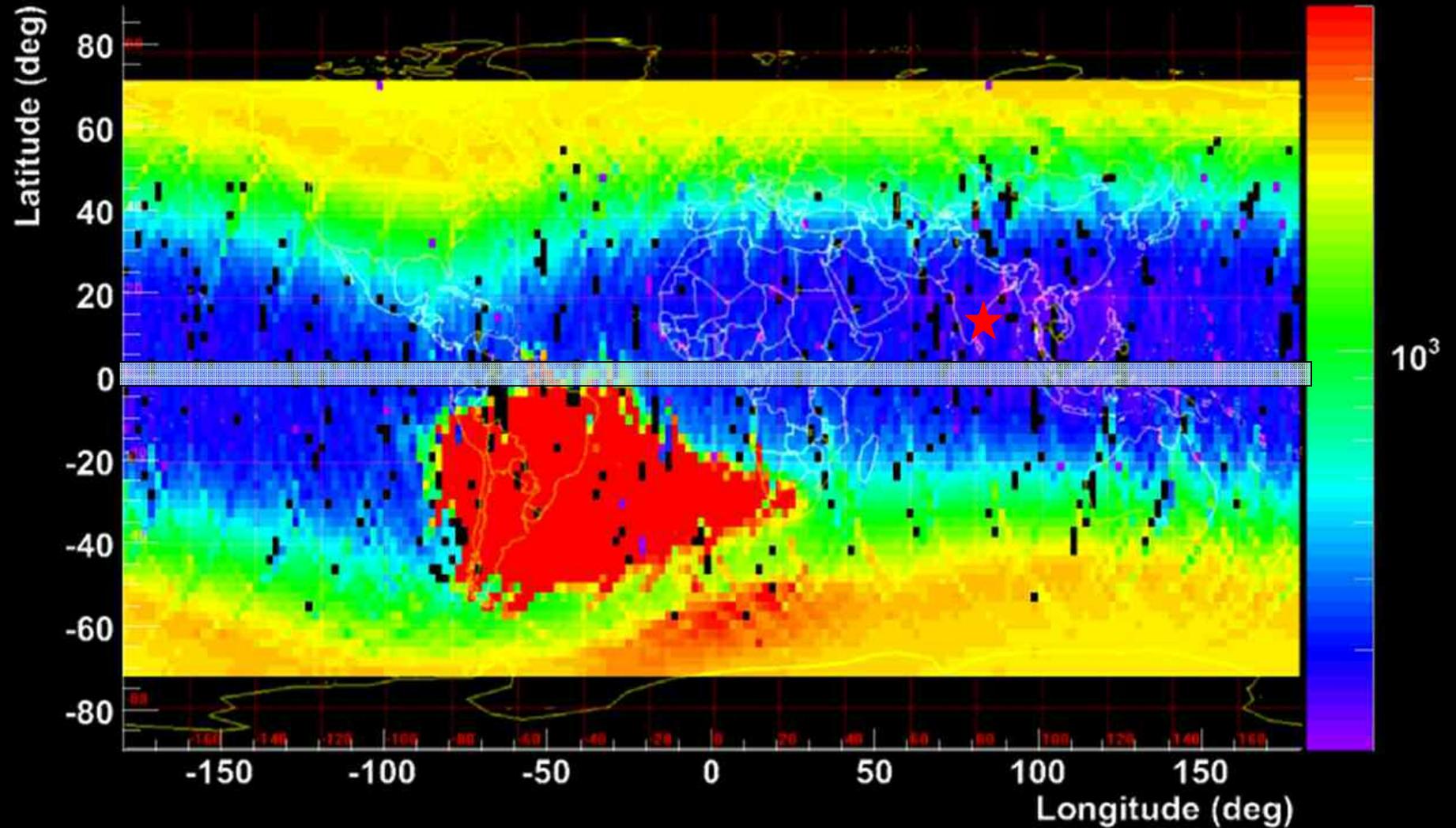
In-orbit background analysis (preliminary results)

- **proton background as expected
(and measured by PAMELA)**
- **electron/positron background lower by a
factor of 2-3 compared to pre-launch
expectations**



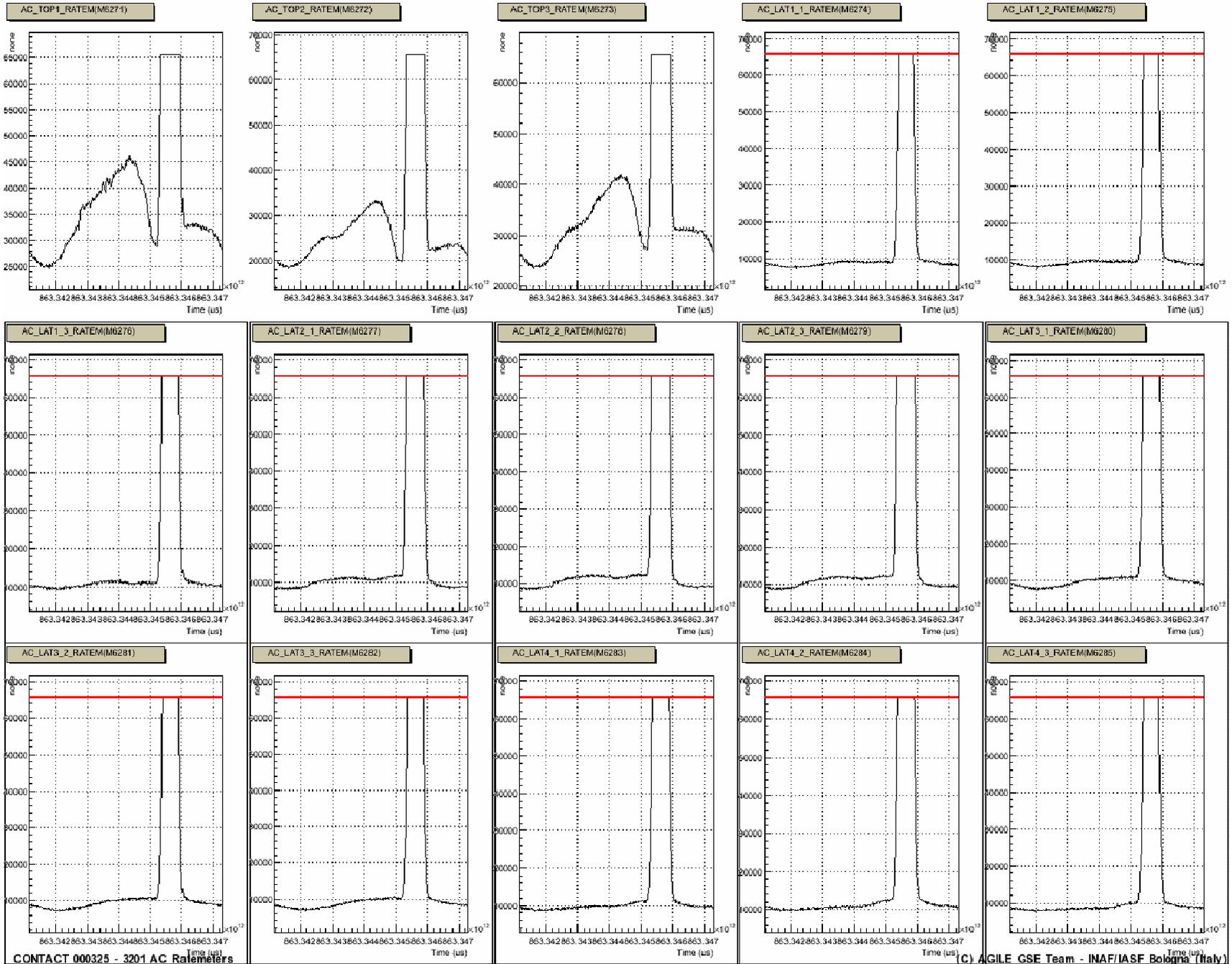
(S11*S12) [hit/time]

PAMELA first results on low-energy cosmic rays (h=400-500 km) (Picozza, Casolino et al. 2006)

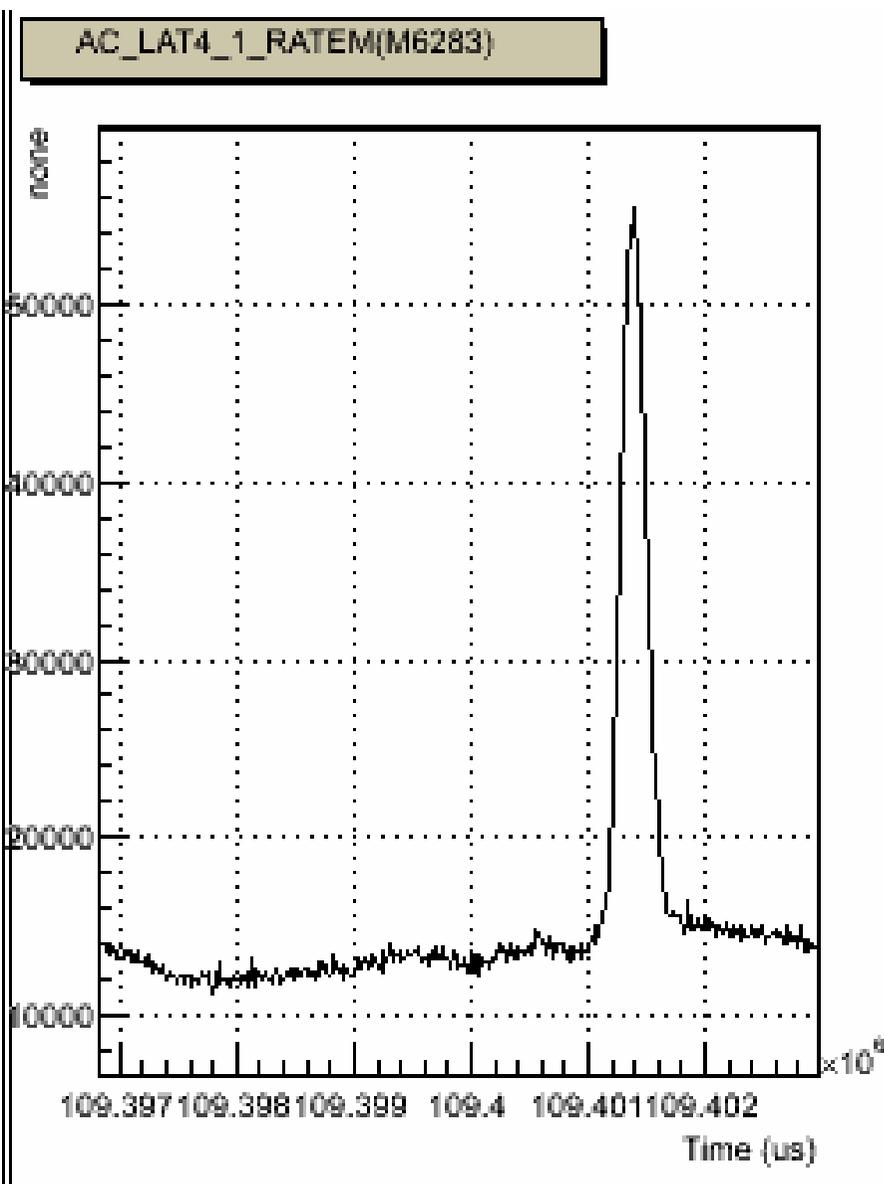
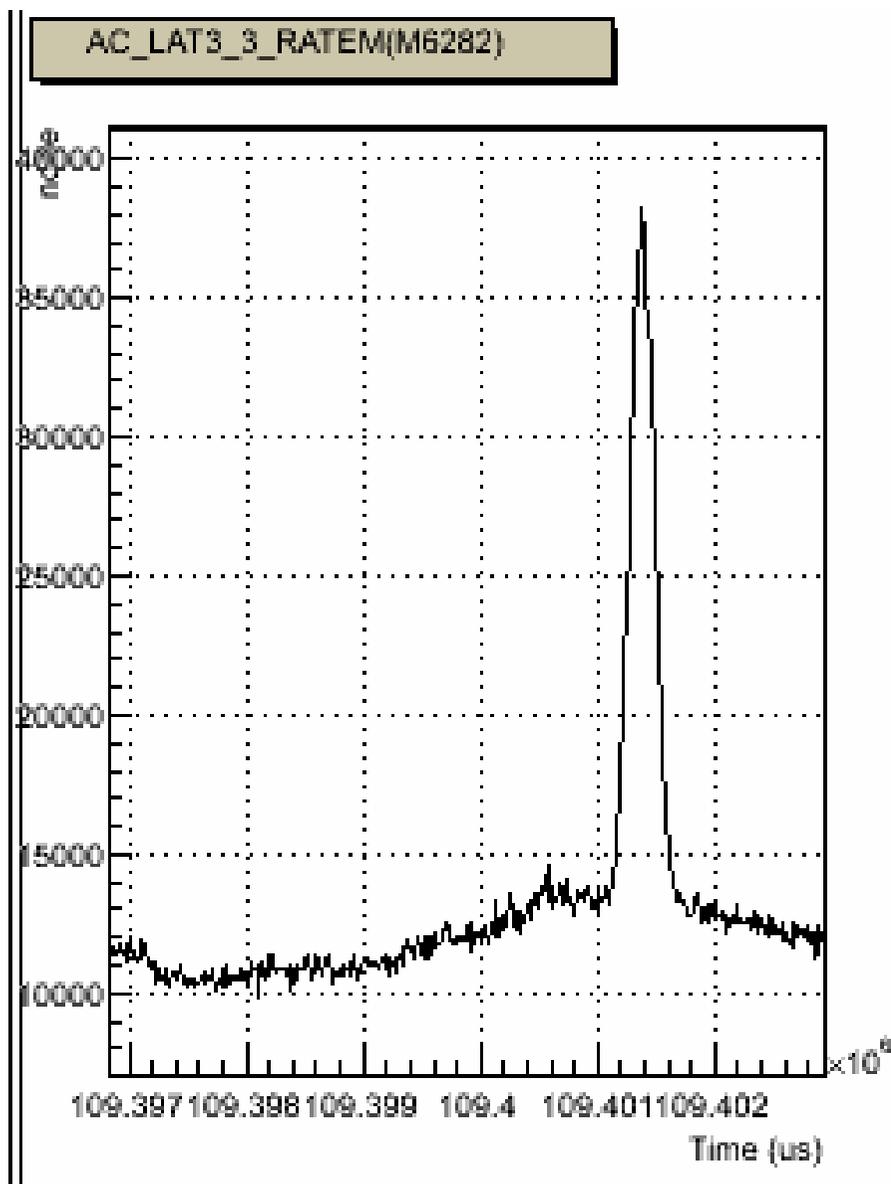


36 MeV p, 3.5 MeV e-

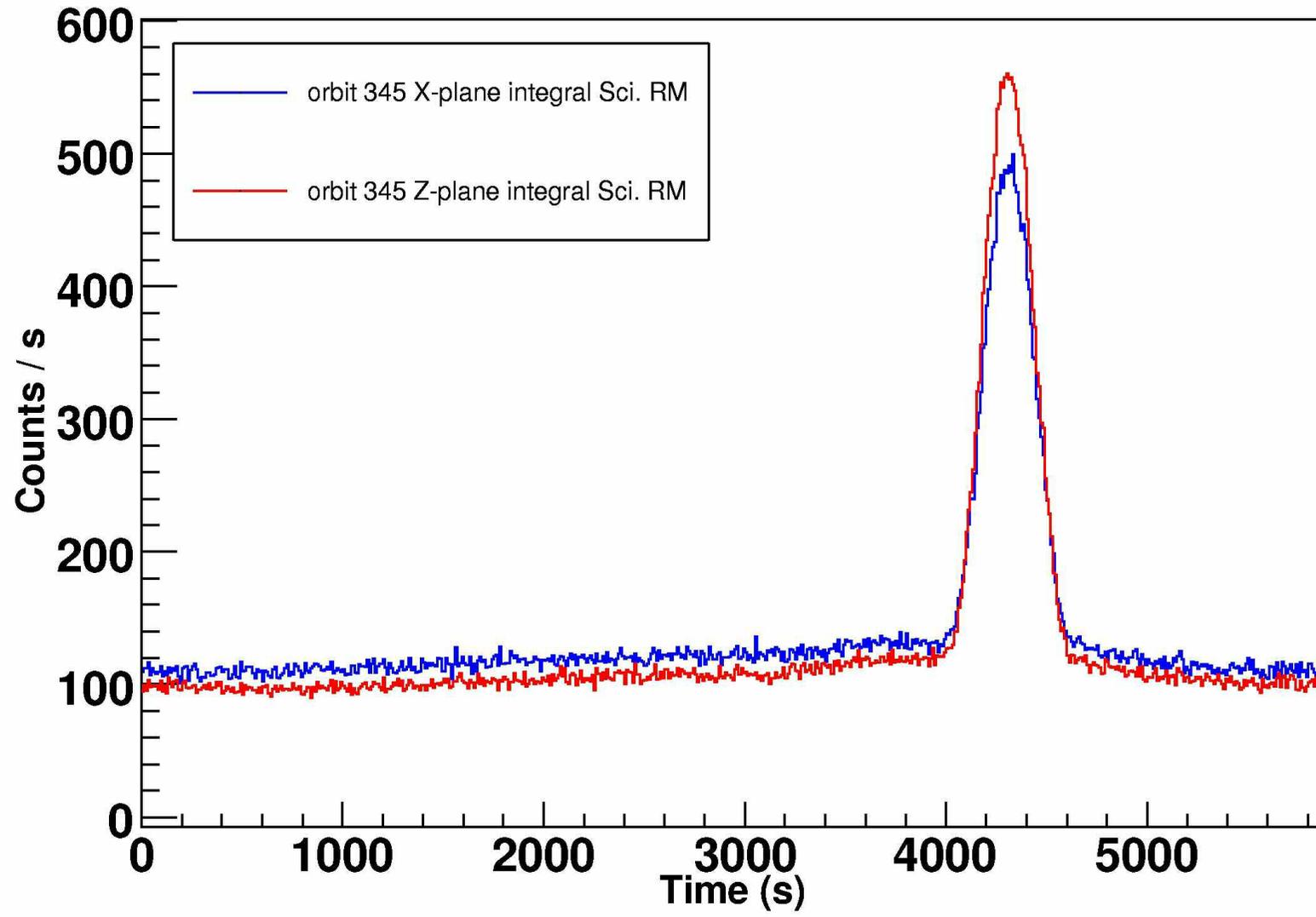
Anti-Coincidence in orbit data



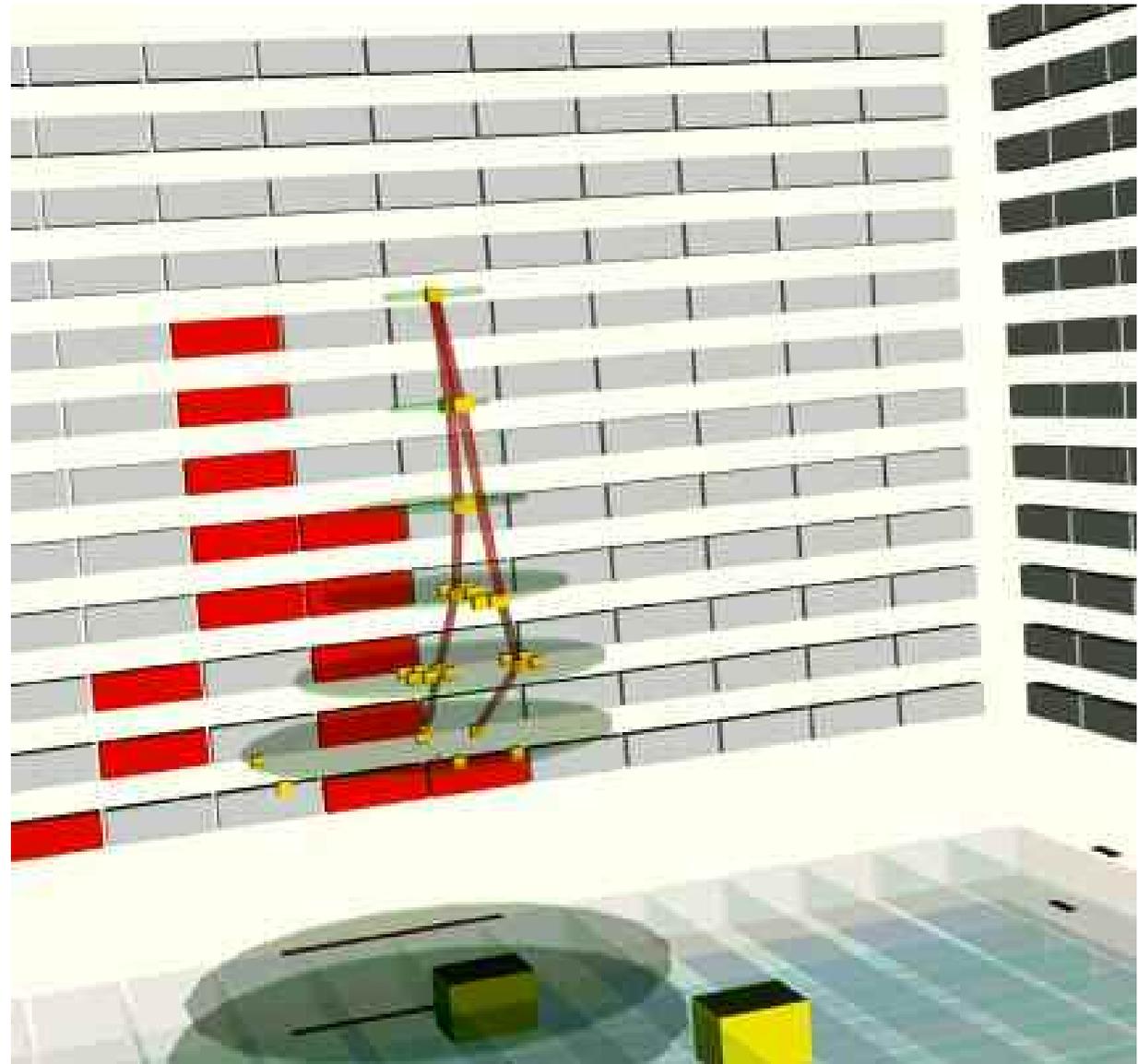
AGILE Anti-Coincidence Data: a very stable orbit



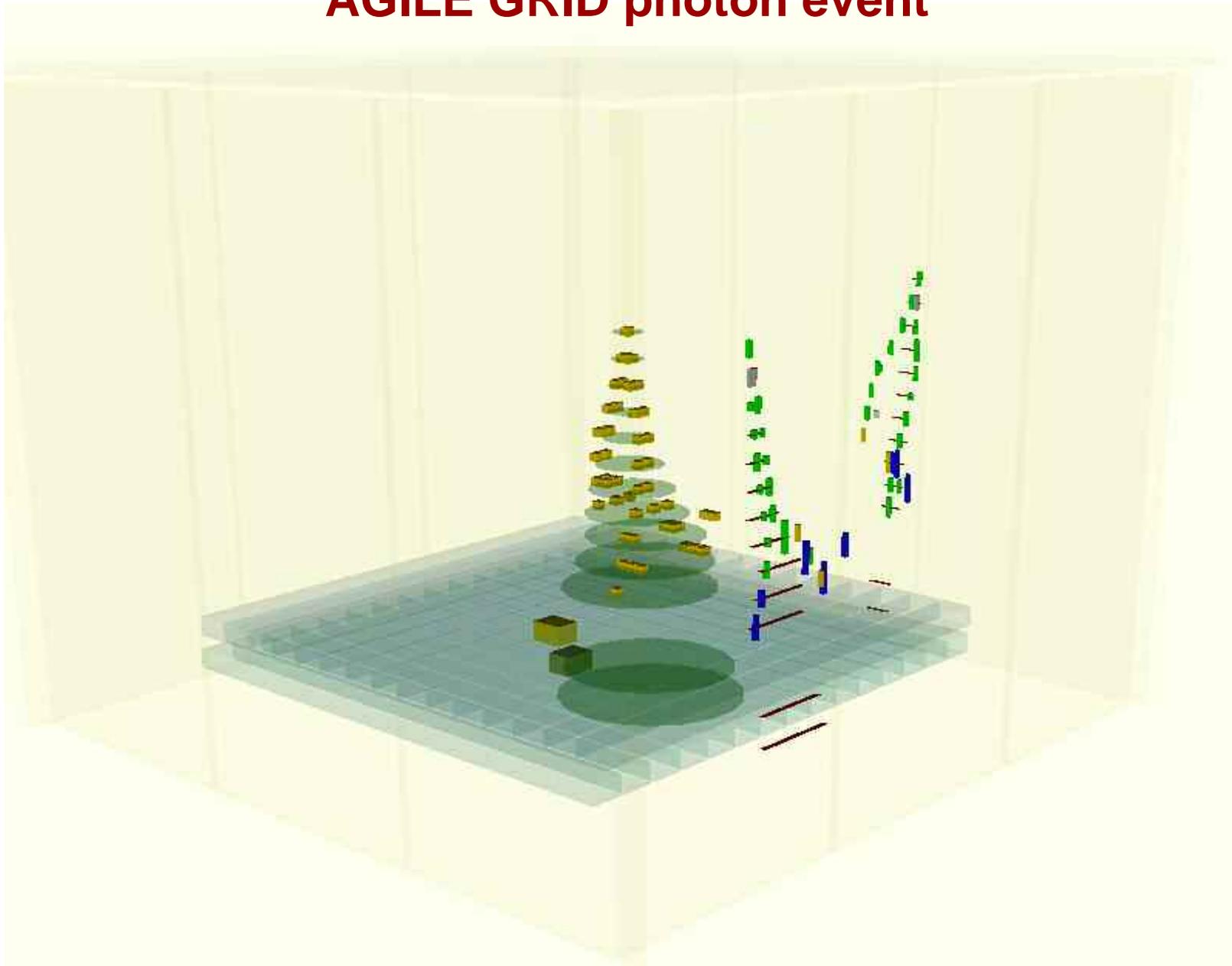
MCAL Scientific Ratemeters integrated light curve ($E > 650$ keV, time bin 10 s)



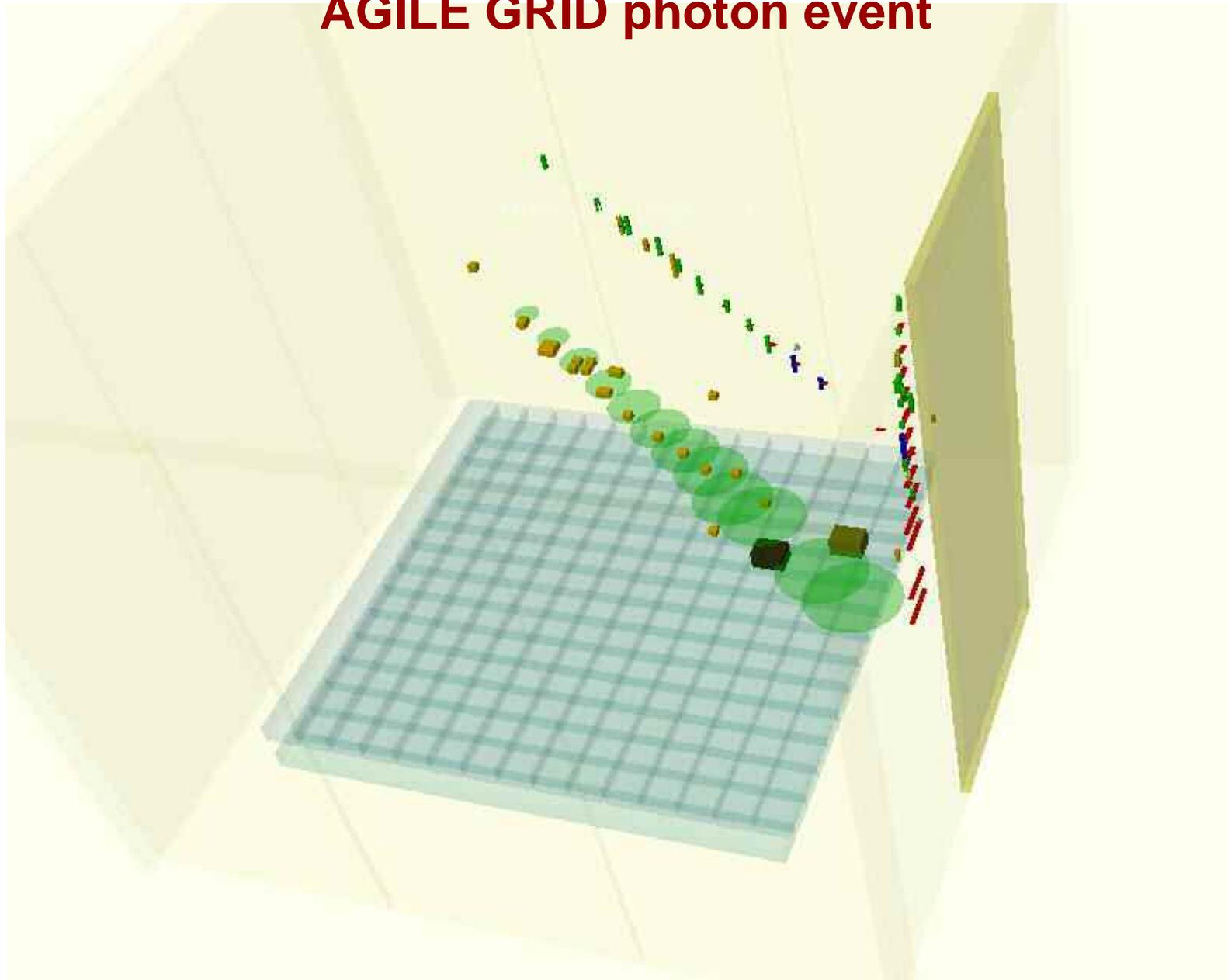
**First gamma-ray
detected in orbit
with the nominal
GRID trigger
configuration
(May 10, 2007)**



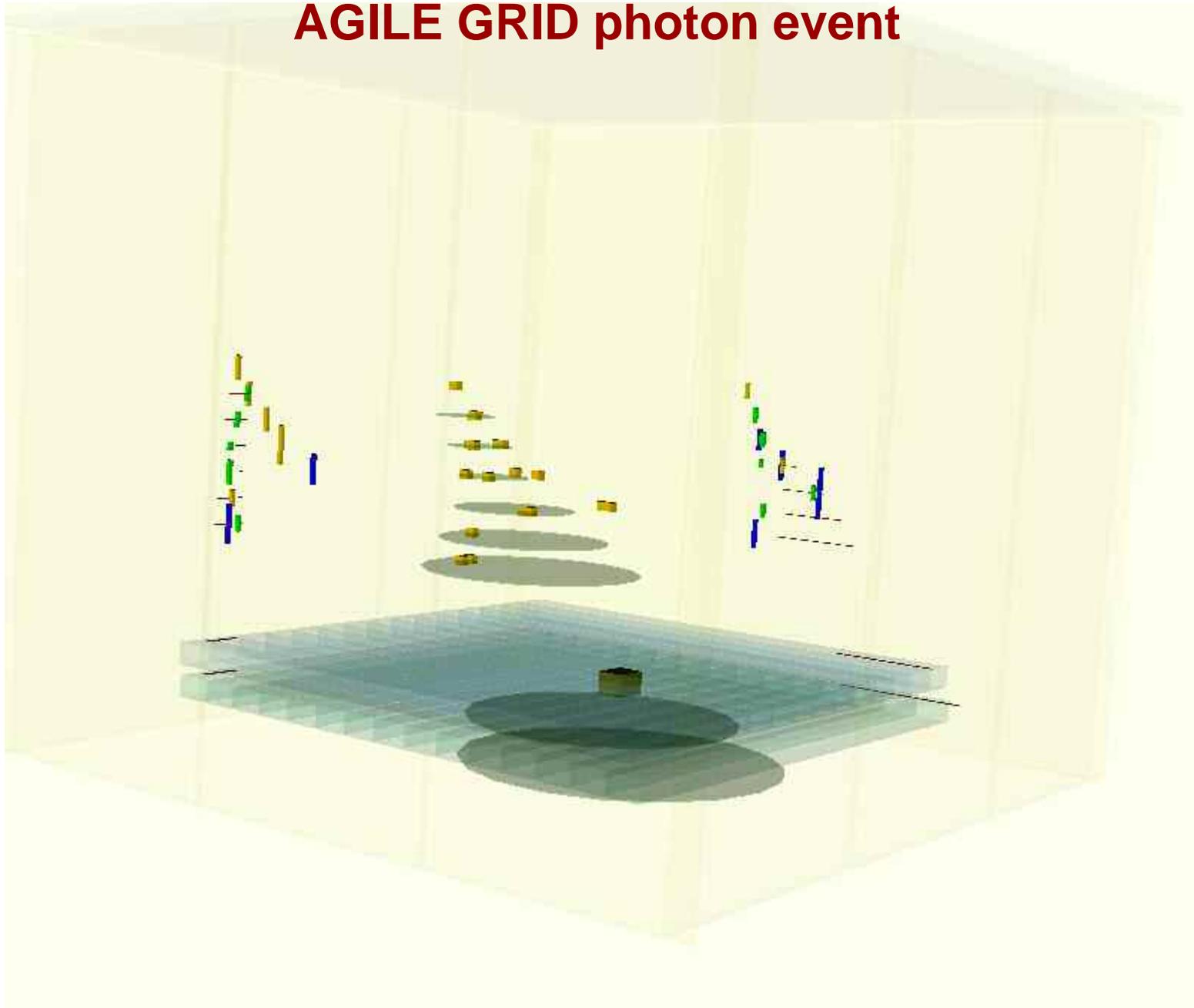
AGILE GRID photon event



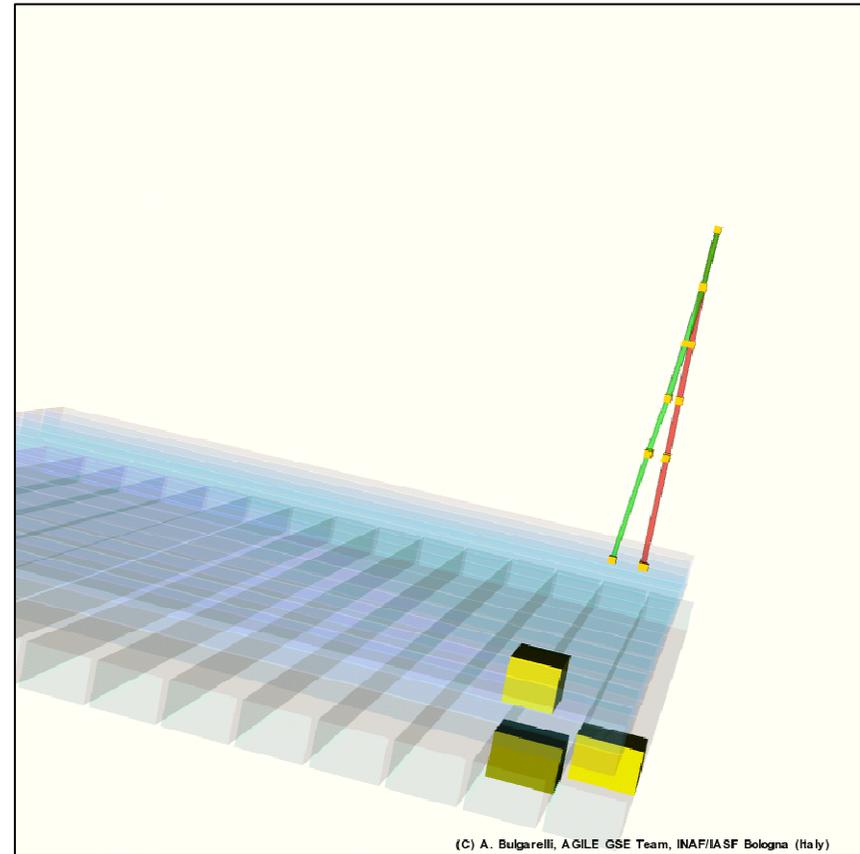
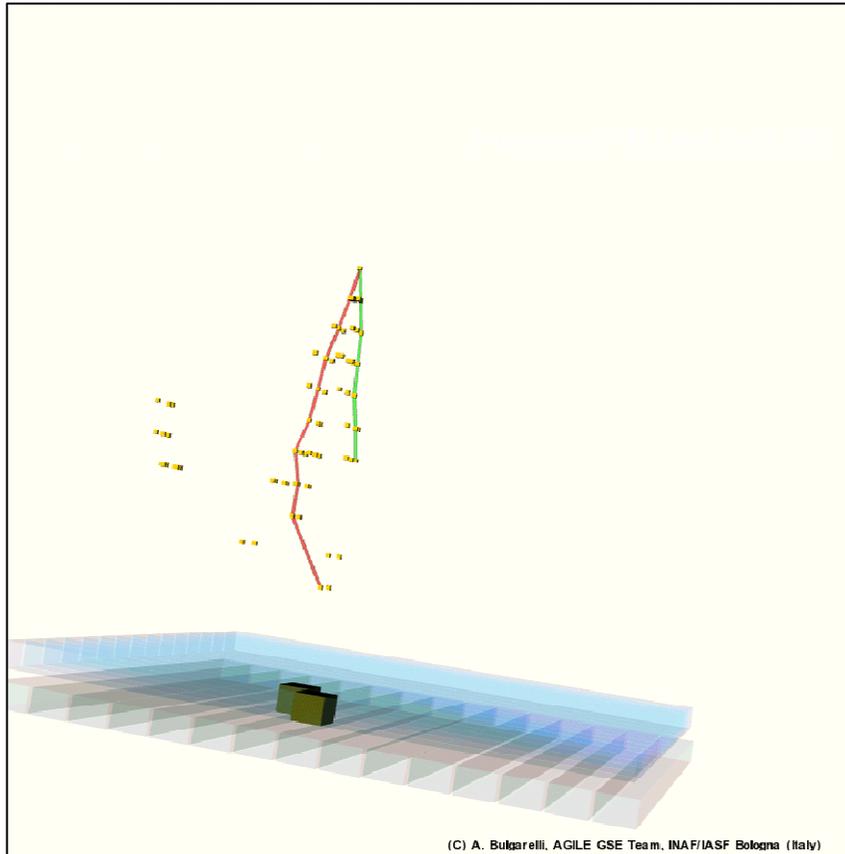
AGILE GRID photon event



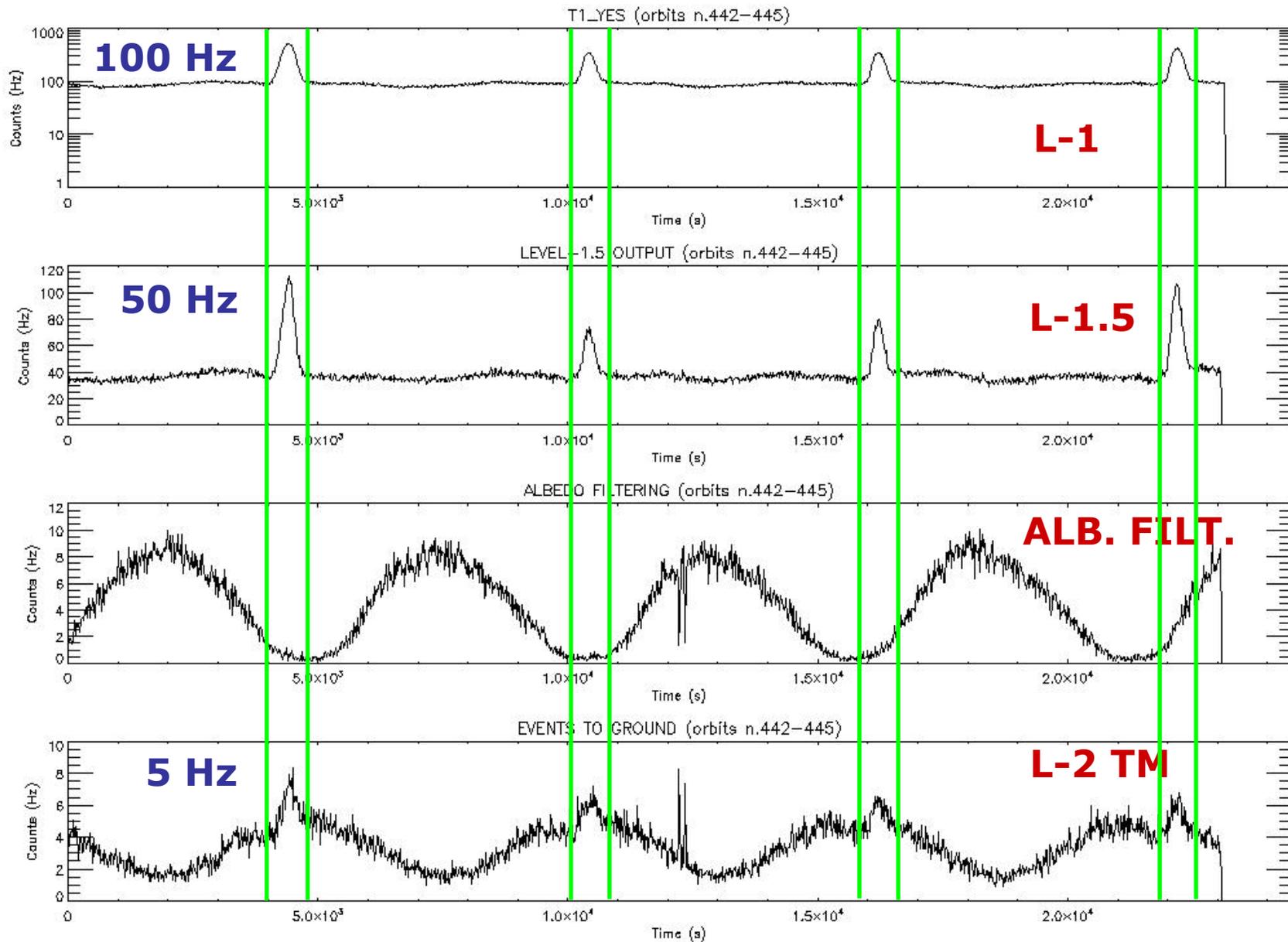
AGILE GRID photon event



AGILE GRID photon events



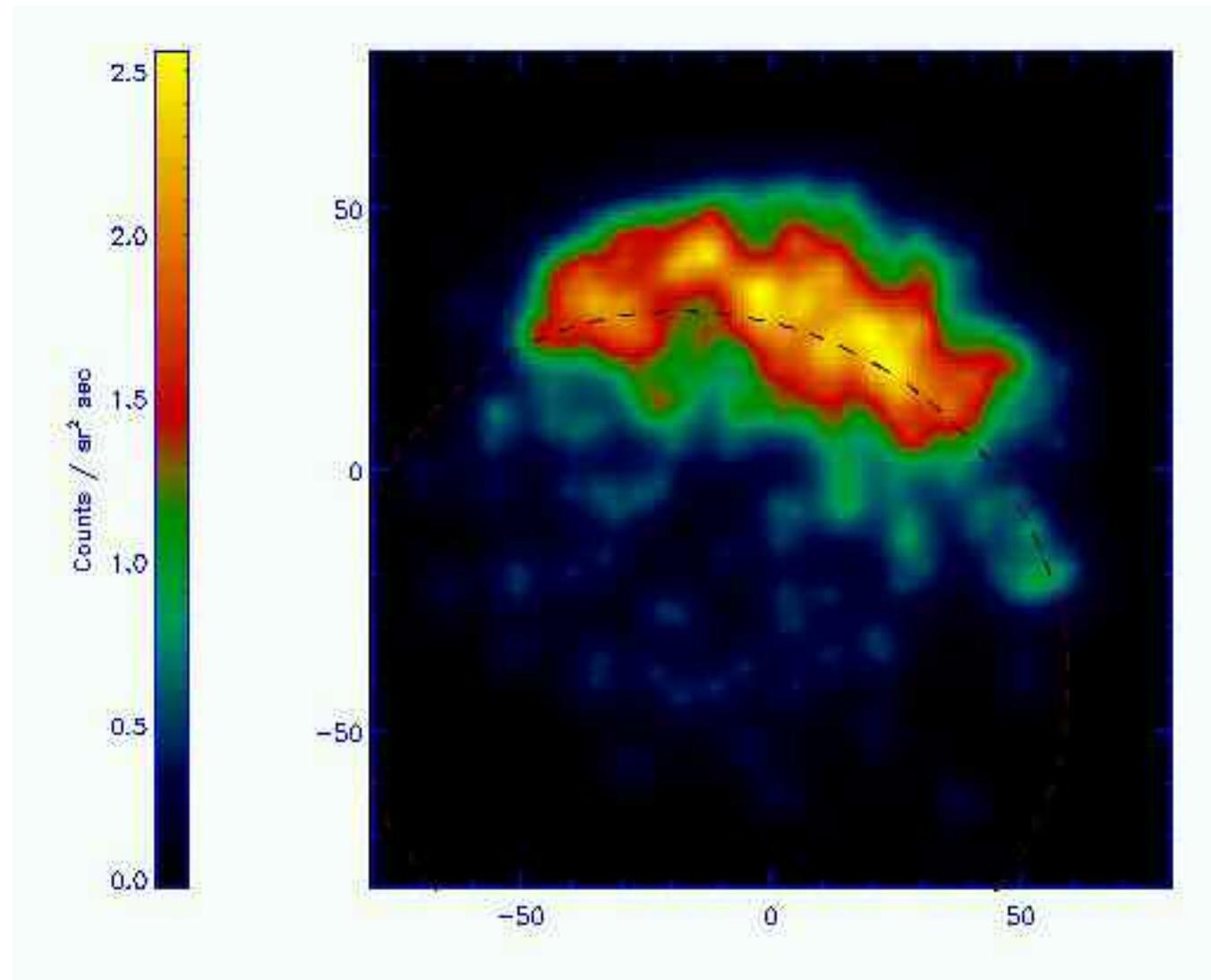
GRID OBS during the SAA



**ALBEDO
FILTERING IS
CRUCIAL !!!**

**Events with
 $E > 100$ MeV**

**Orbit 242,
May 10, 2007**



Silicon Tracker performance

- no post-launch degradation of performance
- Optimal analog threshold level, even better than on the ground
- Stable configuration

AGILE Tracker efficiency (0-9 degrees)

(physical calibration)

ORBITAL CONTACT NUMBER	TR-FEE Threshold (and strip-mask)	TM TYPE	Pull-X	Pull-Z	% EVT < 3 CL	% C3 < 100 ADC	Single track efficiency (detection in the 3rd plane out of 4 aligned planes with the other 3 planes with detected hits)		
Run 11119 (IAGB, Munich)	7 (6)	phys	16.7	16.2	1%	0%*	Efficiency -Z	0.97 +/-	0.02
							Efficiency- X	0.95 +/-	0.02
253	20 (6)	phys	16.7	16.7	1.50%	0.20%	Efficiency -Z	0.83 +/-	0.03
							Efficiency -X	0.80 +/-	0.03
510	6 (6)	phys	18.1	17.4	5%	2.30%	Efficiency -Z	0.97 ±	0.01
							Efficiency -X	0.96 ±	0.01
522	5 (7)	phys	17	17.4	13%	2.50%	Efficiency -Z	0.97 ±	0.01
							Efficiency- X	0.96 ±	0.02
535 (FVC – 1 plane)	5 (8)	phys	17	17.2	7.50%	2%	Efficiency -Z	0.98 ±	0.03
							Efficiency -X	0.95 ±	0.03

AGILE and GLAST are different...

- **Size, cost, SMEX vs. Observatory**
- **Mission profile, orbit-background**
- **Analog signal, FEE, Tracker structure**
- **Hard X-ray + gamma-ray imagers**
- **Calorimeter as independent GRB detector**
- **GRB search with dynamic range, from sub-ms to tens of seconds**
- **AGILE optimized near 30 MeV-1 GeV, GLAST in the range 1-100 GeV**

AGILE main science topics

- **Active Galactic Nuclei**
- **Gamma-Ray Bursts**
- **Pulsars**
- **TeV sources**
- **SNR and origin of cosmic rays**
- **Diffuse Galactic gamma-ray background**
- **Unidentified gamma-ray sources**
- **Microquasars**
- **Galactic Neutron Stars and Black Holes**
- **Fundamental Physics: Quantum Gravity**

Some action...

AGILE HISTORY IN ORBIT (May 10 – Jul. 21, 2007)

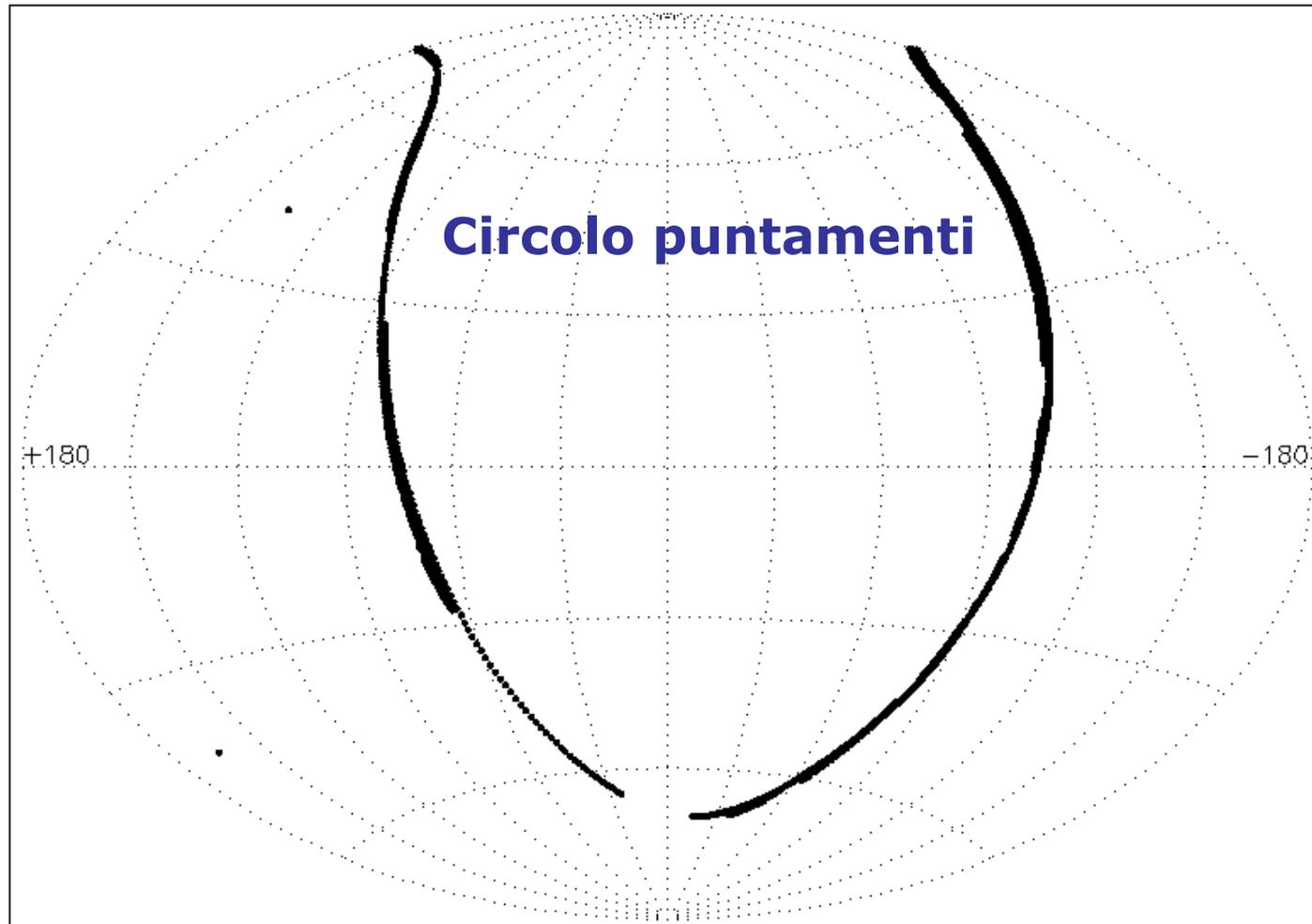
	<i>DATE</i>	
1	early May	PL turn-on, PL overall checking, no HW PL malfunctioning
2	early May	Particle background checking, AC tests
3	May 10	GRID telemetry successful check: 10 Hz, albedo filtering test
4	end of May	First GRID maps, large field of view, 120 degree diameter
5	May 23-24	First Vela PSR detection in a few orbits, positive check of A_{eff}
6	May 30	GRID threshold at S=5
7	early June	Solar flares detections by AC
	June 8-20	Super-A setting and tuning
8	June 22	GRB detected at 80 deg. off axis by AC/MCAL/Super-A RMs
9	June 29	First Super-A source detected: GX 301-2
	July 2	ASI-ASDC Meeting: large FOV GRID imaging
	July 2-8	SW patch loading and PPSE checks, coarse pointing
10	July 9-13	GRID detection of 3C 279 (3.5 days)
11	July 13	Super-A detection of Vela X-1
12	July 16-18	Super-A detection of multiple X-ray sources (Cen X-3,...)

AGILE HISTORY IN ORBIT (July 24 – Aug. 31, 2007)

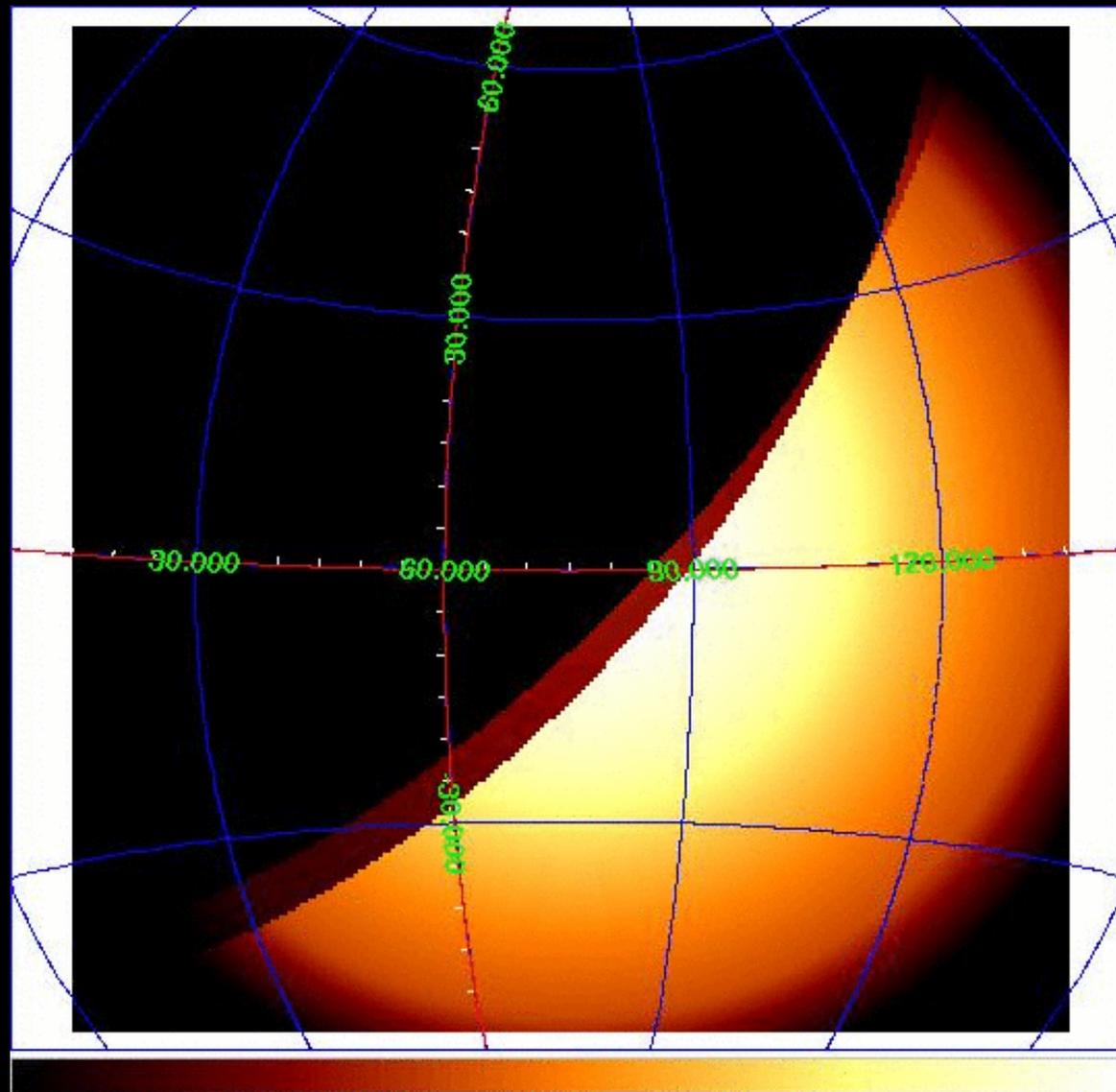
	<i>DATE</i>	
13	July 24	AGILE first repointing to 3C454.3 (following an optical flare): pointing centroid at 36 degrees
14	July 24, 11:24pm	Detection of the first GRB by Super-A, no detection by GRID and MCAL, a “no-high-energy” burst, first two AGILE GCNs
15	July 25	Preliminary evidence of significant gamma-ray emission from 3C 454.3
16	July 27	Strong gamma-ray flare of 3C454.3 confirmed, Astron.Telegr.
17	July 27	AC localization of a strong flare from SGR 1806-20
18	August	Vela PSR off-axis calibration
19	August	Several off-axis GRBs
20	Aug. 27-31	First observation of the Galactic Center Region

AGILE coarse pointing, 22-23 May 2007

106910664_106984560.log



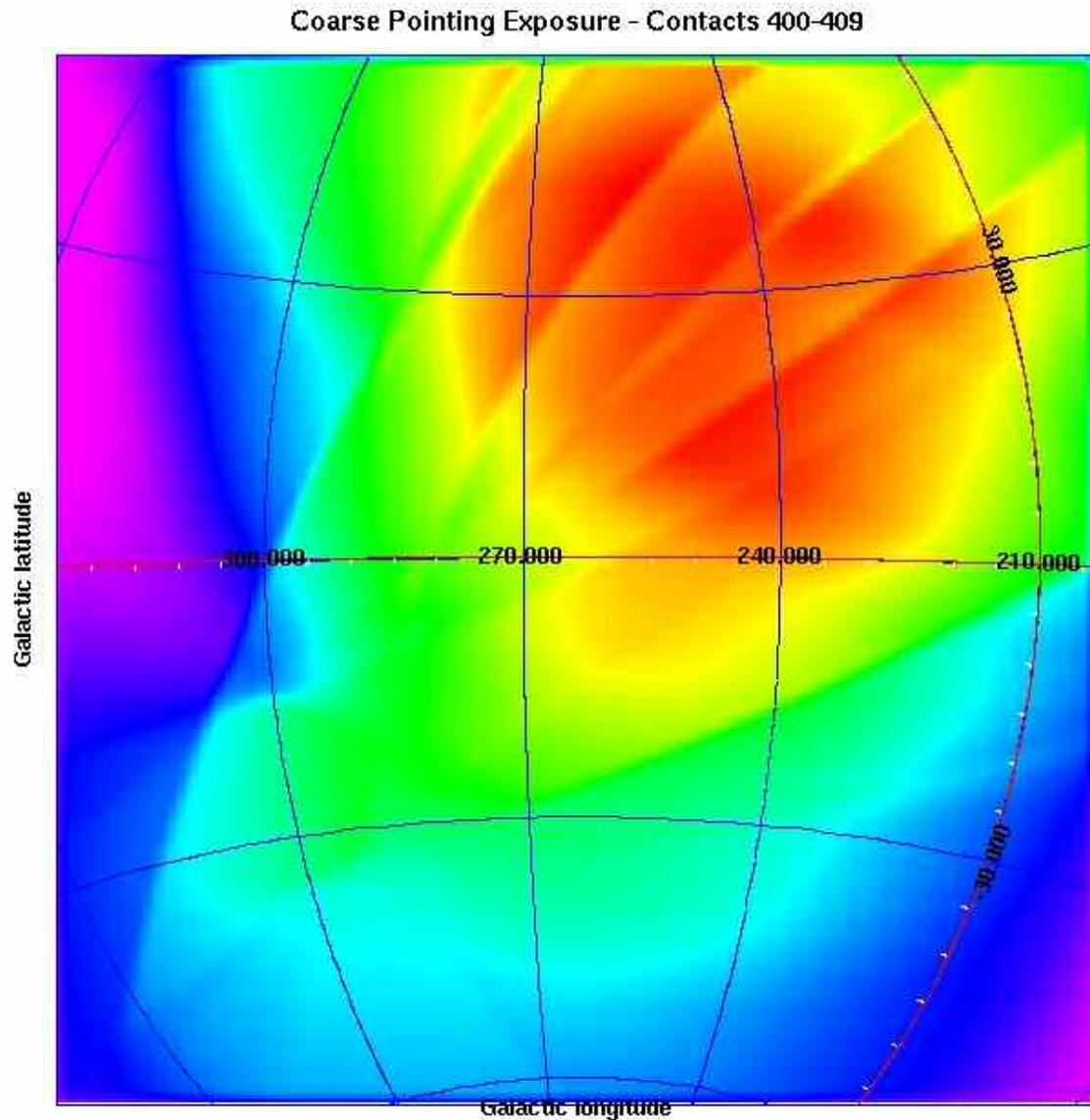
AGILE May 23-24 exposure in "Coarse Pointing"



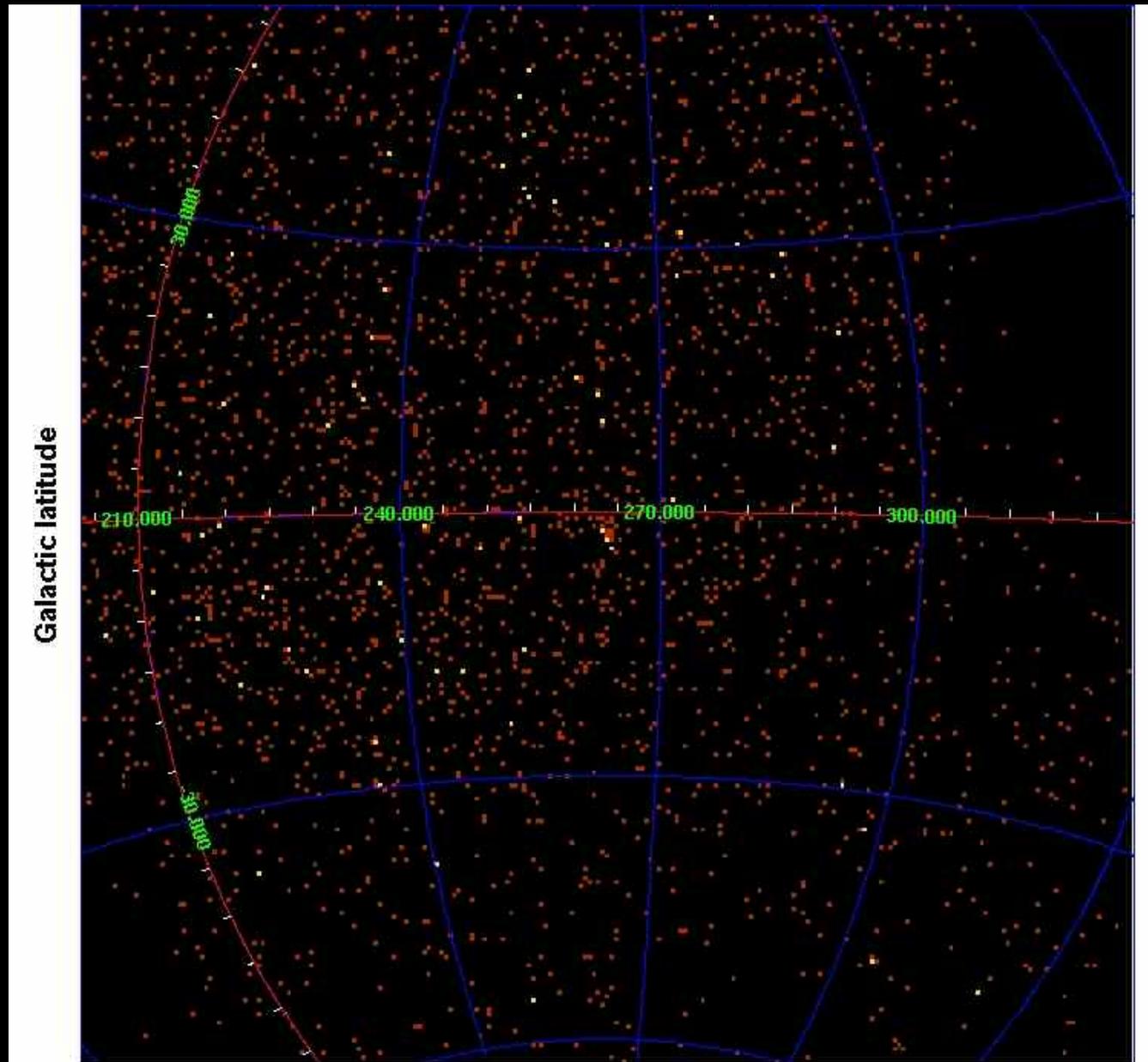
**May 21-22, 2007
orbits from
000400 to 000409**

**Exposure in the
field of the Vela
PSR in Coarse
Pointing**

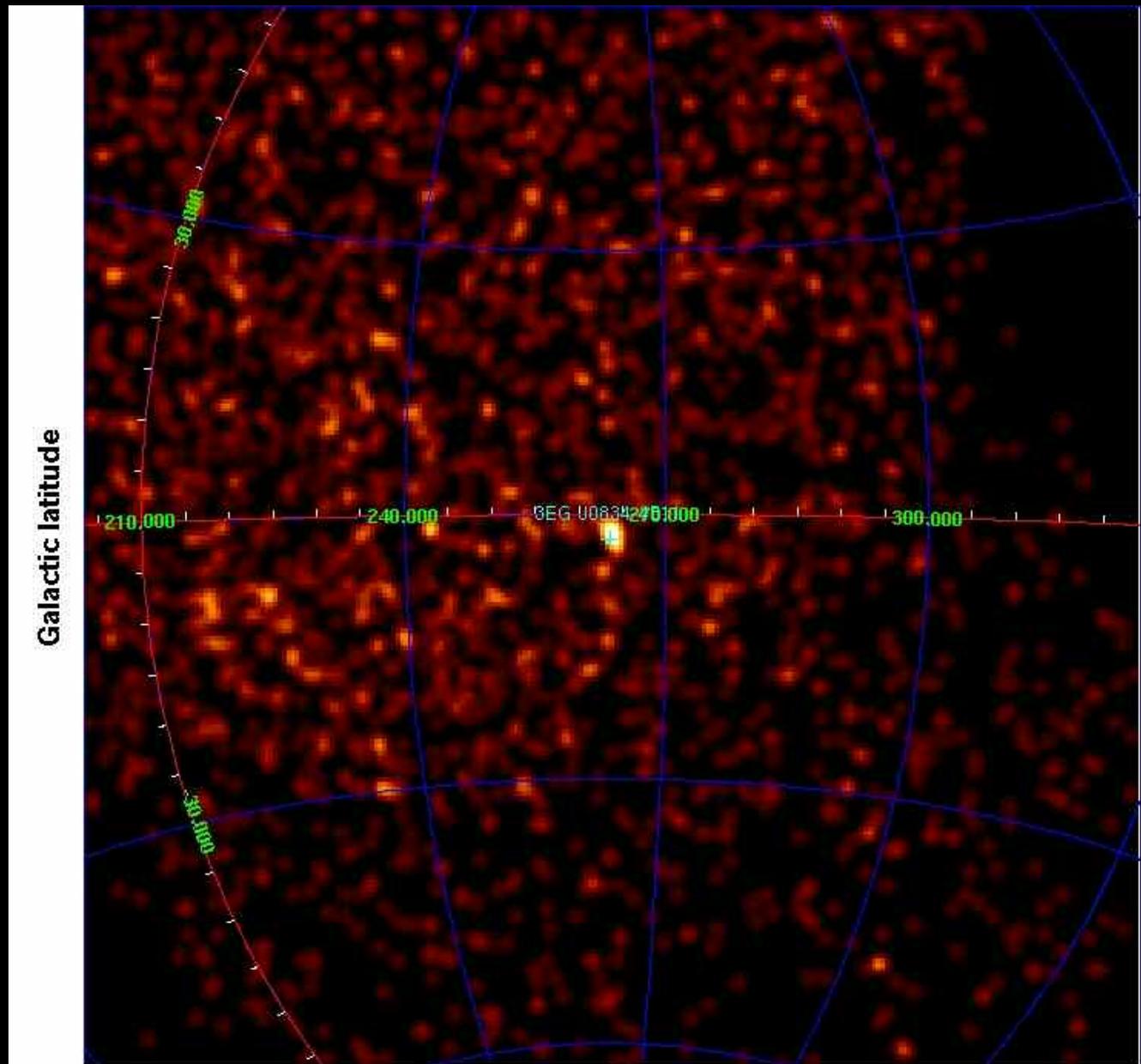
**“Sliced exposure”:
it requires a
careful data
treatment !**



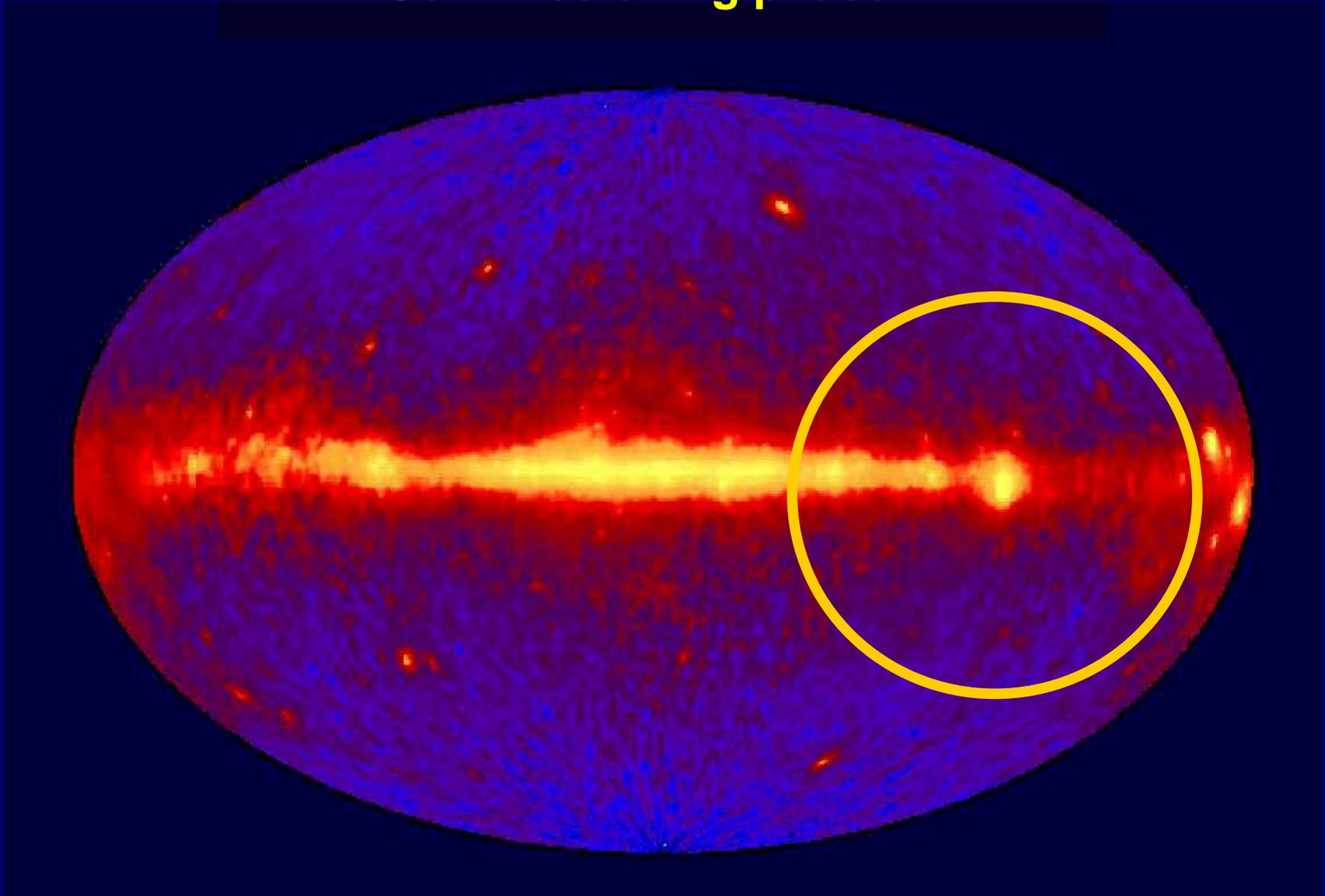
! VELA PSR ! ($E > 100$ MeV)



Smoothed map

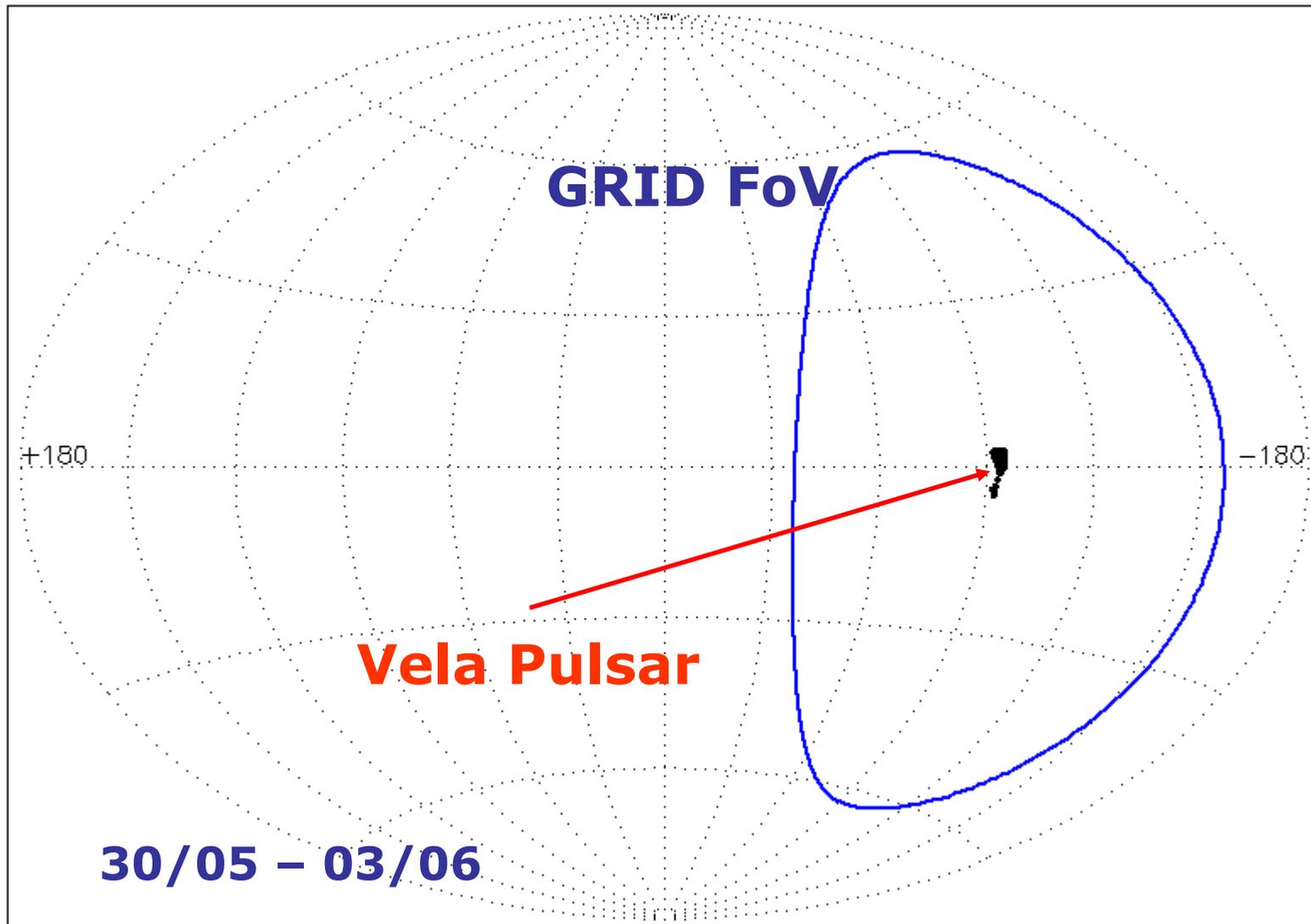


AGILE fine pointing, May 24-June 4, 2007
Commissioning phase



AGILE FINE POINTING

107609122_107937922.log



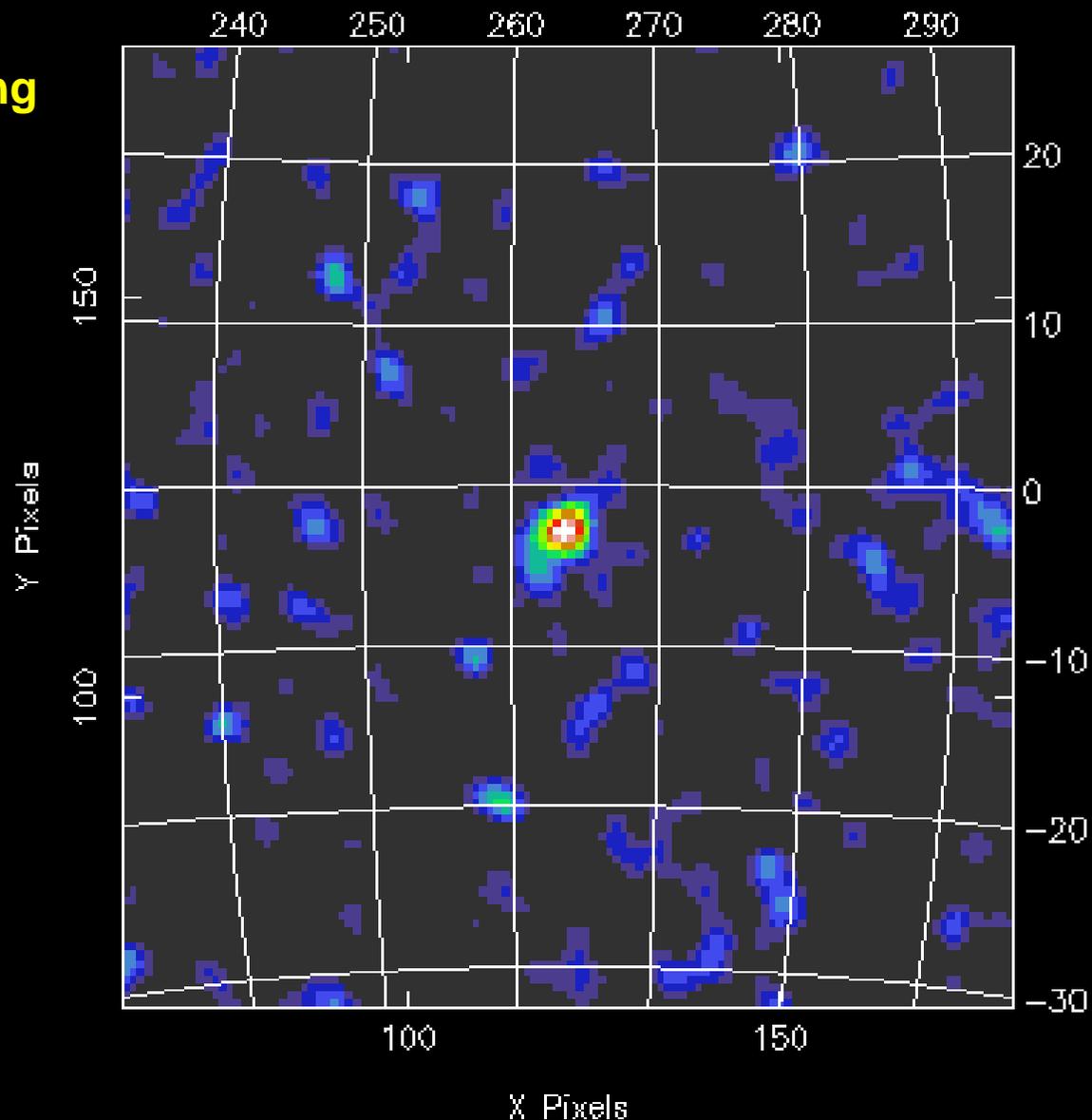
Vela PSR gamma-ray detection by AGILE

AGILE GRID 2007 May 24

Sat. fine pointing

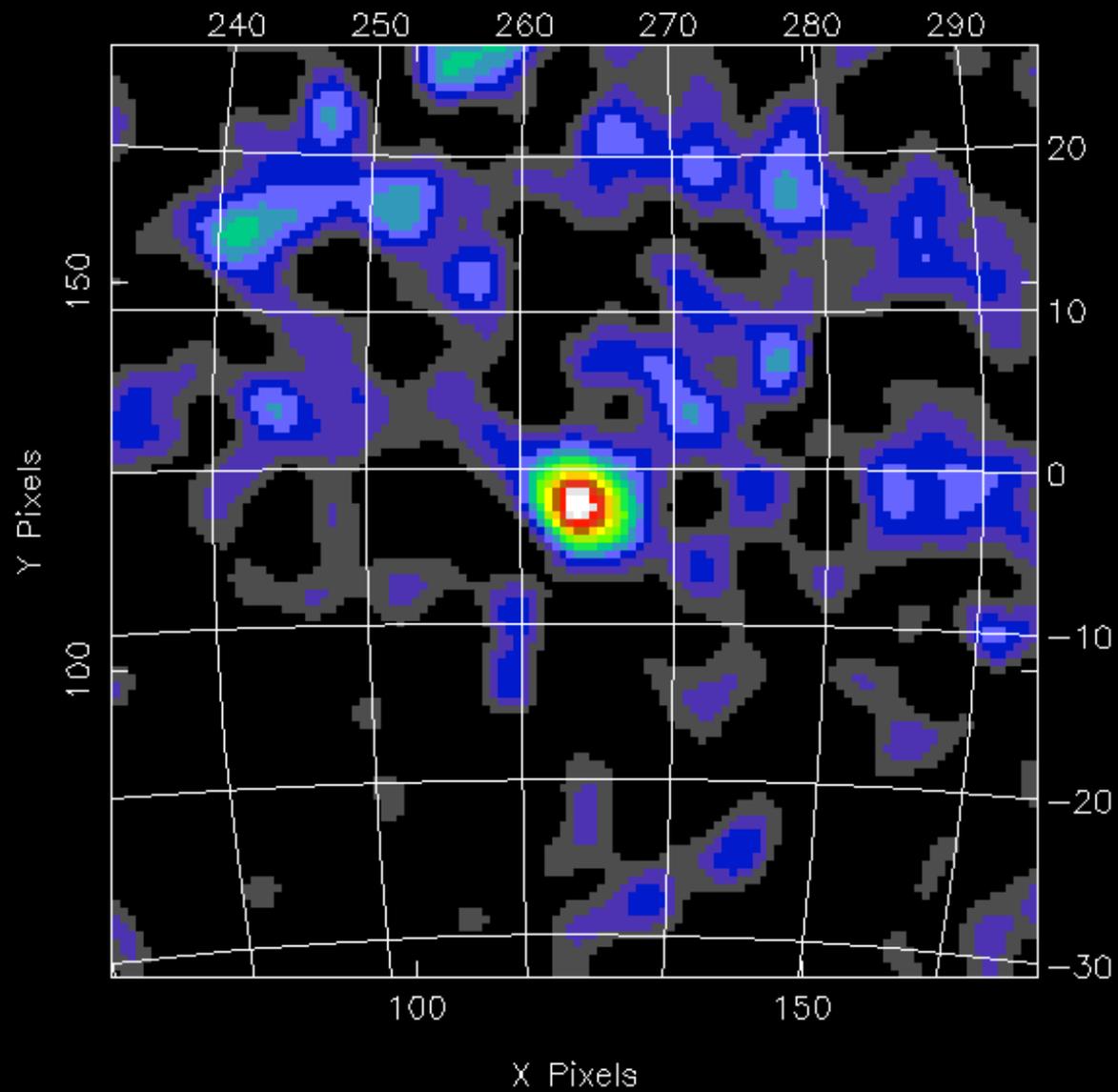
3 orbits

May 25 2007



Vela PSR AGILE-GRID detection (7 orbits)

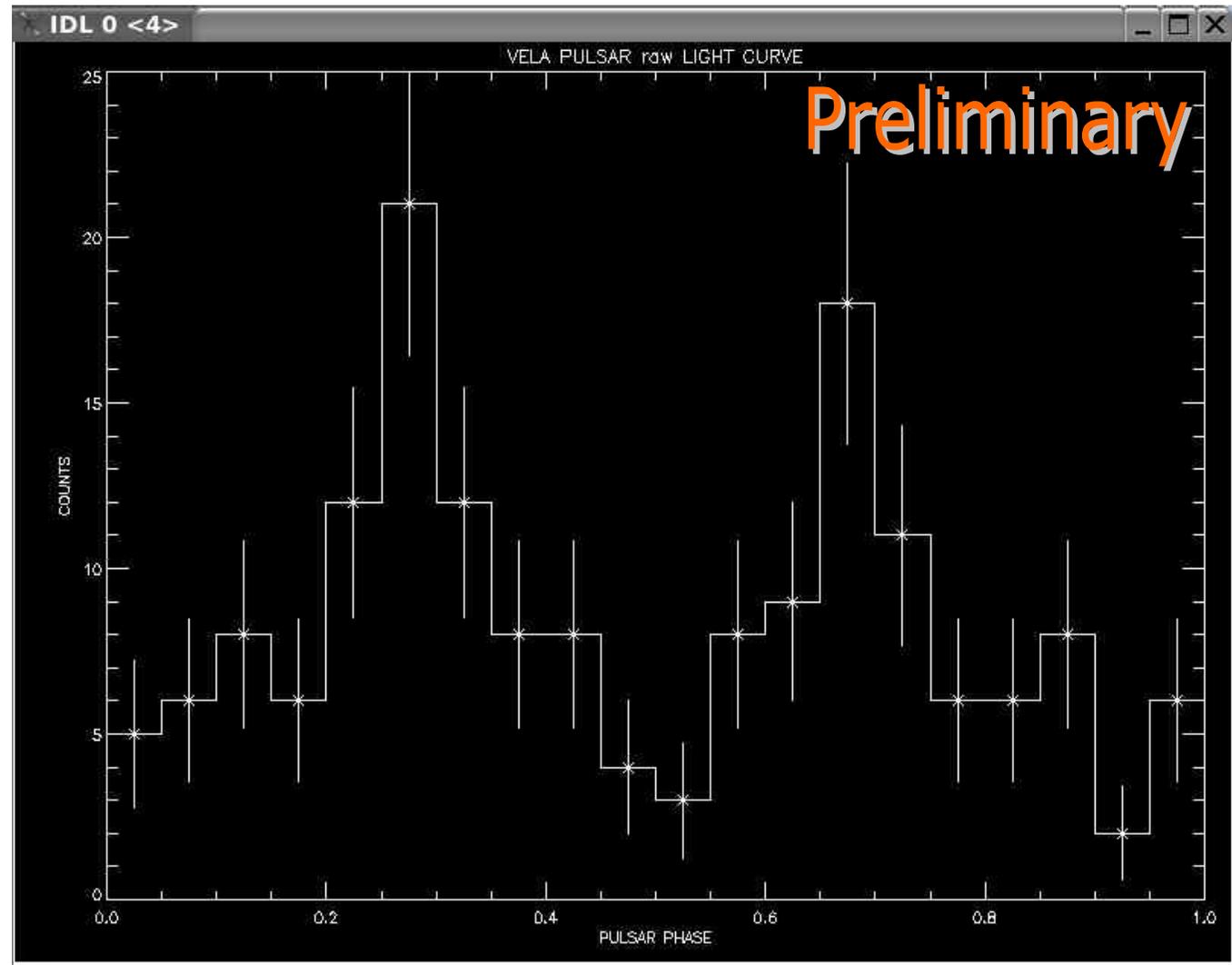
AGILE GRID 2007 May 29



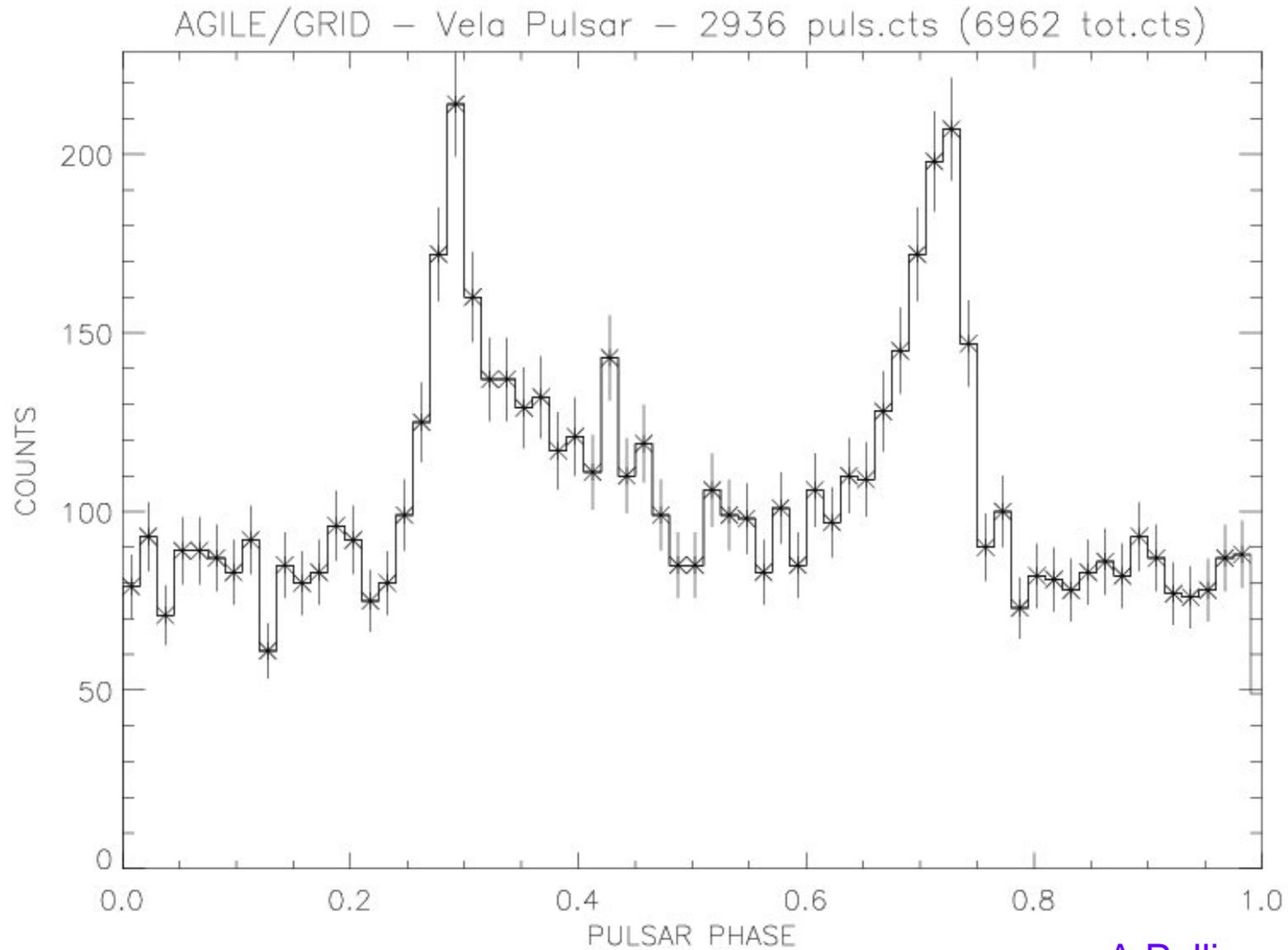
The AGILE first detection of gamma-ray pulsations from the Vela PSR

orbits 441-452, about 170 counts

Consistent with the measured spin rotation period of $P=89$ msec.

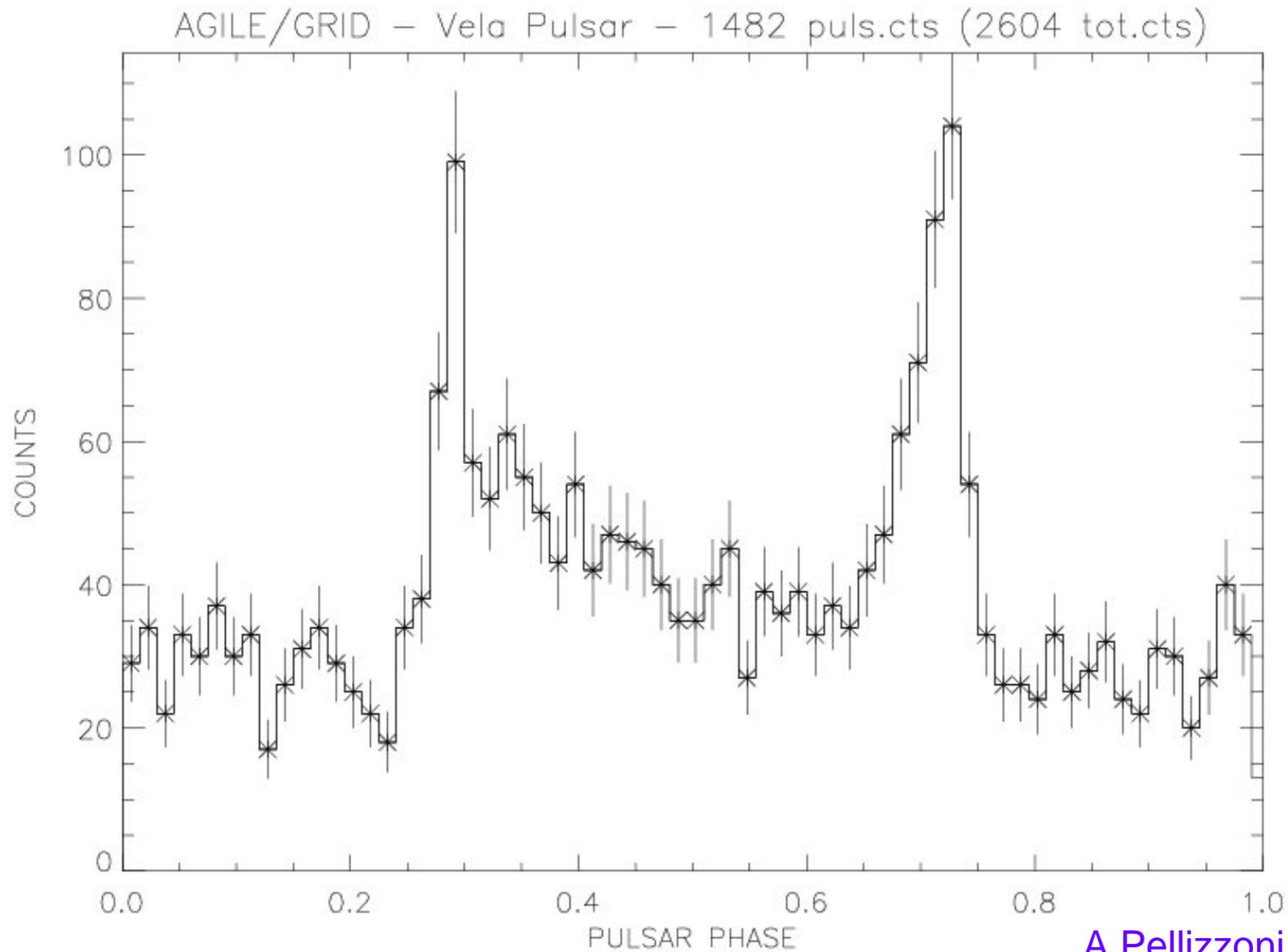


Vela PSR light curve ($E > 100$ MeV), 12 day integration,
(calibration observation block no.1, July, 13-24). 1 ms time bins.

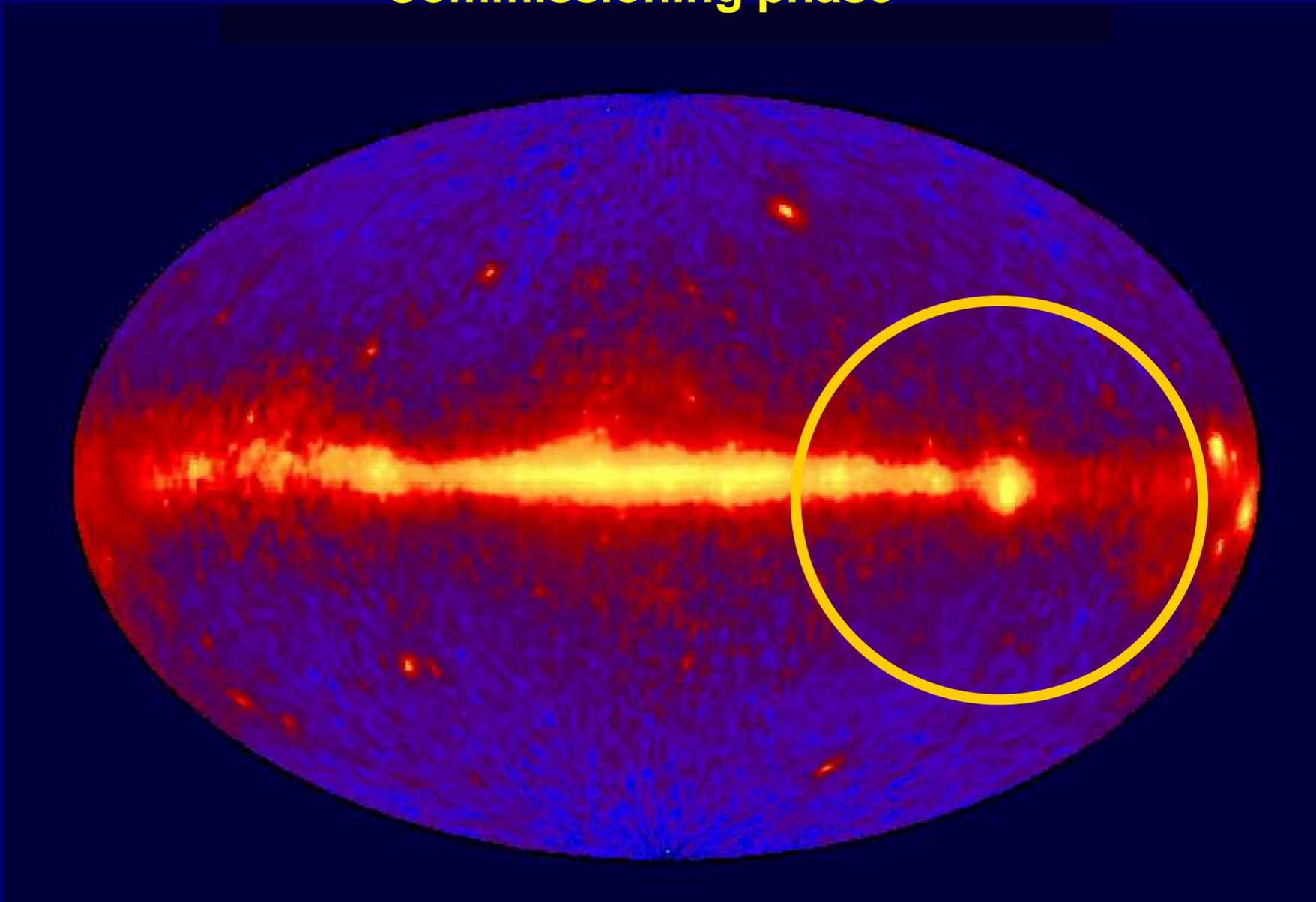


A.Pellizzoni

Vela PSR light curve ($E > 300$ MeV), 12 day integration,
(calibration observation block no.1, July, 13-24). 1 ms time bins.



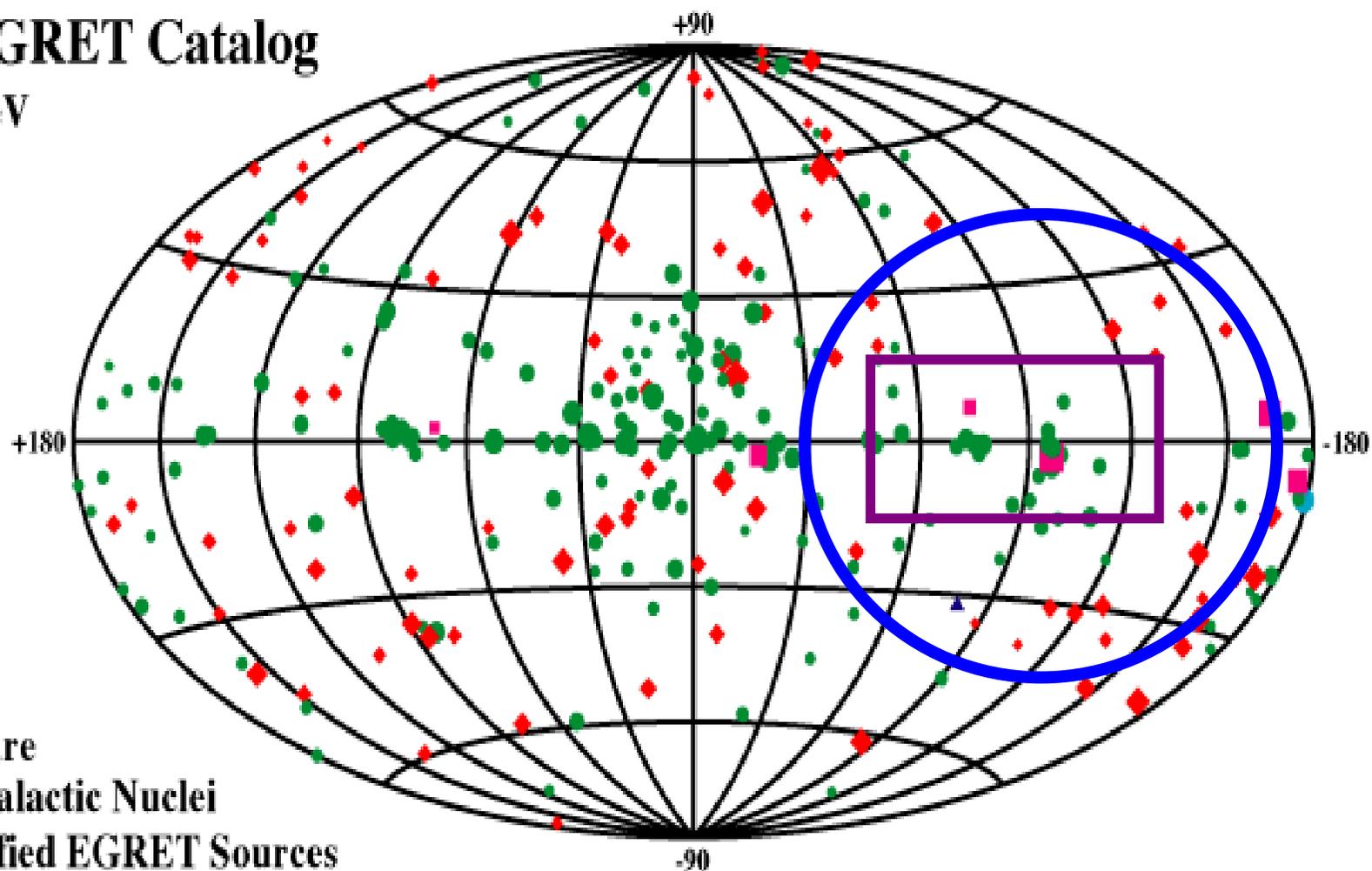
AGILE fine pointing, May 24-June 4, 2007
Commissioning phase



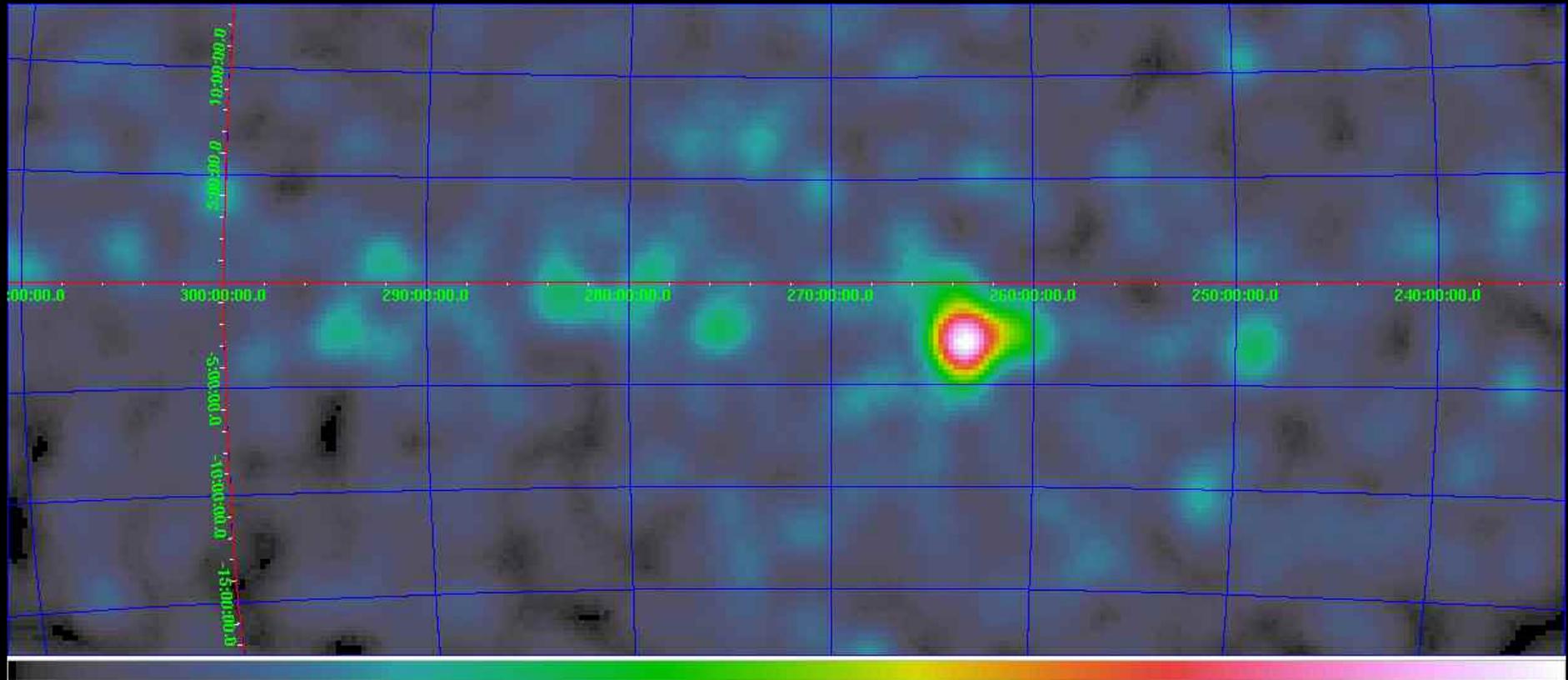
Third EGRET Catalog

$E > 100 \text{ MeV}$

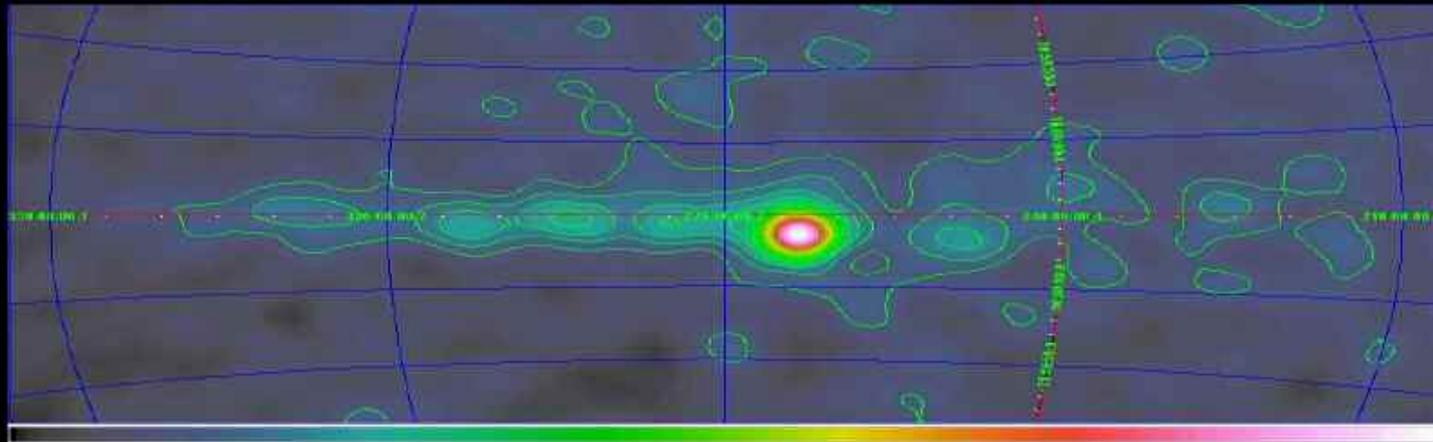
- ▲ LMC
- Pulsars
- Solar Flare
- ◆ Active Galactic Nuclei
- Unidentified EGRET Sources



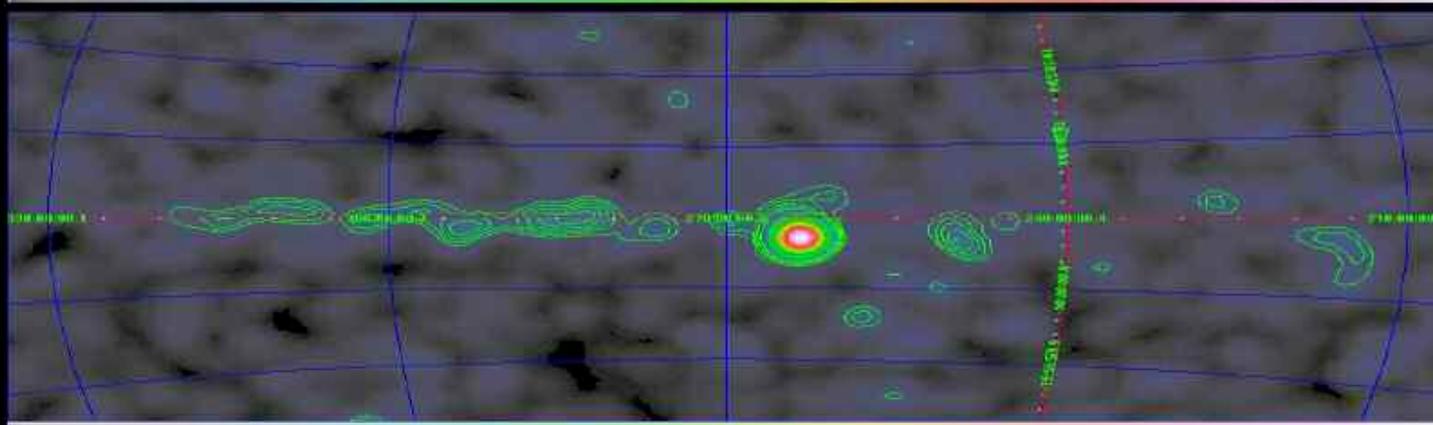
AGILE-GRID ($75^\circ \times 30^\circ$), orbits 549-590, preliminary cuts



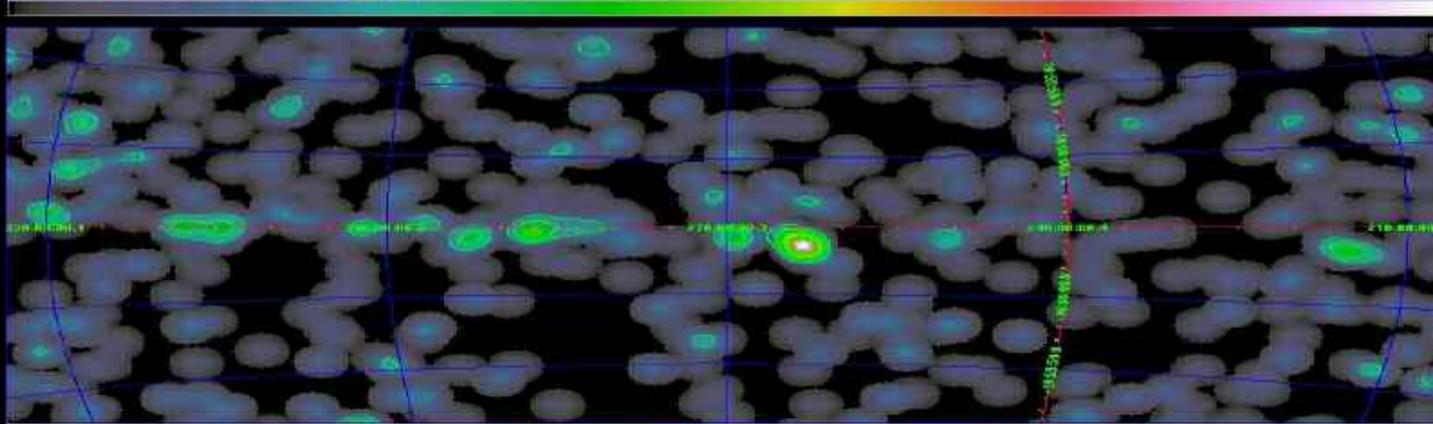
Vela Region, 80 orbits, preliminary cuts, $(120^\circ \times 50^\circ)$



$E > 200$ MeV

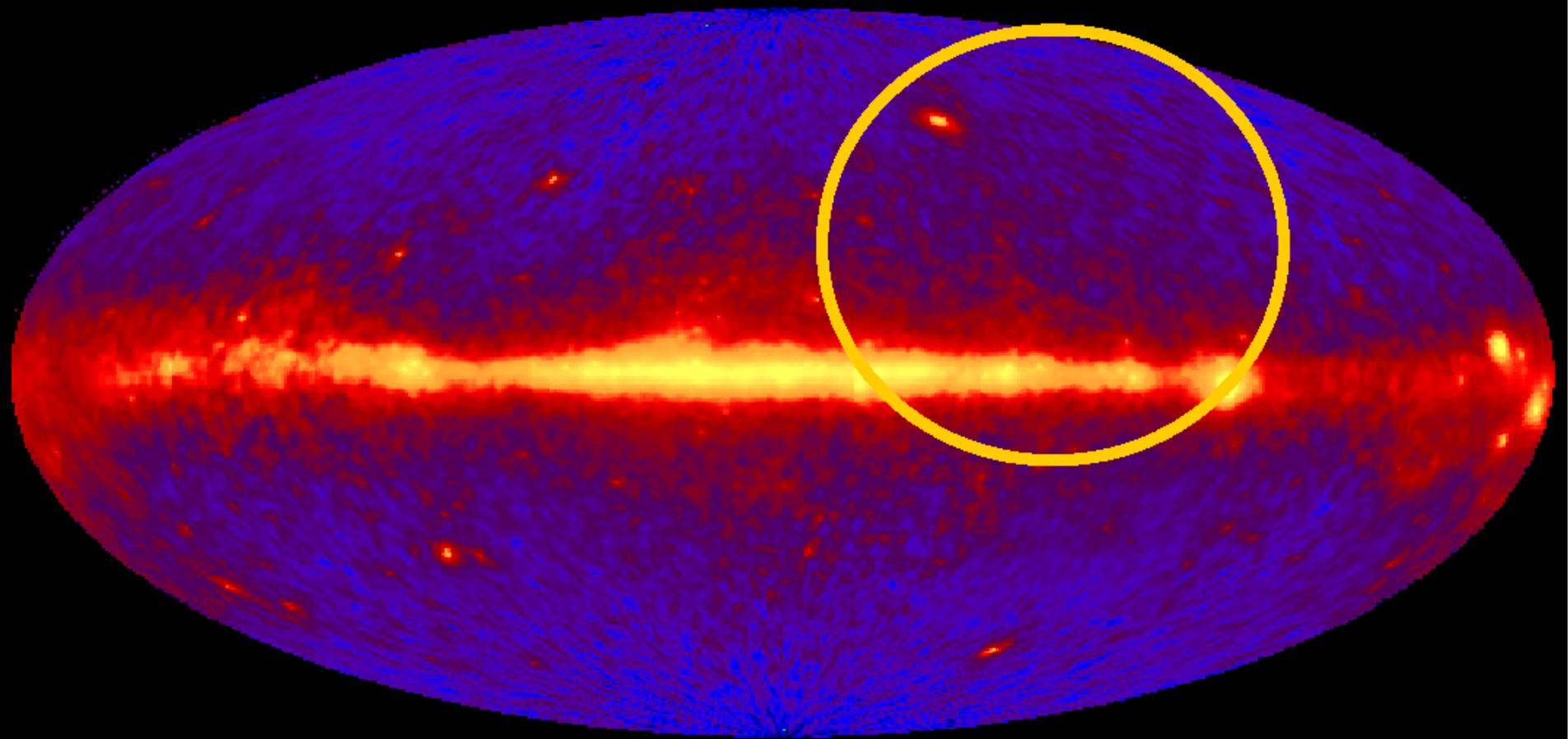


$E > 400$ MeV

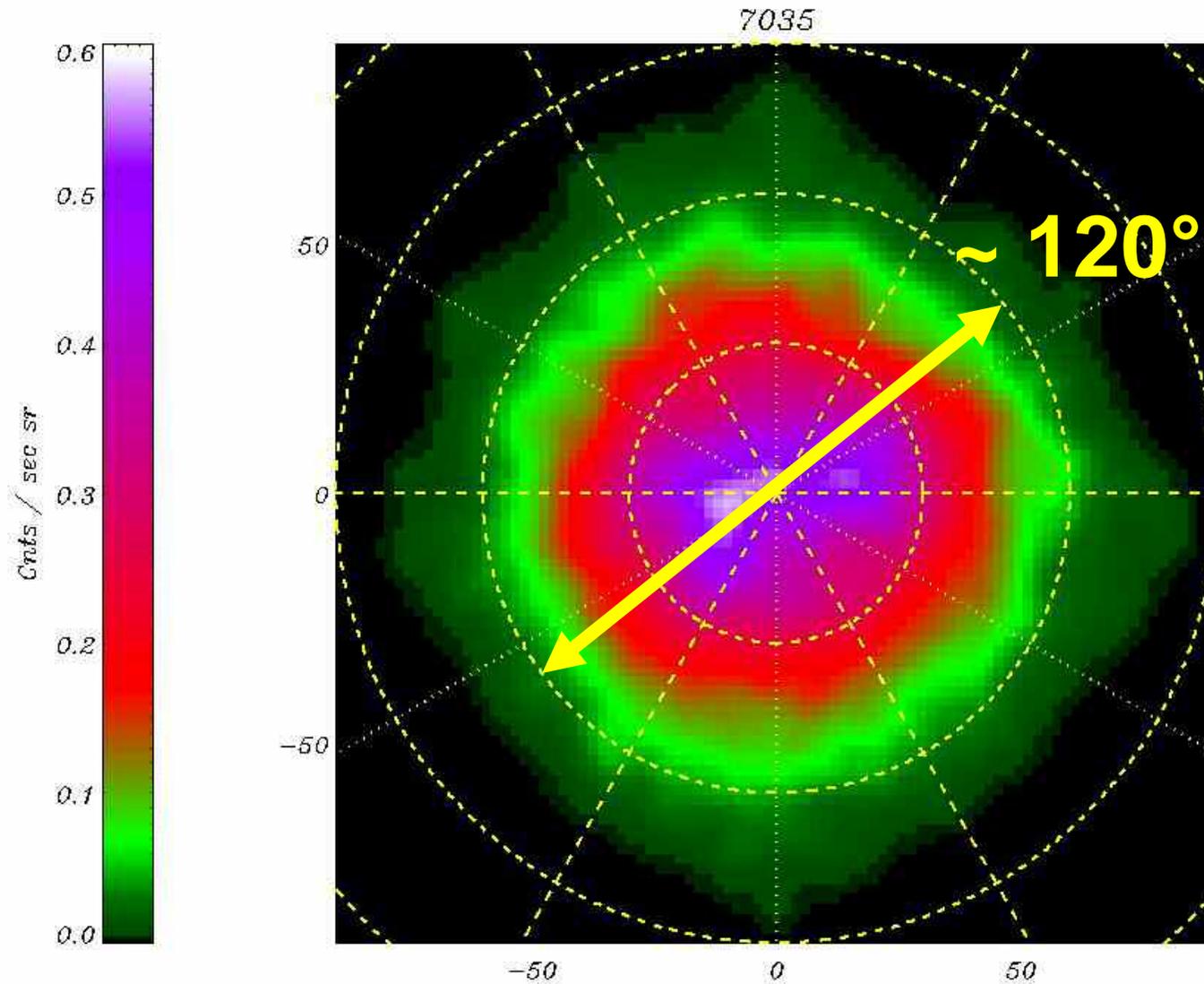


$E > 1$ GeV

AGILE fine pointing, June 8–10, 2007
Commissioning phase : *the “empty” field*



AGILE detection of the natural γ -ray background (Tortona, 29 December 2006)



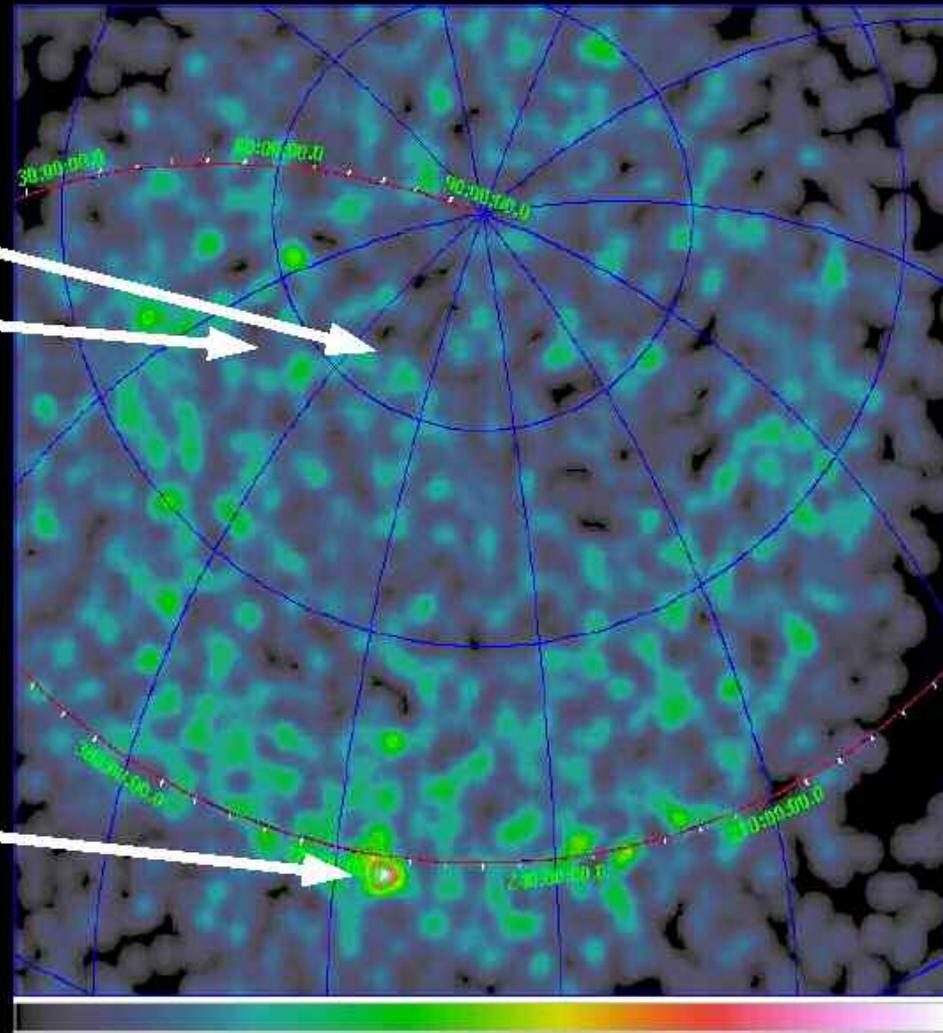
“Empty” Field ($100^\circ \times 100^\circ$)

8-10 june, orbits 653-691, preliminary cuts

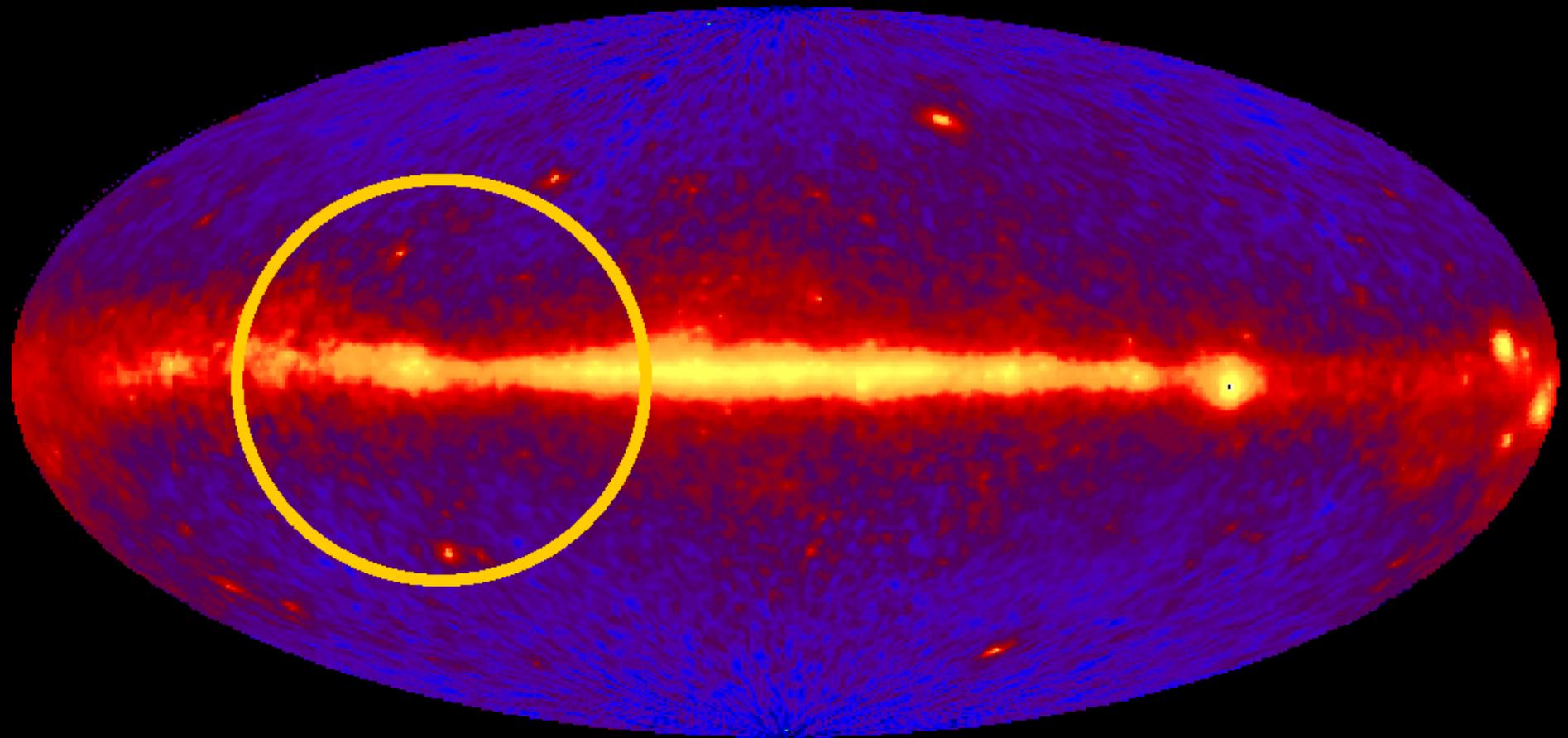
no 3C 279 Flares

no 3C 273 Flares

Vela PSR
(55 degrees off axis !)

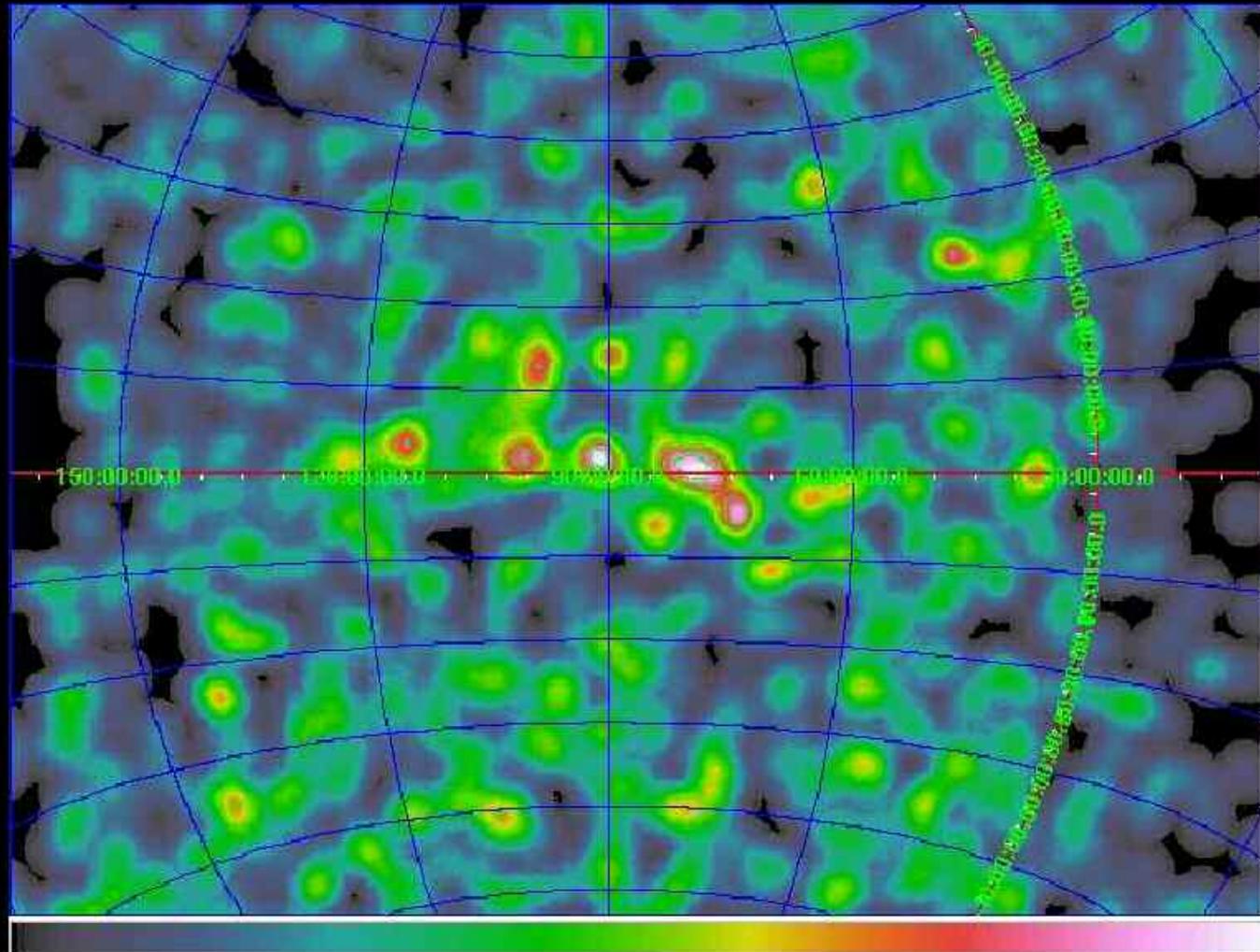


Commissioning phase : *the Cygnus region*
coarse pointing, orbits 747-790



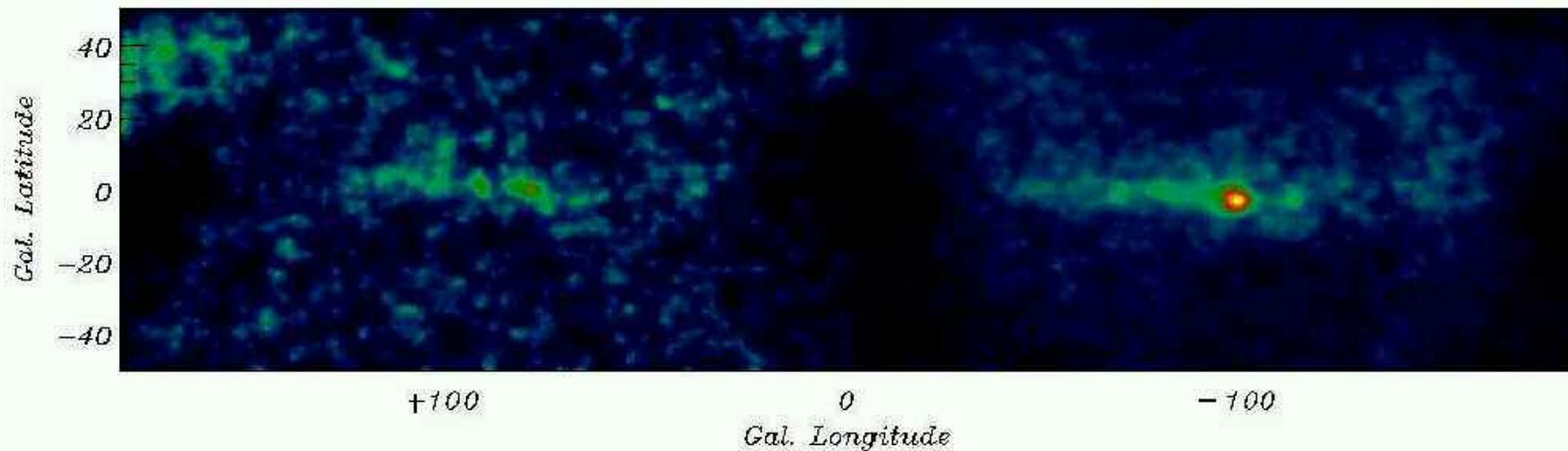
Cygnus Region (120° x 90°)

orbits 747-790, coarse pointing, preliminary cuts



AGILE Commissioning phase
Cygnus + Vela Regions

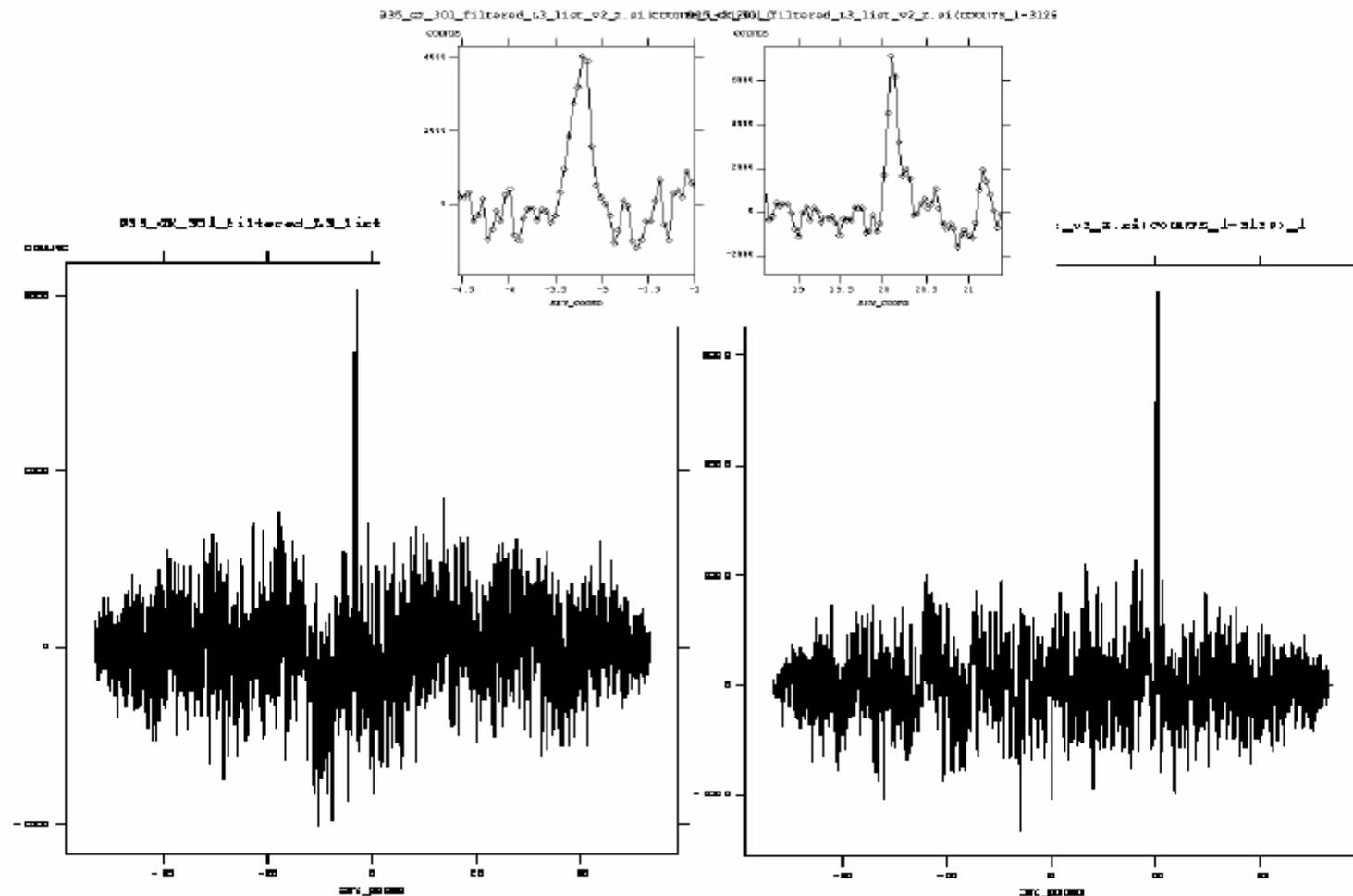
orbits 549-590 + 747-790, preliminary cuts



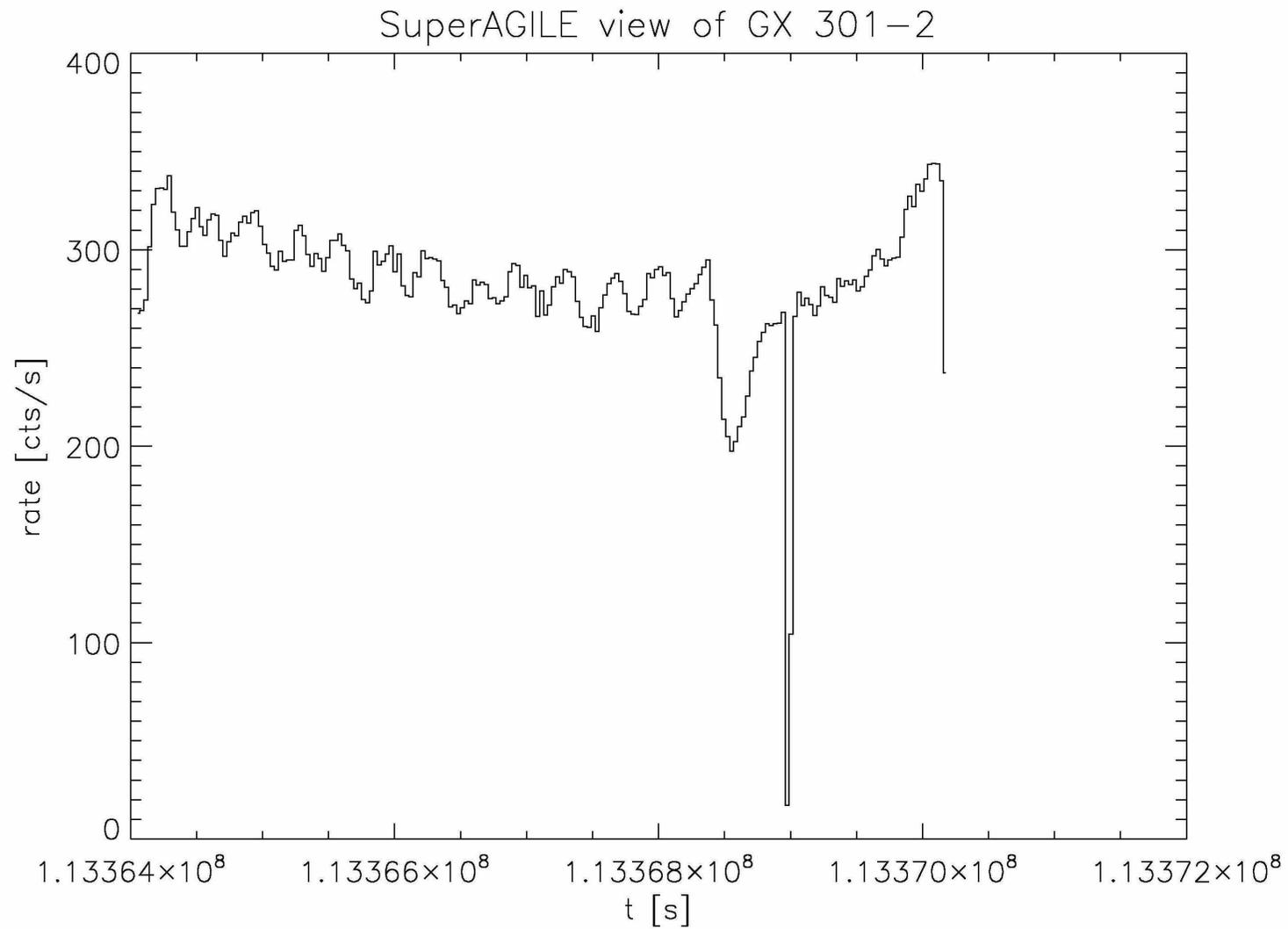
Super-Agile imaging

Super-Agile first source detection, June 28, 2007:
GX 301-2

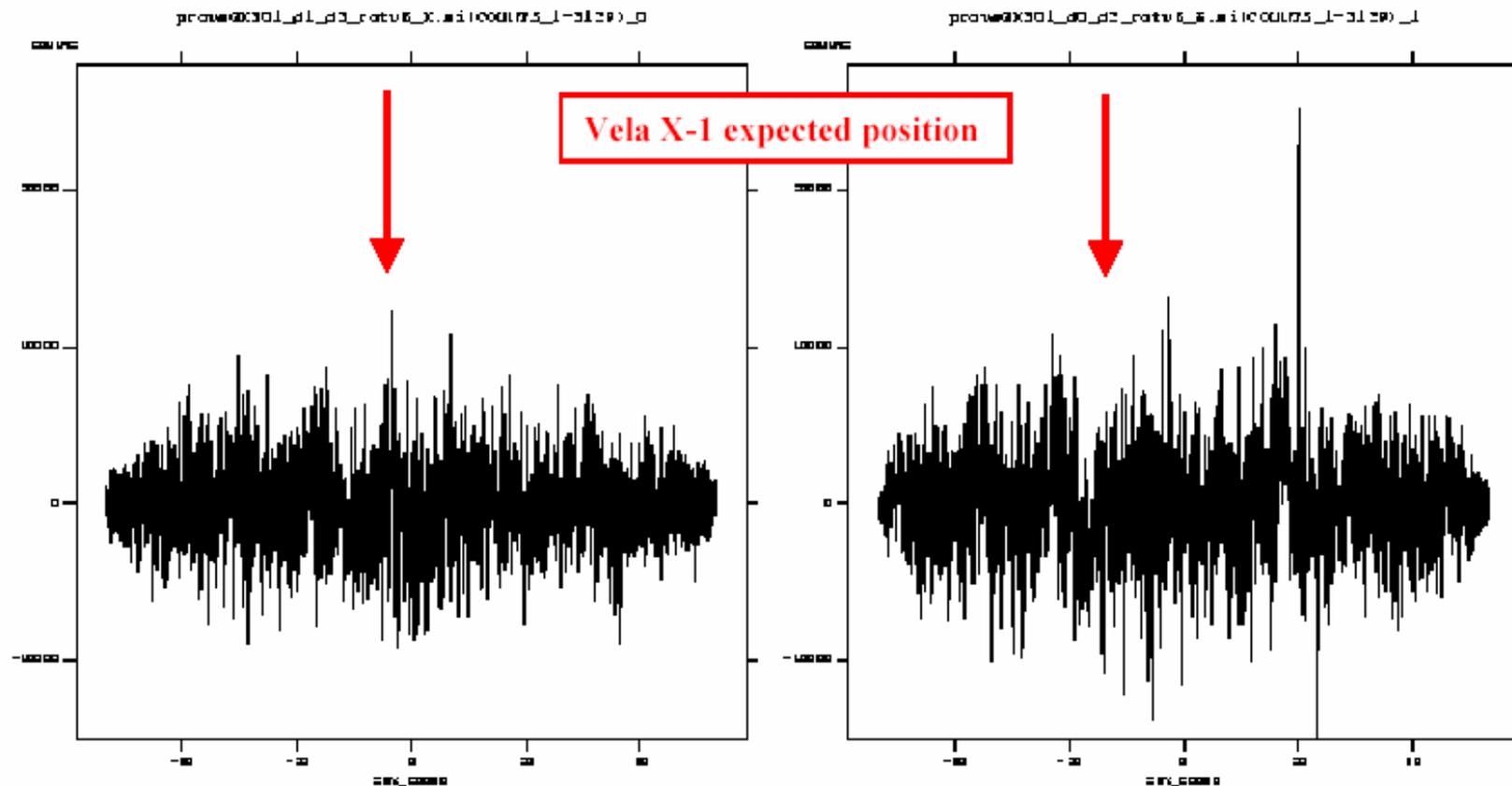
On-ground Imaging: first light (orbit 935)



Super-Agile detection of X-ray pulsations from GX 301-2 (orbit 1464)



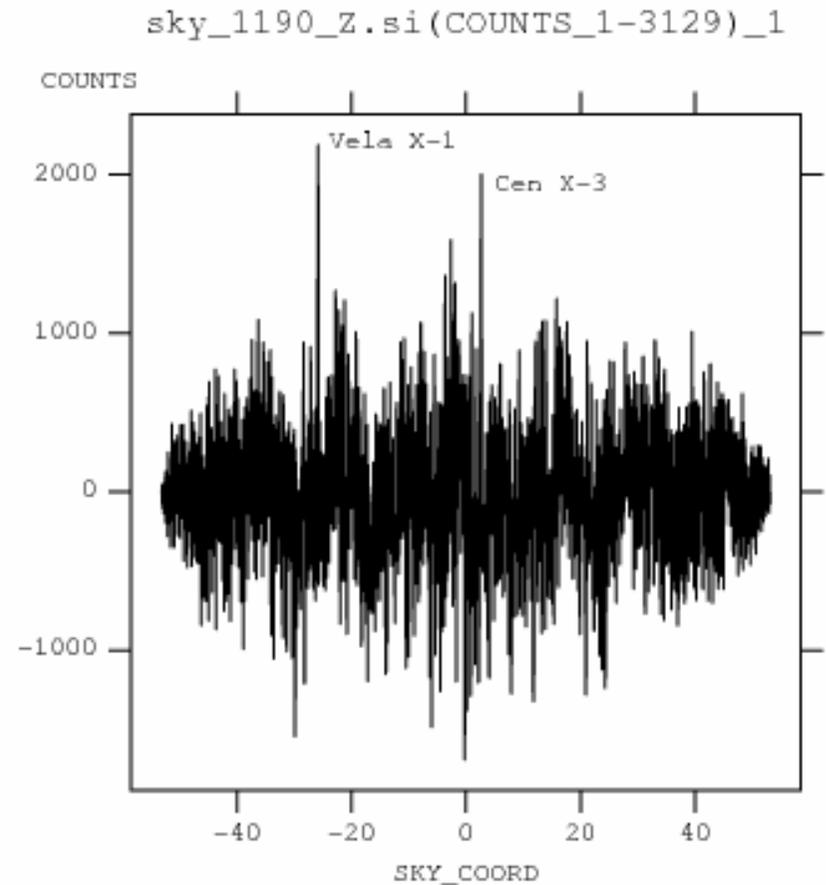
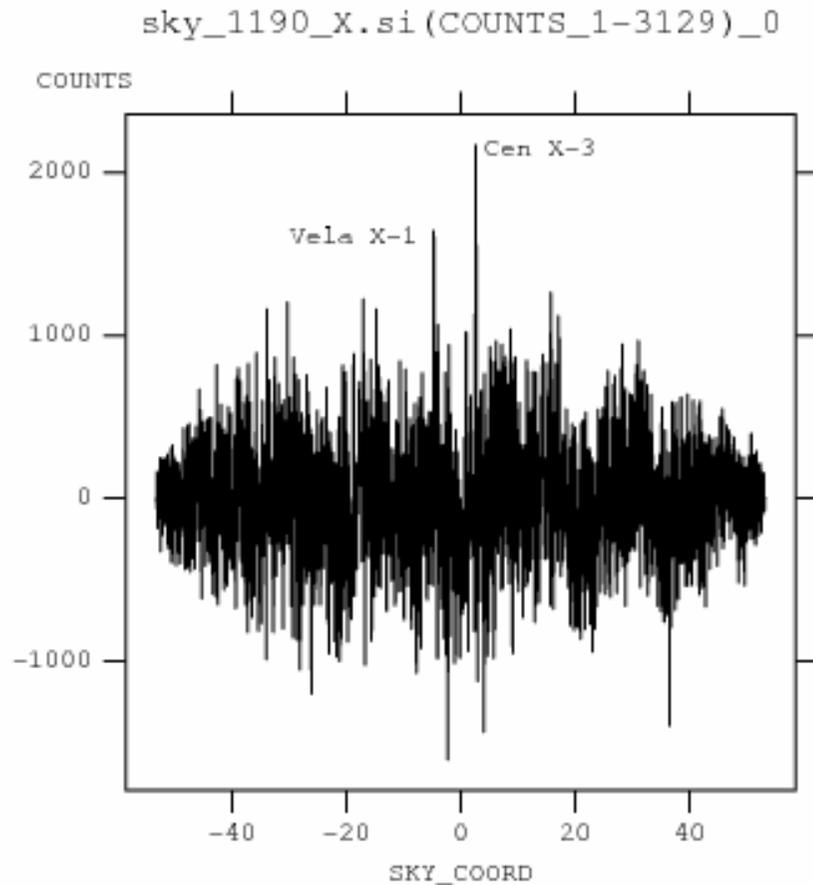
On-ground Imaging: first steps towards longer integrations (orbits 935-940)



X Direction

Z Direction

First Super-A multiple source detection (orbit 1190, Jul. 14, 2007)

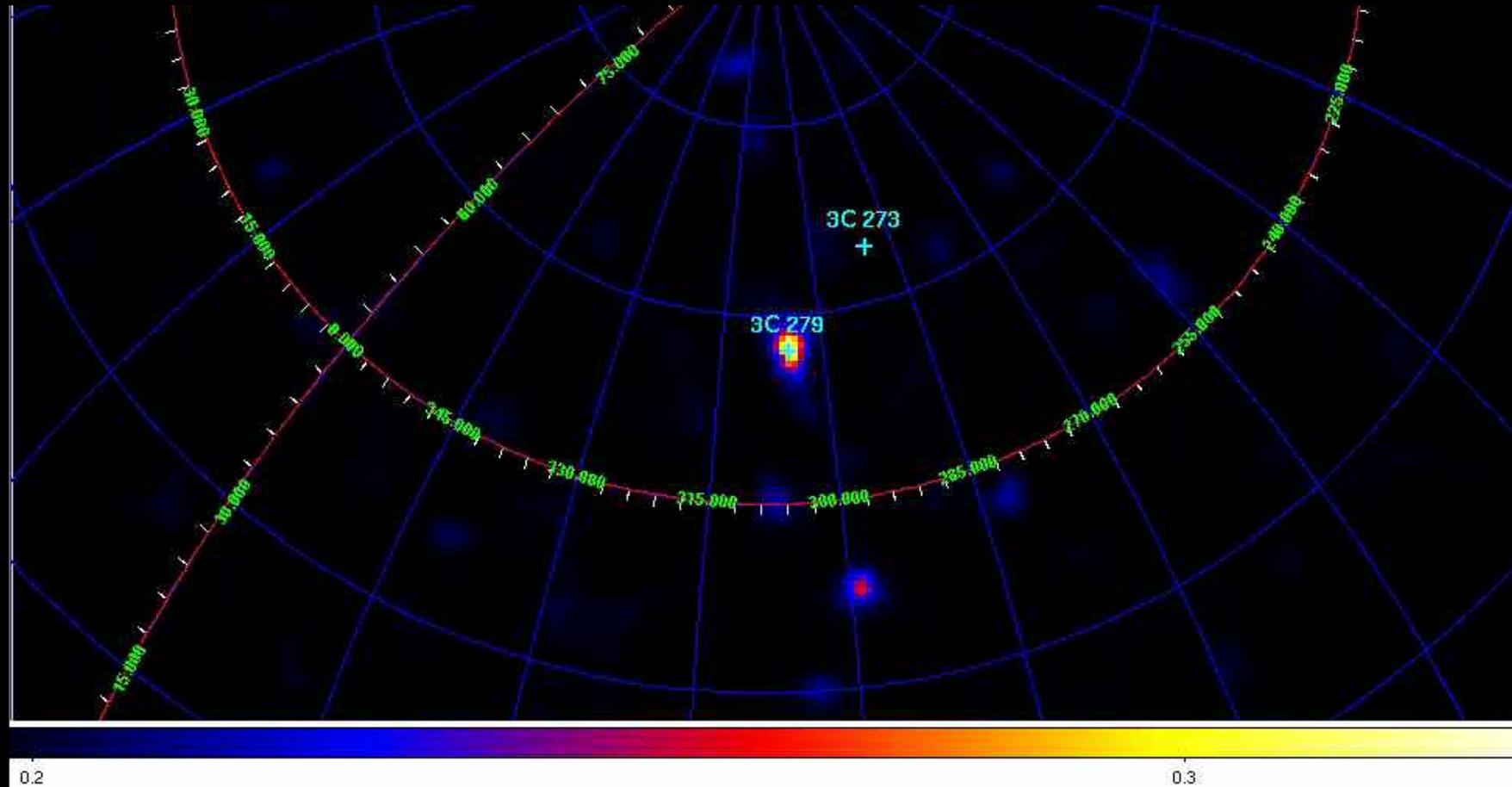


First AGILE multifrequency campaign

- **July 9-13, 2007**
- **“empty field”, in reality containing very famous quasars, Virgo region**
- **3C 273 and 3C 279 near on-axis**

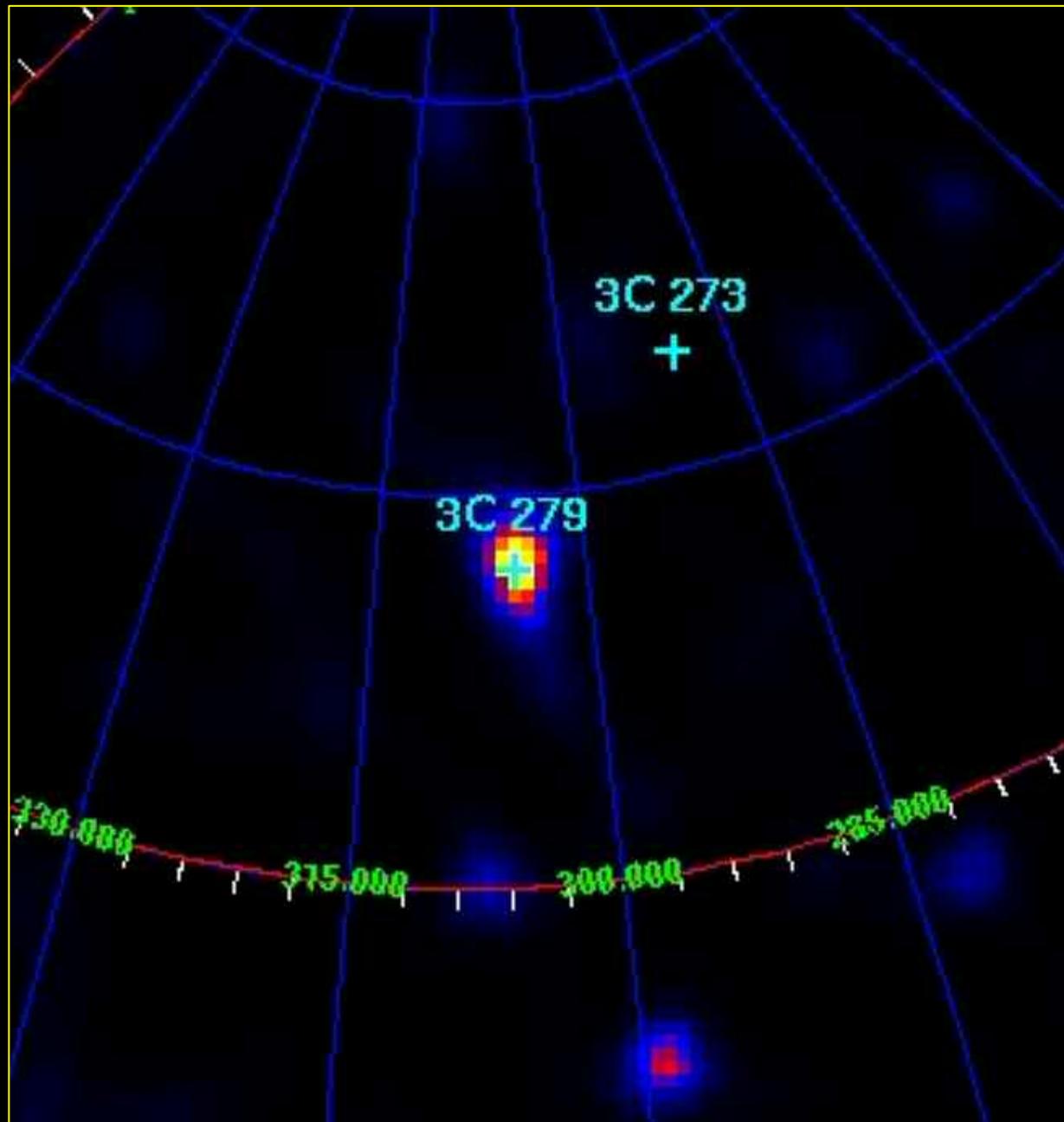
Observatory	PI, Observer or Contact	3C273	3C279	3C454.3
AGILE	AGILE Team- M. Tavani / P. Gianni	July 9-12	July 9-12	No
Chandra	Ann Wehde	July 10@21:23, 21sec	July 11@17:41, 21sec	July 11@20:38, 21sec
RXTE	Public- Ann Wehde	July 8 (x2), 10,12	July 8,10,12	No
(RXTE- unrelated private program)	(Al Marscher)	(July 7,9,11)	(July 7,9,11)	(No)
Swift	Public- Ann Wehde	XRT, UVOT grism 2 ksec/day July 7-13	XRT, UVOT filters 4 lsec/day July 8-14	XRT, UVOT filters 2 lsec July 11 only
Spitzer	Ann Wehde	July 10 @ 22:02 UT	July 11 @17:50 UT	July 11@20:55 UT
Pomona College, CA optical	Alma Look and students	Various filters July 8-13	Various filters, July 8-13	Various filters, July 8-13
Colgate University, NY optical	Tom Balonek	R band, nightly, ongoing program	R band, nightly, ongoing program	R band, nightly, ongoing program
Palomar Observatory, CA	Ann Wehde (remote)	BVRI nightly	BVRI nightly	BVRI nightly
REM Chile, optical	Gino Tosti (remote)	Nightly, ongoing program	Nightly, ongoing program	Nightly, ongoing program
SMA (requested)	Mark Garwell (remote)	unknown	unknown	unknown
GTN amateurs (requested)	Gordon Spear and Ann Wehde	unknown	unknown	unknown

AGILE GRID detection of 3C 279 ! (9-13 July, 2007)



3C 279
detected in 3.5
days at 5 sigma

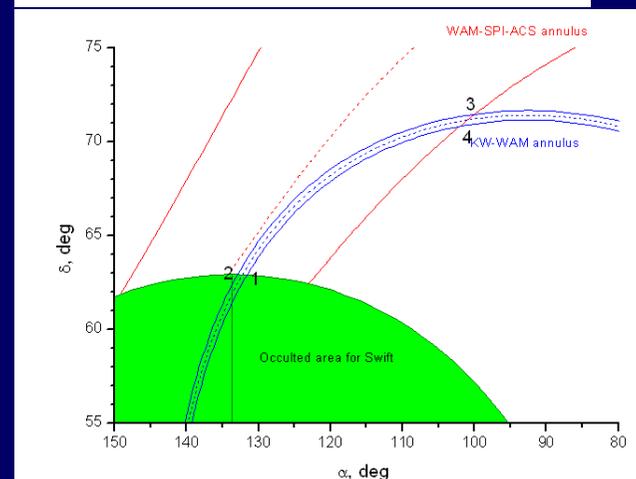
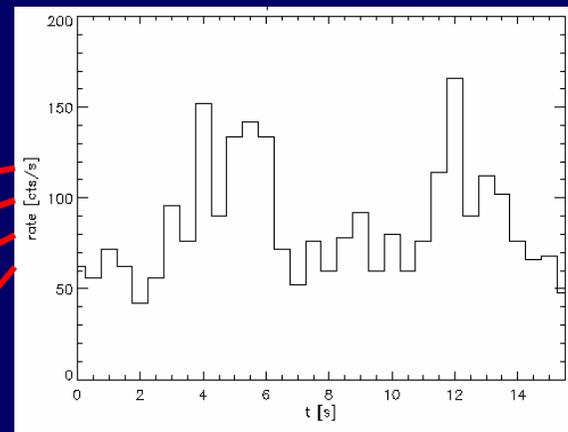
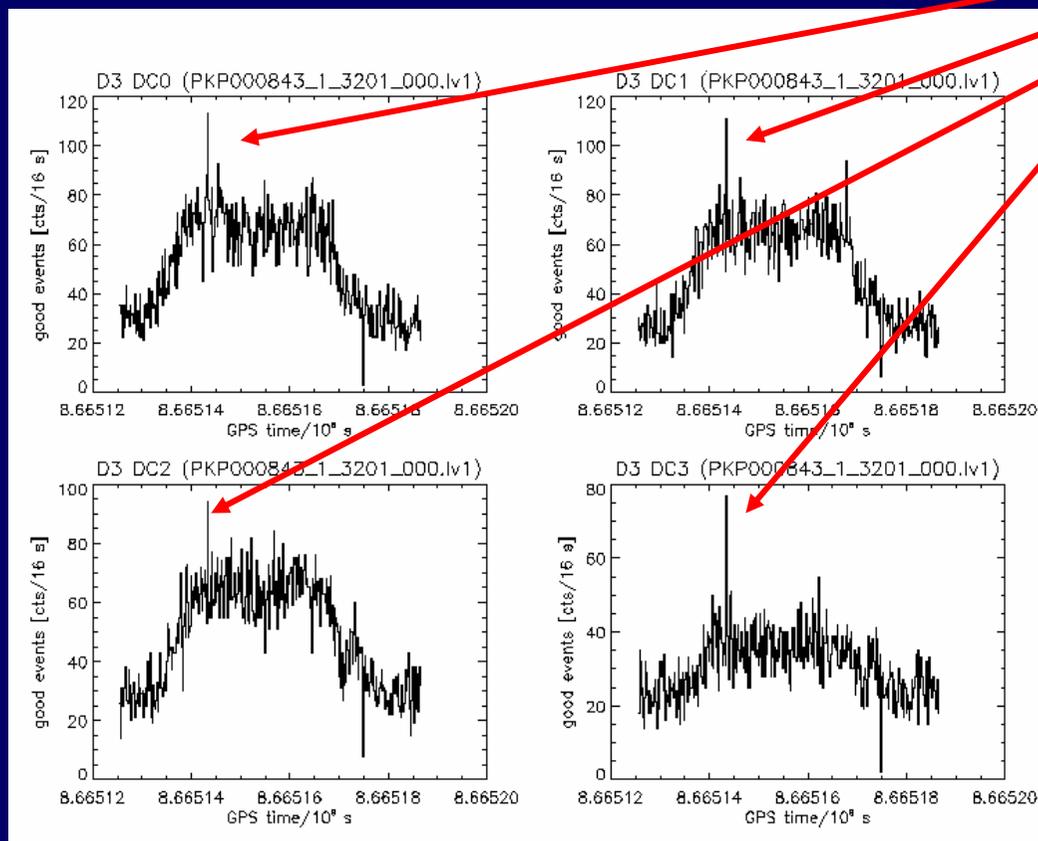
(likelihood
analysis)



First GRBs...

GRB 070622: our first GRB

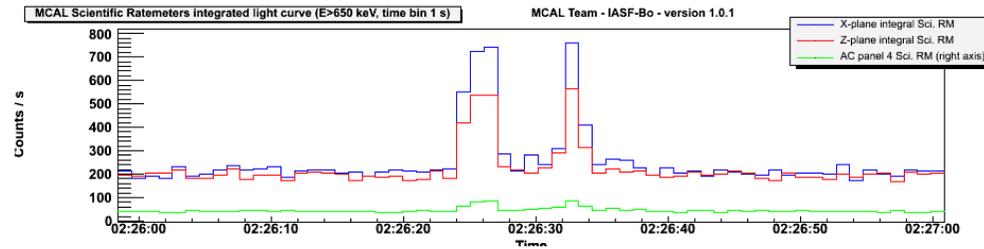
Super-AGILE D3 HK - $E_{\text{thr}} \sim 21$ keV



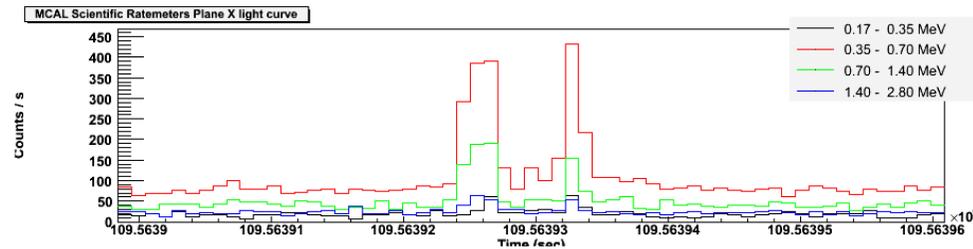
But it is out the f.o.v. !
as shown by IPN

MCAL light curves of the orbit 843 GRB

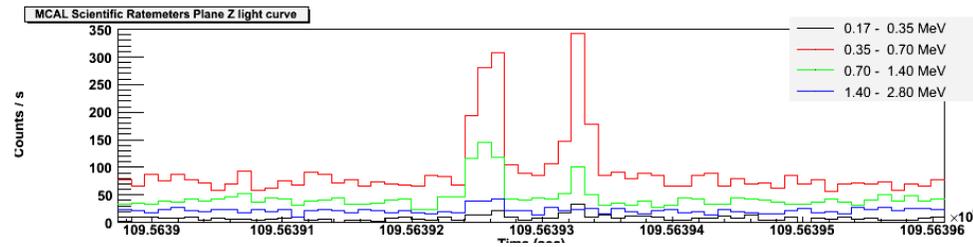
Scientific
Ratemeters light
curves, 1 sec
integration



Plane X Scientific
Ratemeters light
curves in different
energy bands



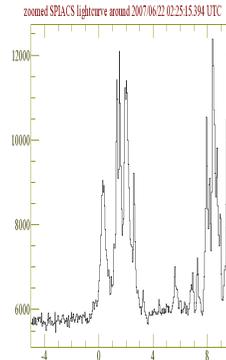
Plane Z Scientific
Ratemeters light
curves in different
energy bands



MCAL burst mode can produce light curves with a time detail as INTEGRAL SPI ACS

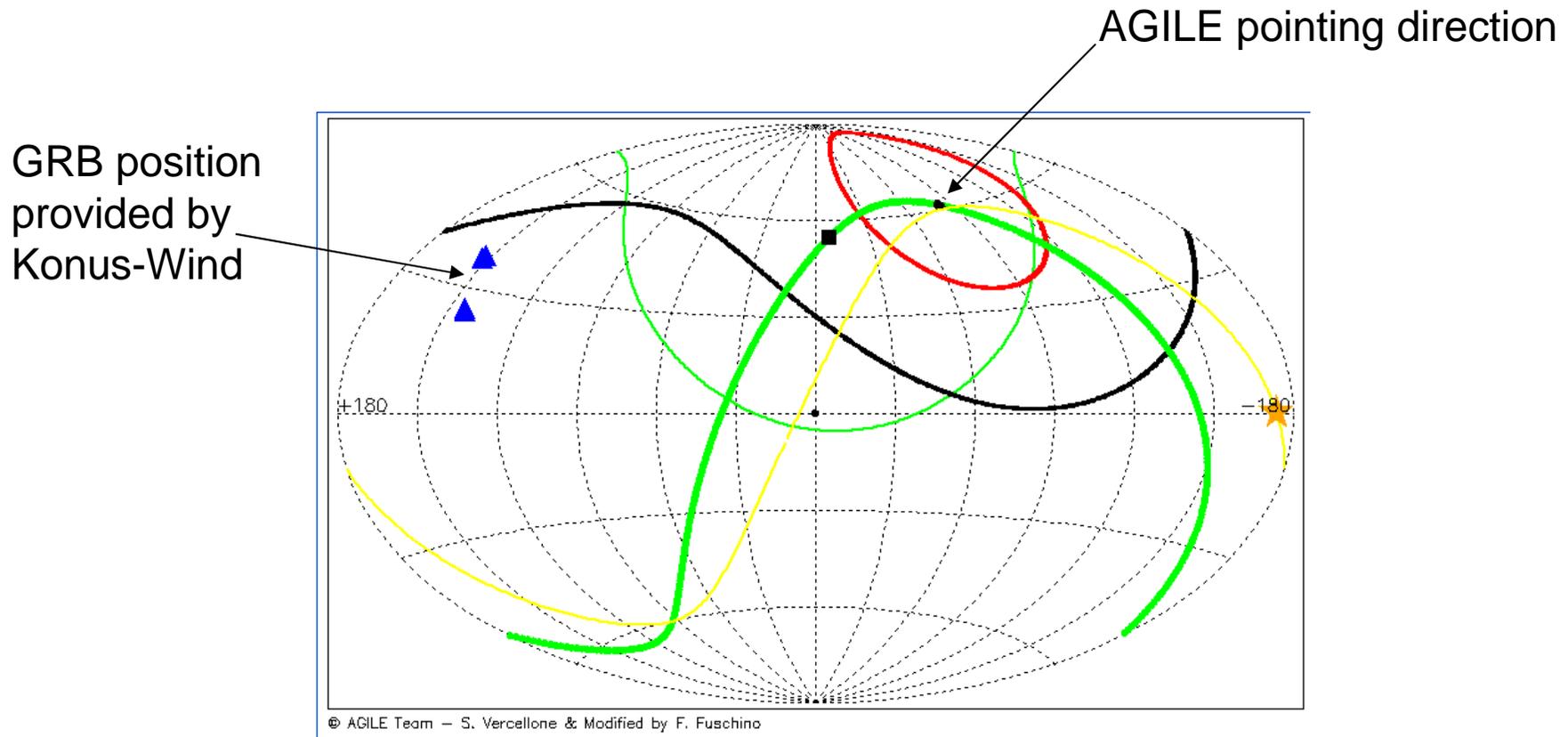
BUT

with an extended energy band



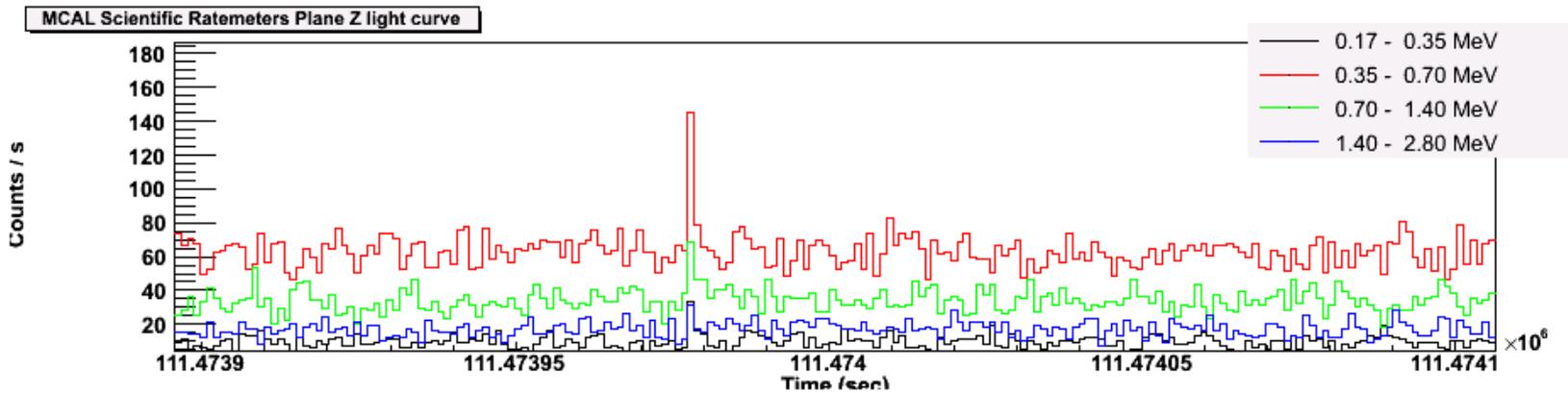
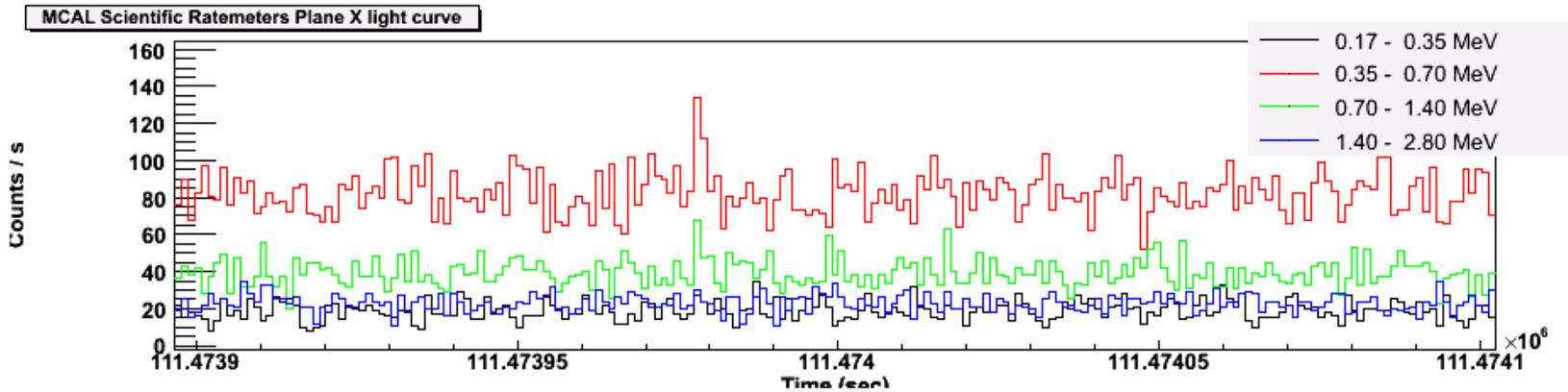
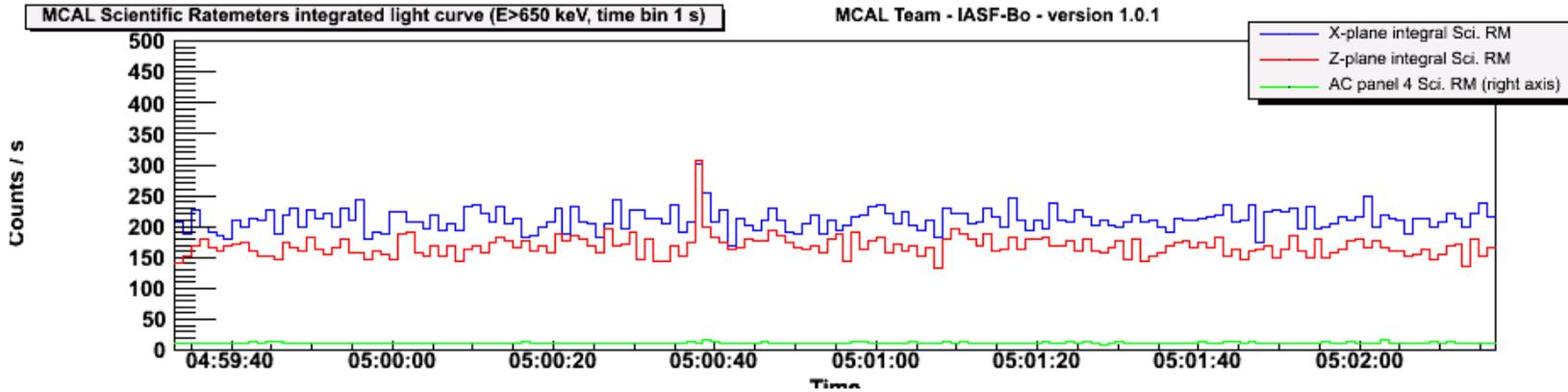
**Agreement with the INTEGRAL
SPI ACS burst detection**

GRB 070622 (June 22, 2007) turns out to be at about 80 degrees off axis !

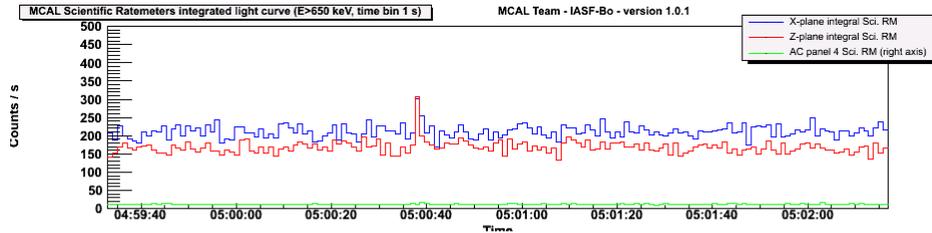


Burst detected at about 80° off-axis

MCAL detection of GRB 070714b

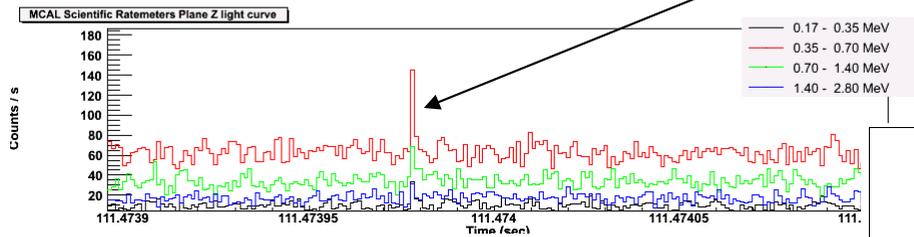
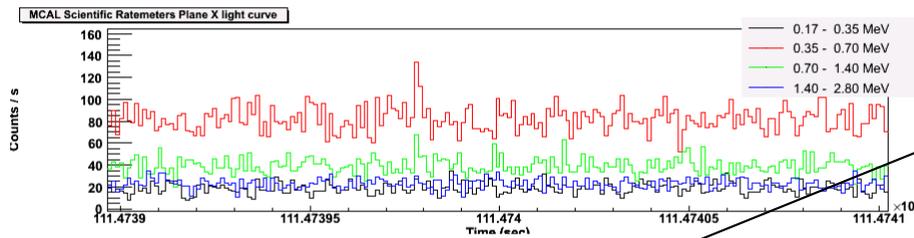


AGILE MCAL detection of GRB070714b

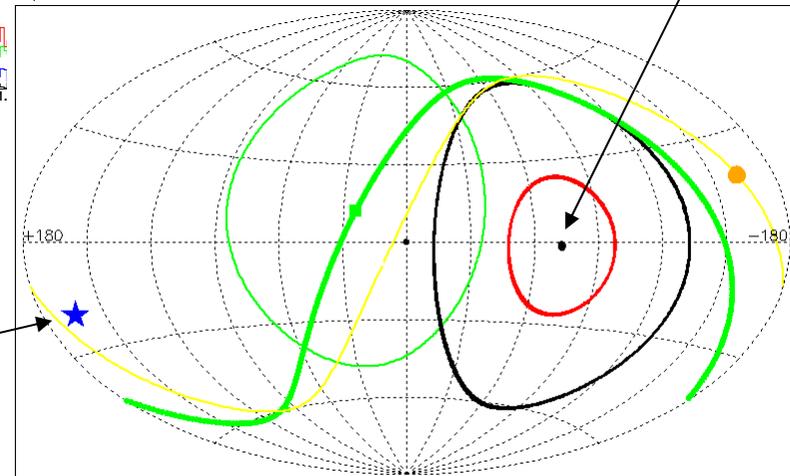


Short burst (<3 sec)

MCAL Scientific Ratemeters:
>7 σ signal on plane Z low energy band:

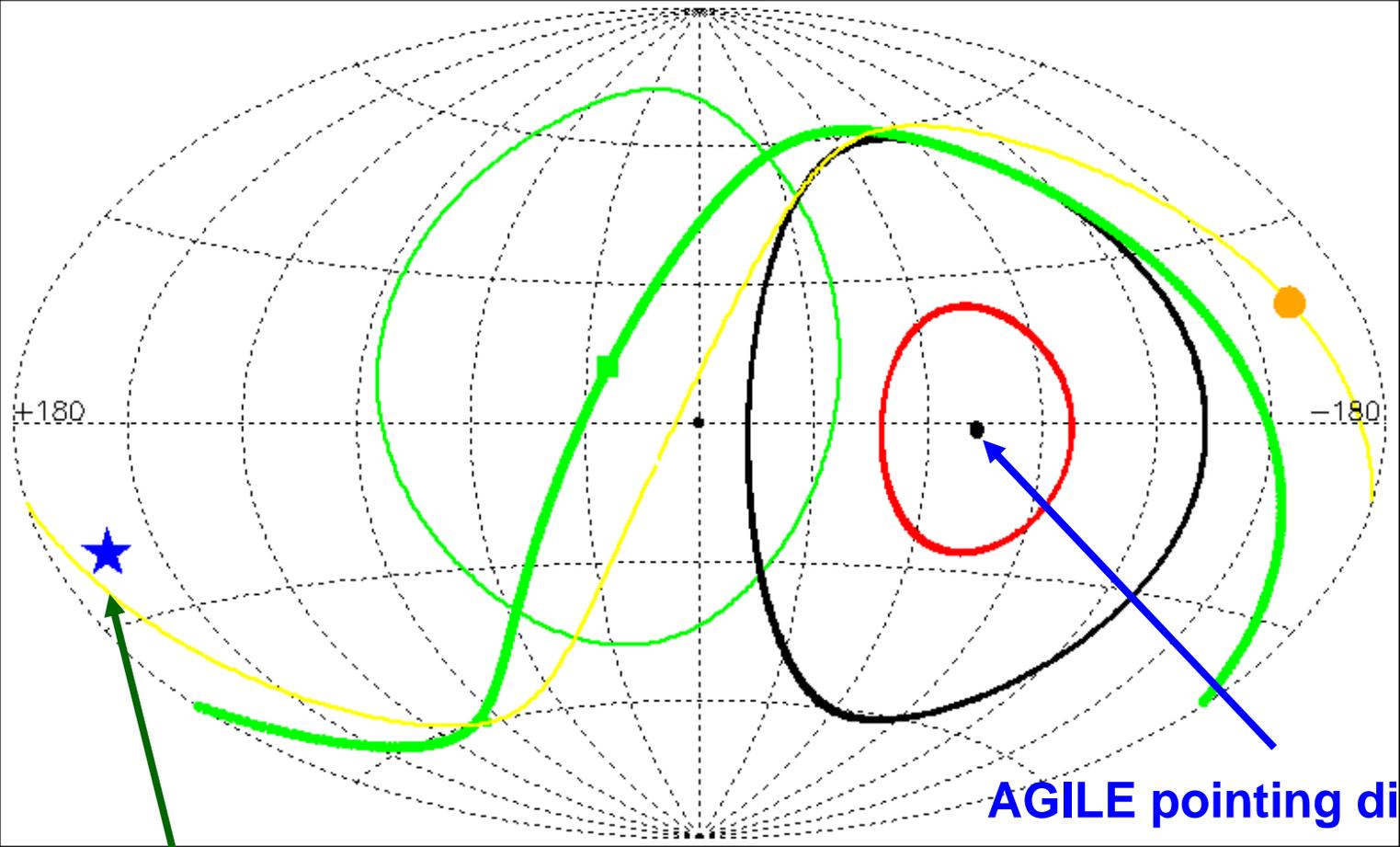


AGILE pointing direction



GRB direction provided by **SWIFT**:
>140° off-axis!

MCAL detection of GRB 070714b

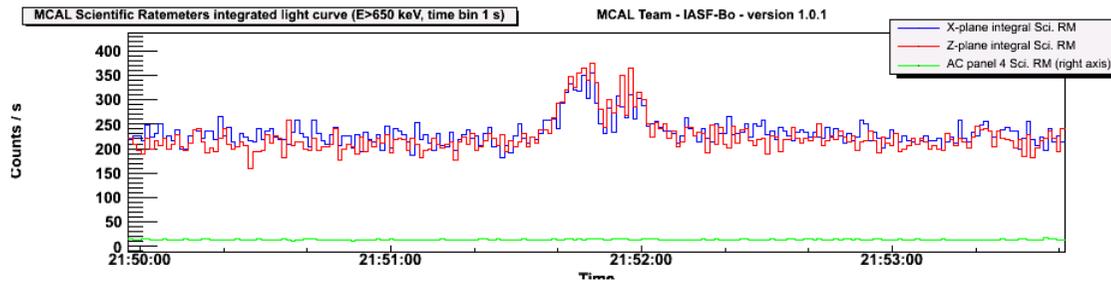


© AGILE Team – S. Vercellone & Modified by F. Fuschino

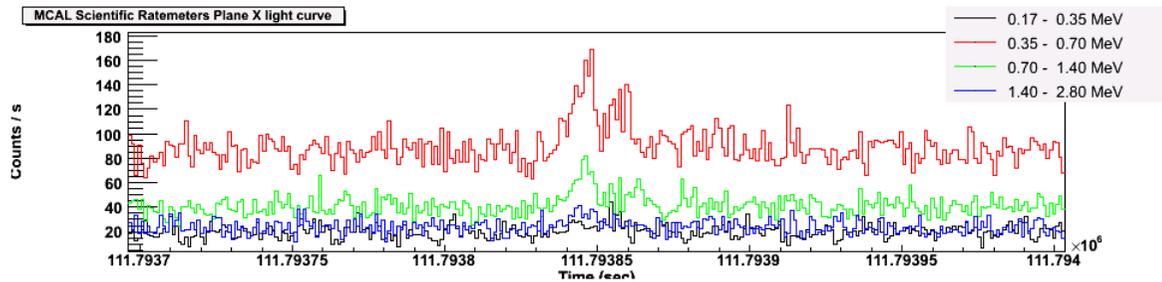
GRB direction provided by SWIFT: >140° off-axis!

MCAL detection of GRB070717

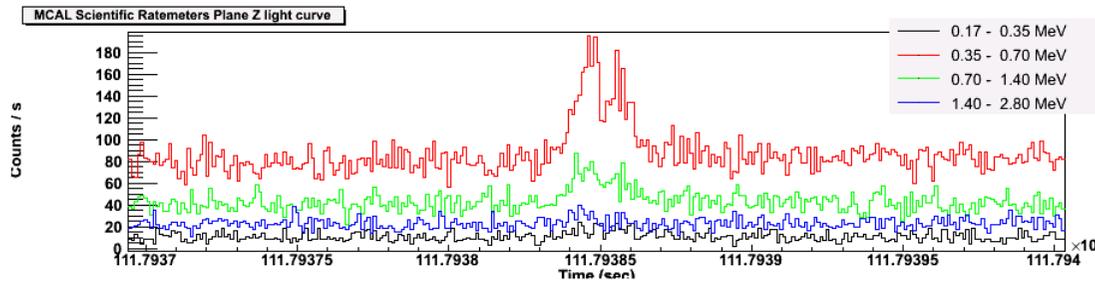
Scientific
Ratemeters light
curves, 1 sec
integration



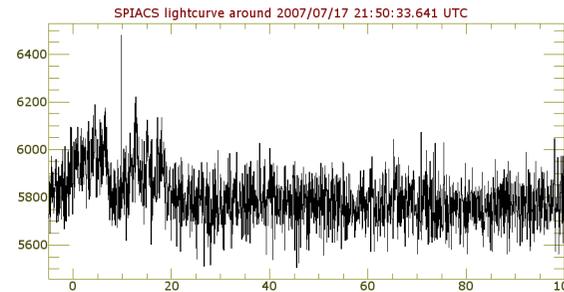
Plane X Scientific
Ratemeters light
curves in different
energy bands



Plane Z Scientific
Ratemeters light
curves in different
energy bands



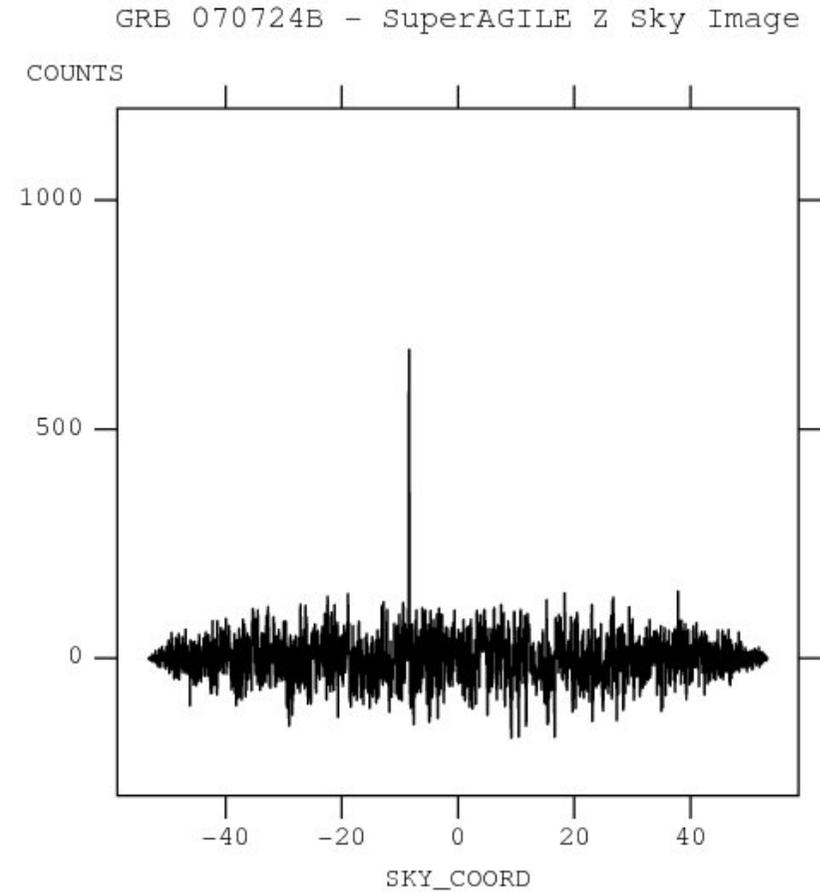
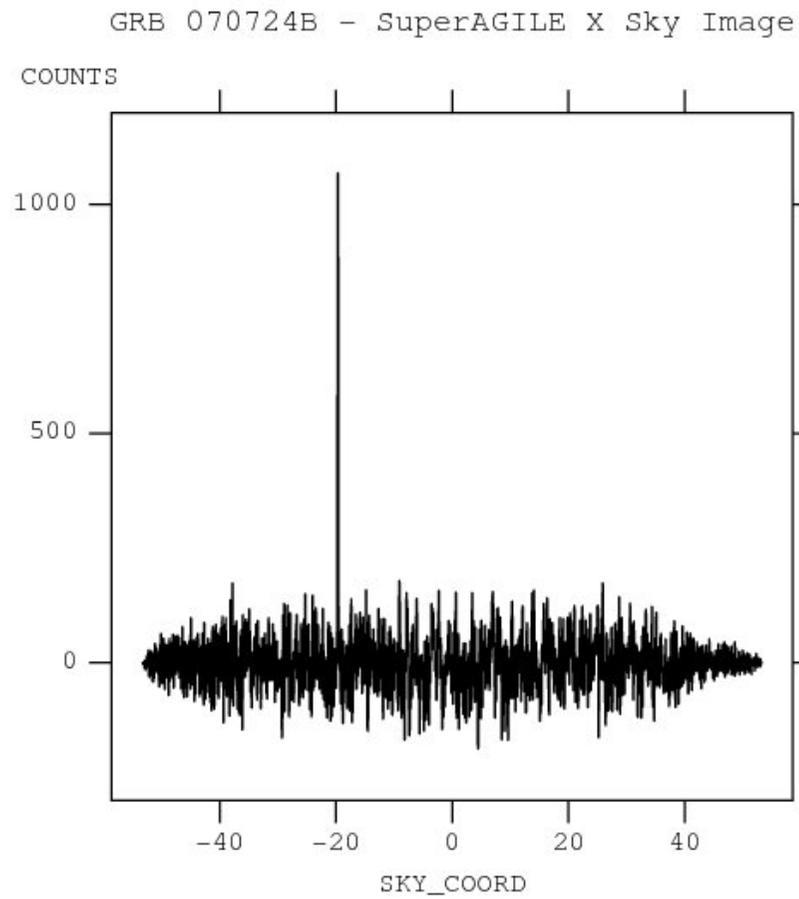
also detected by **INTEGRAL** →
SPI ACS



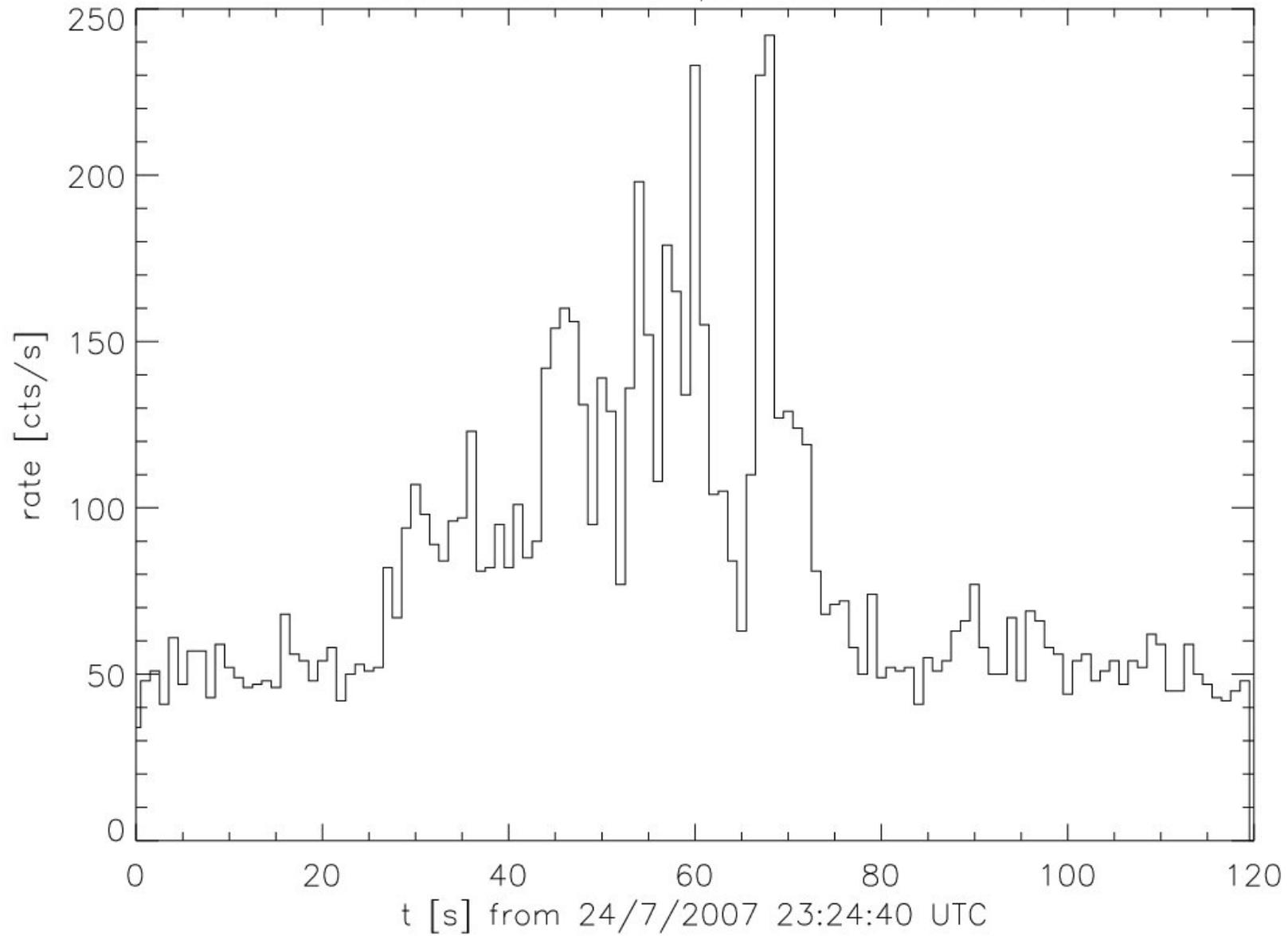
GRB 070724B: first burst in the AGILE FOV

- **Promptly detected by Super-A
[GCN Circ. n. 6668, Feroci et al.]**
- **No signal in the MCAL and the Tracker
[GCN Circ. n. 6670, Chen et al.]**
- **“No-high-energy burst” as confirmed by
Konus-Wind and Suzako**

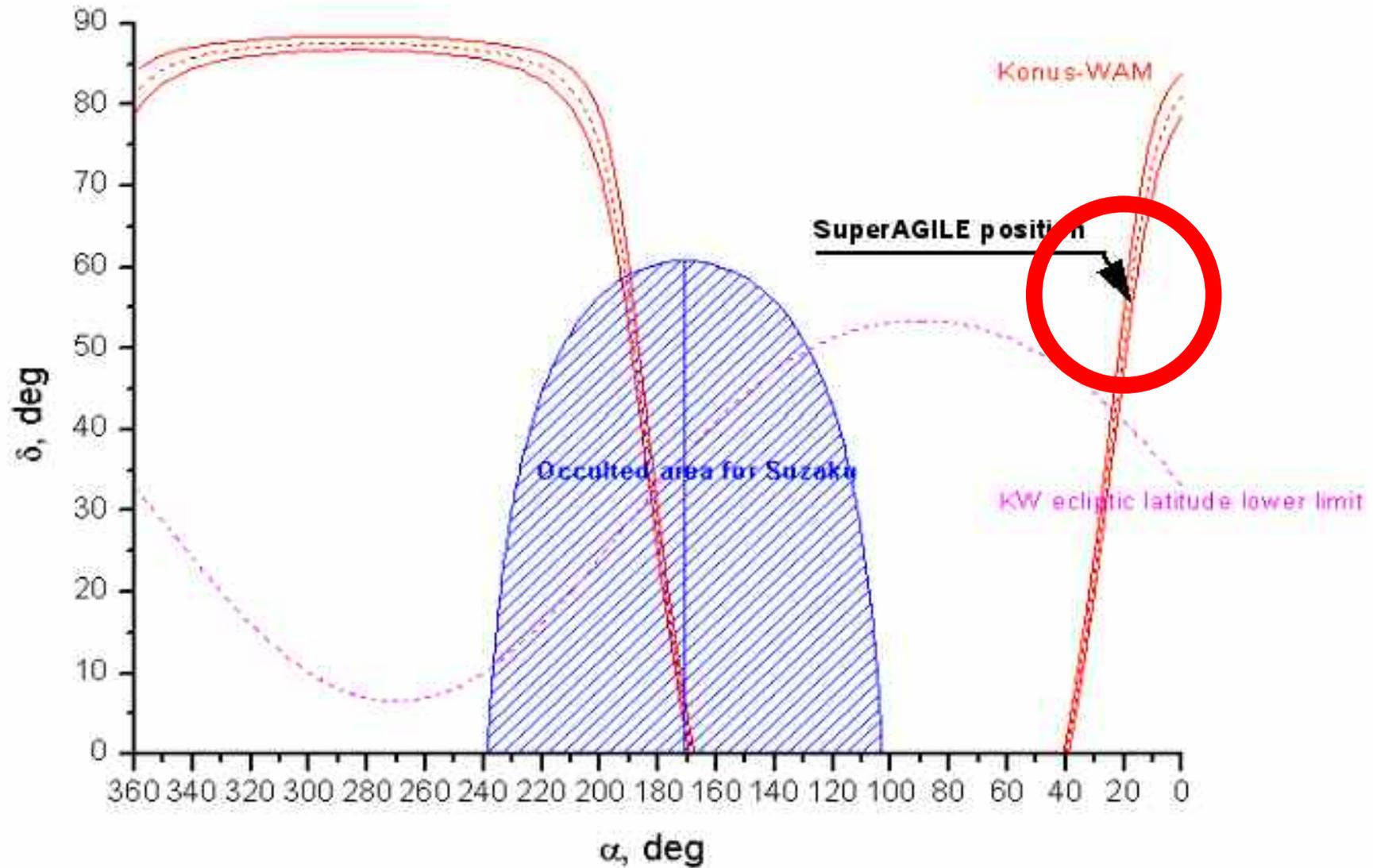
Super-AGILE X-ray sky image of GRB 070724B (18-60 keV)



Super-AGILE X-ray lightcurve of GRB 070724B (18-60 keV)



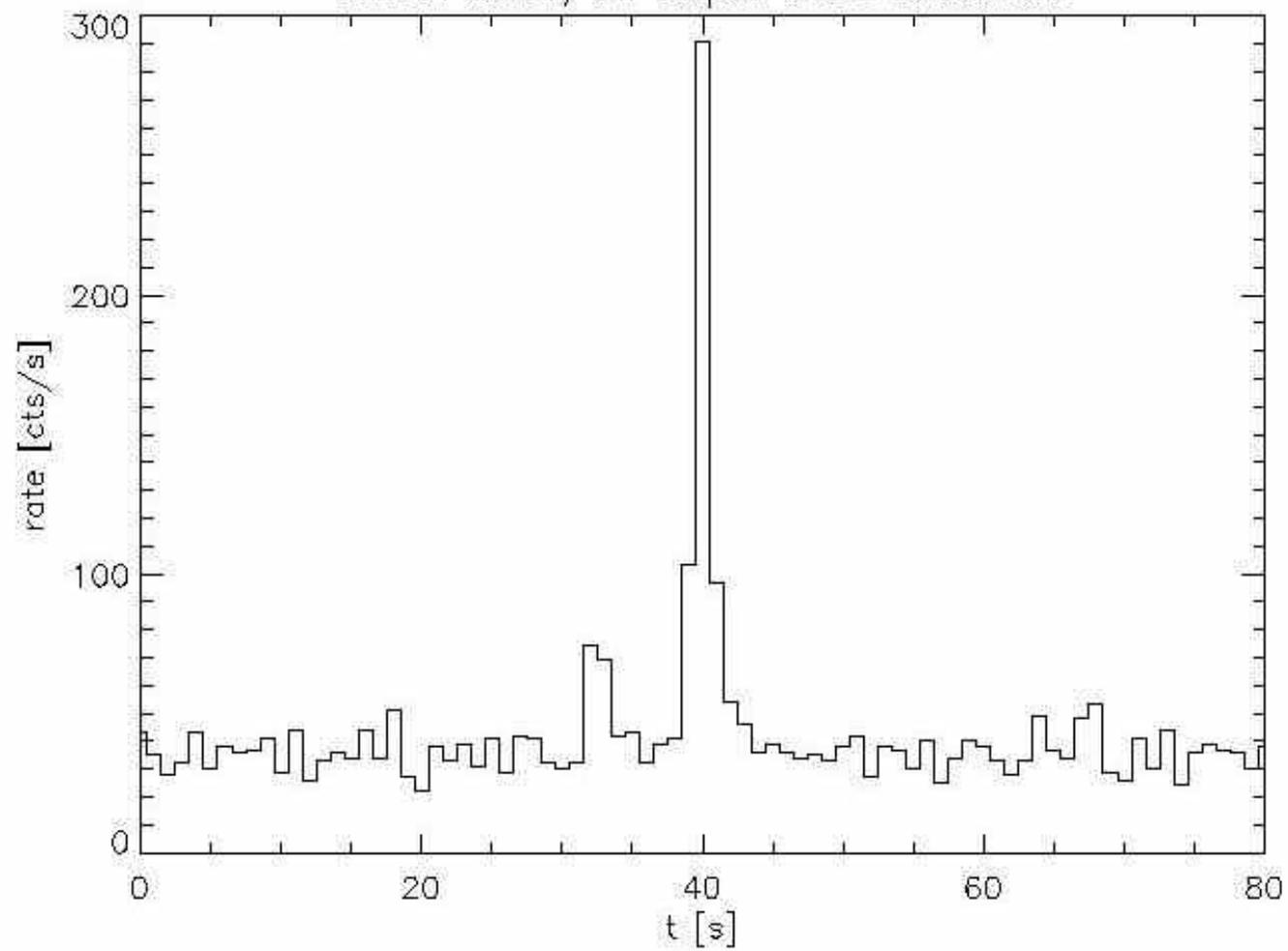
Super-A position consistent with IPN (figure courtesy of V. Pal'shin and IPN Team)



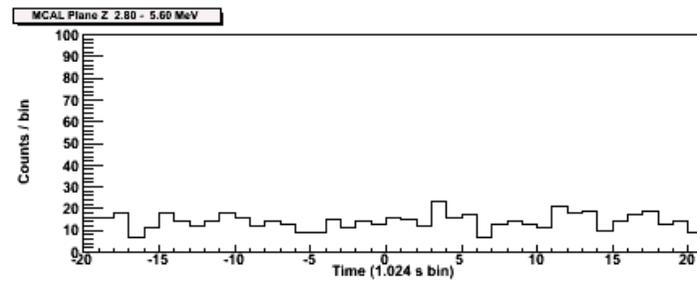
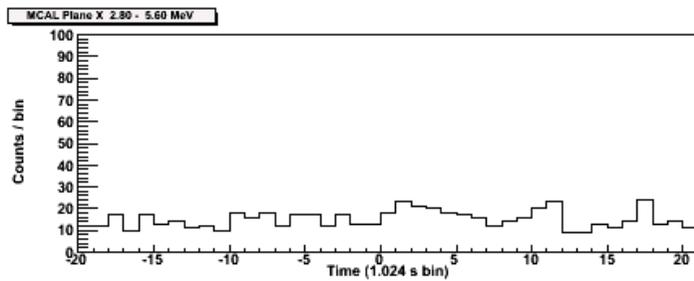
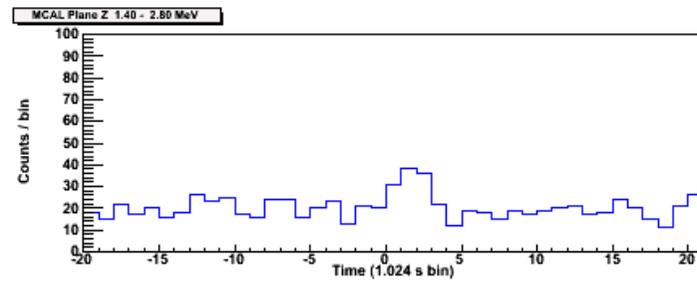
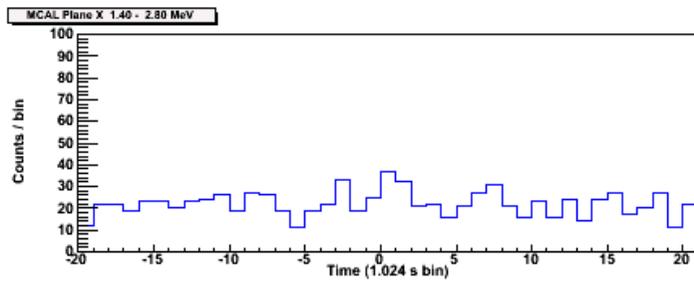
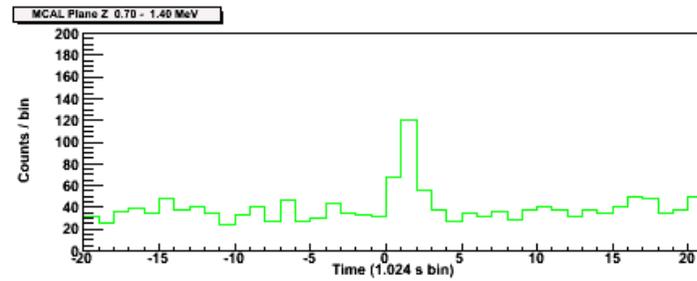
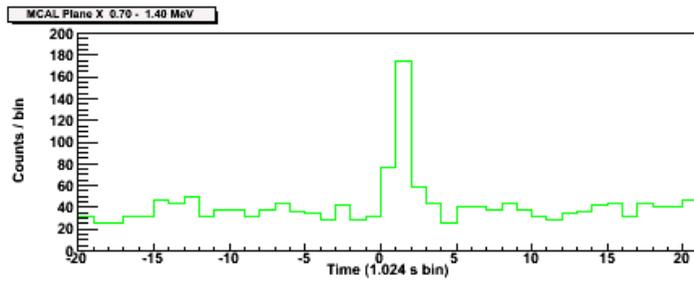
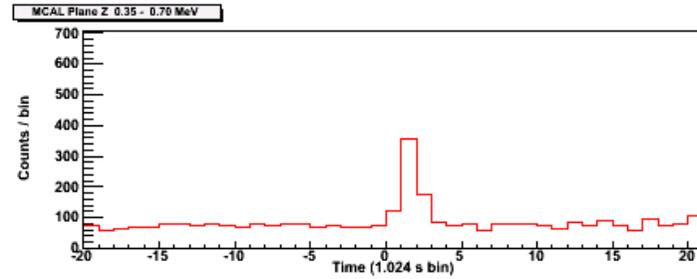
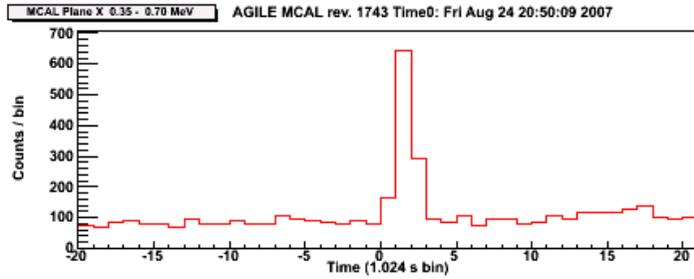
GRB 070824: burst at $\sim 50^\circ$ off axis

- detected by Super-A in 1-coordinate
- strong signal in the MCAL
- marginally detected by the Tracker near the Earth's limb

GRB070824, all SuperAGILE detectors

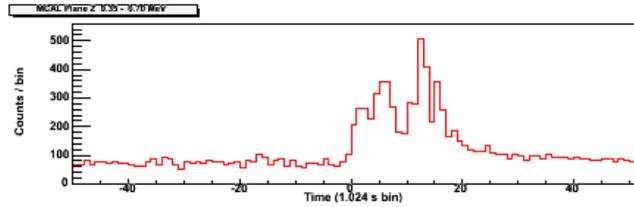
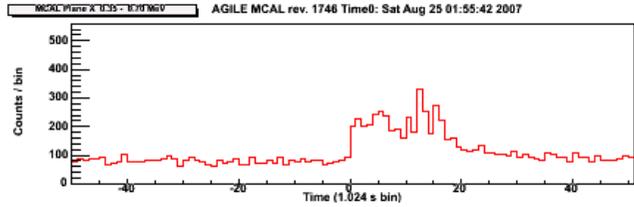


GRB 070824

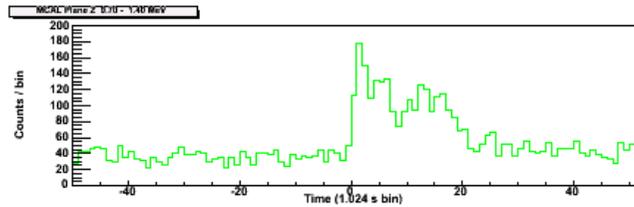
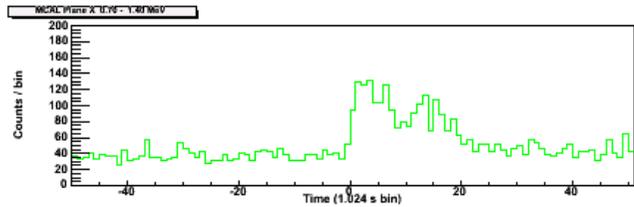


GRB 070825: burst at $\sim 80^\circ$ off-axis

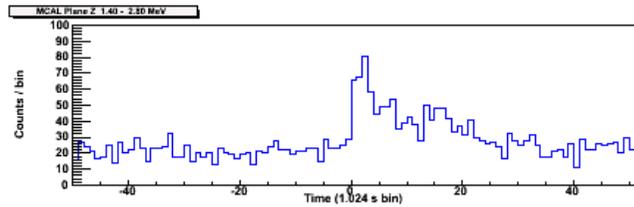
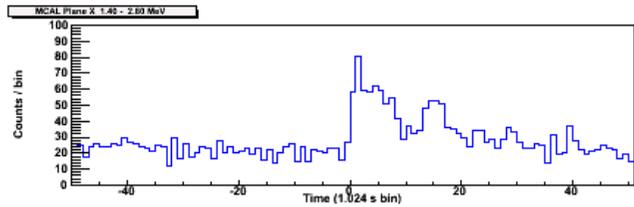
- no detection by Super-A
- strong signal in the MCAL
(up to 20 MeV)
- event rate increase in the Tracker



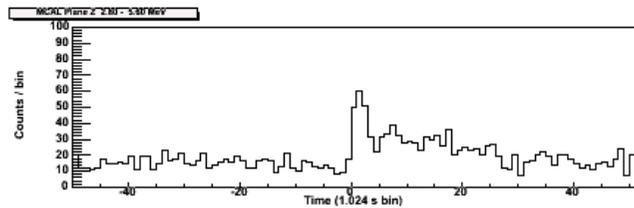
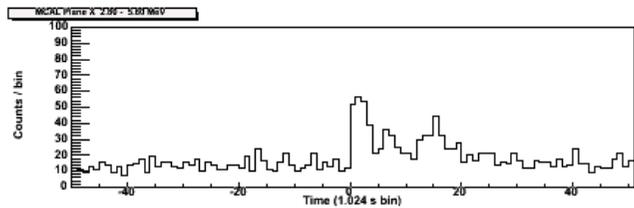
0.35-0.7 MeV



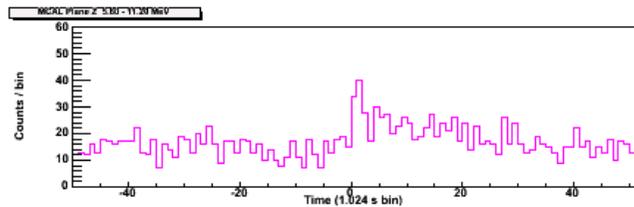
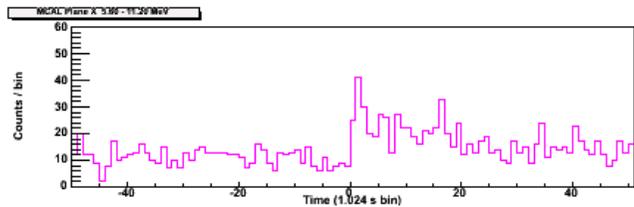
0.7 - 1.4 MeV



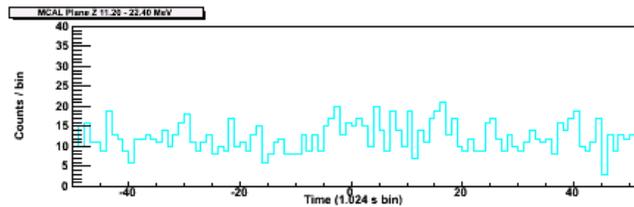
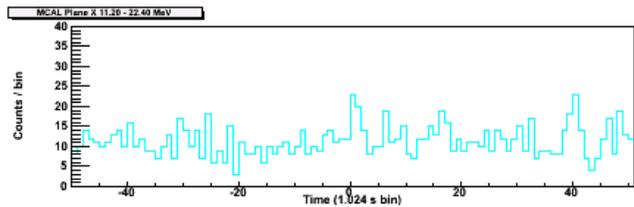
1.4 - 2.5 MeV



2.5 - 5.5 MeV



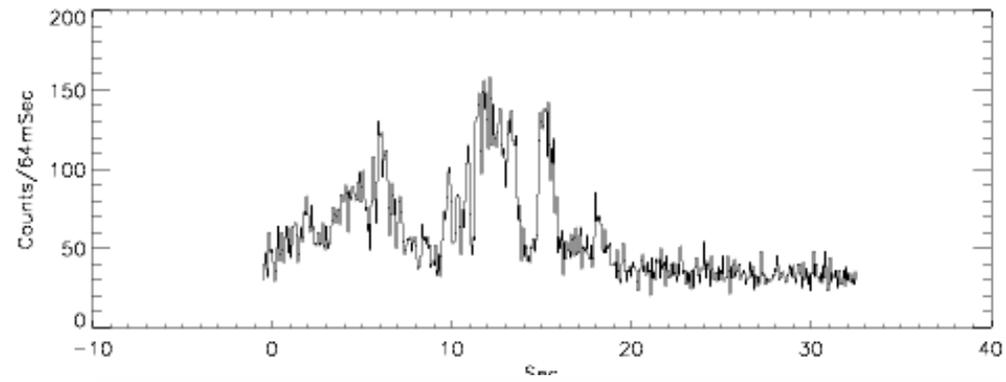
5.5 - 11 MeV



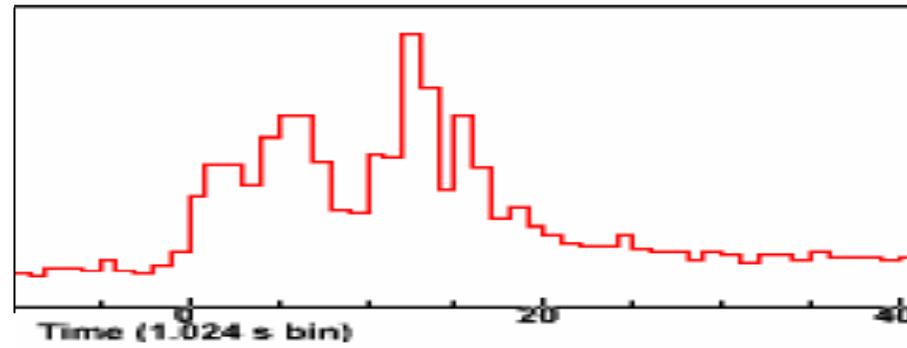
11 - 22 MeV

GCN/KONUS
GRB20070825 01:55:42.624 UT

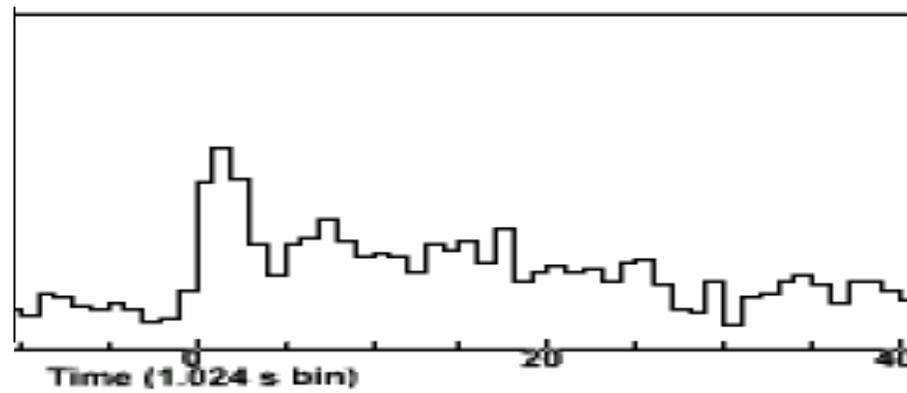
50-200keV

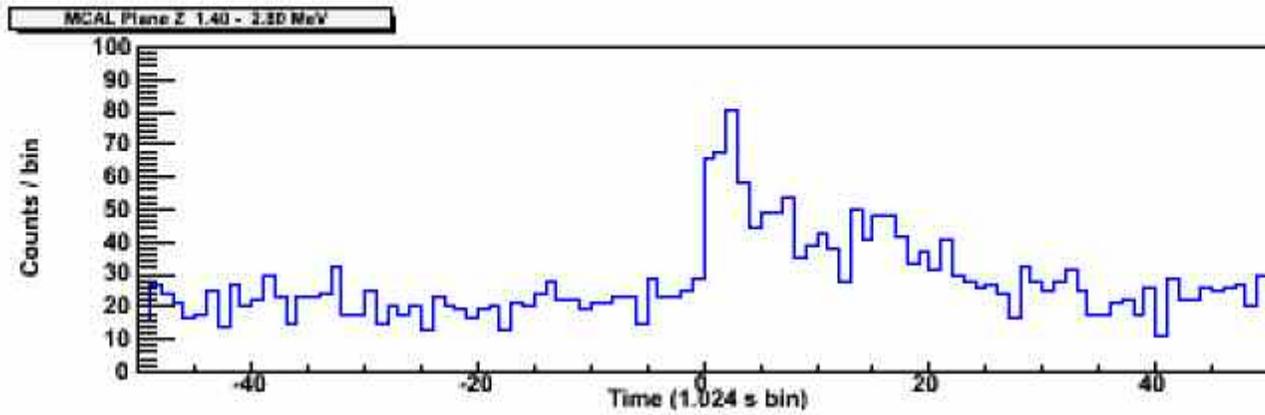


0.35-0.7 MeV

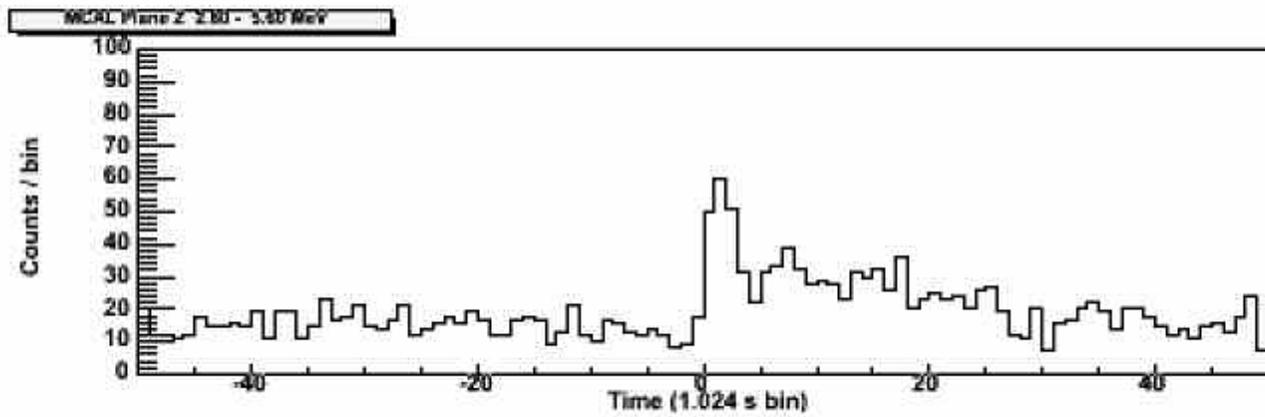


2.5 - 5.5 MeV

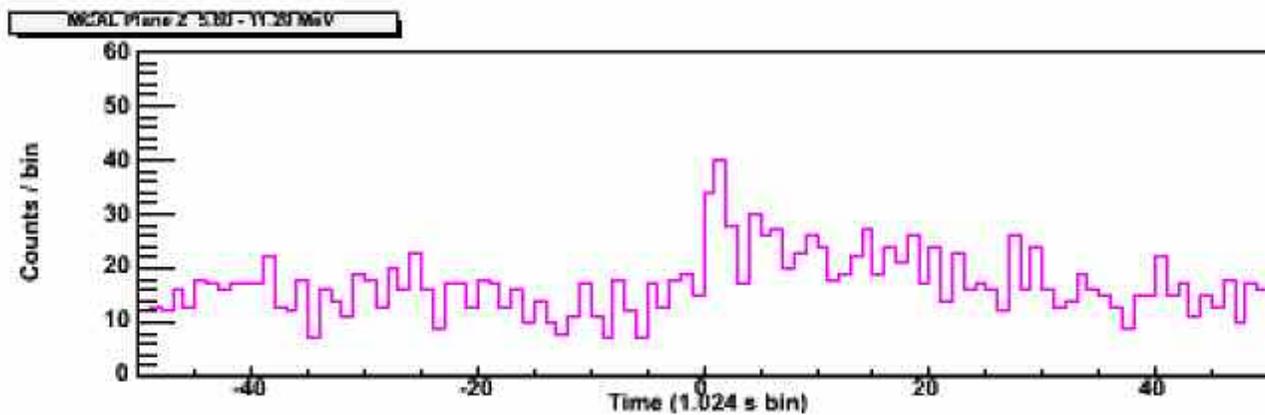




1.4 - 2.5 MeV

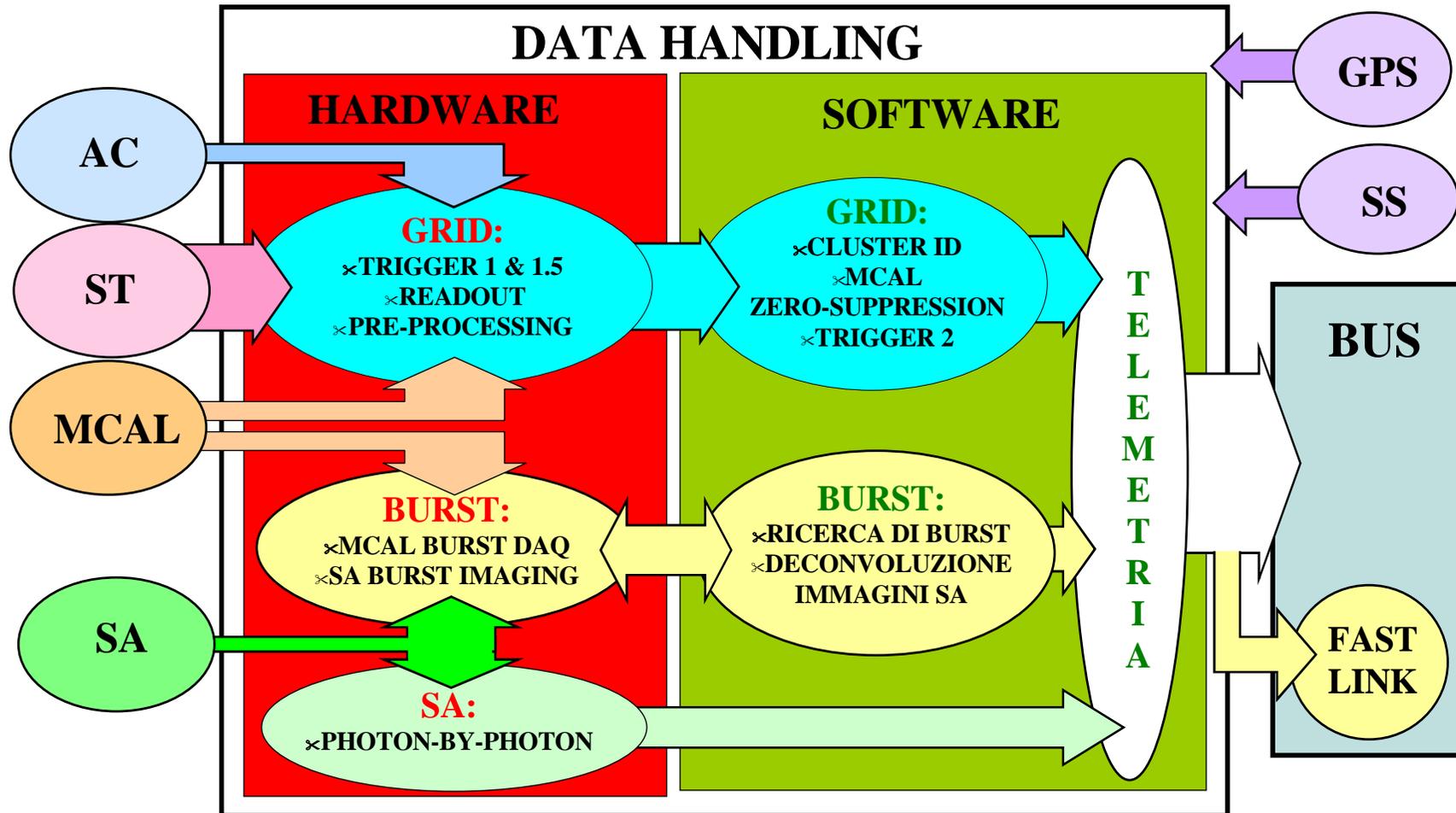


2.5 - 5.5 MeV



5.5 - 11 MeV

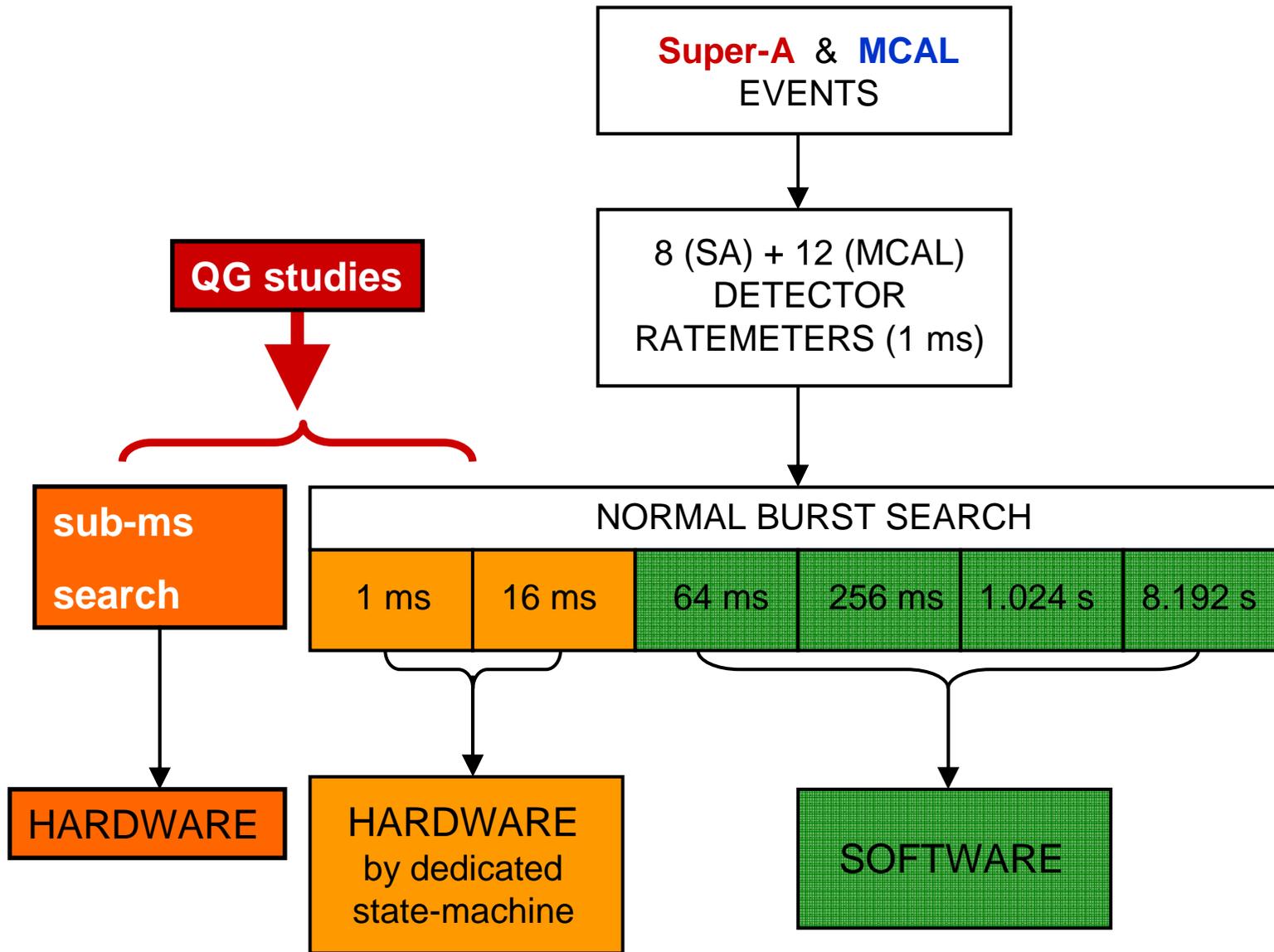
AGILE ON-BOARD DATA PROCESSING & GRB SEARCH



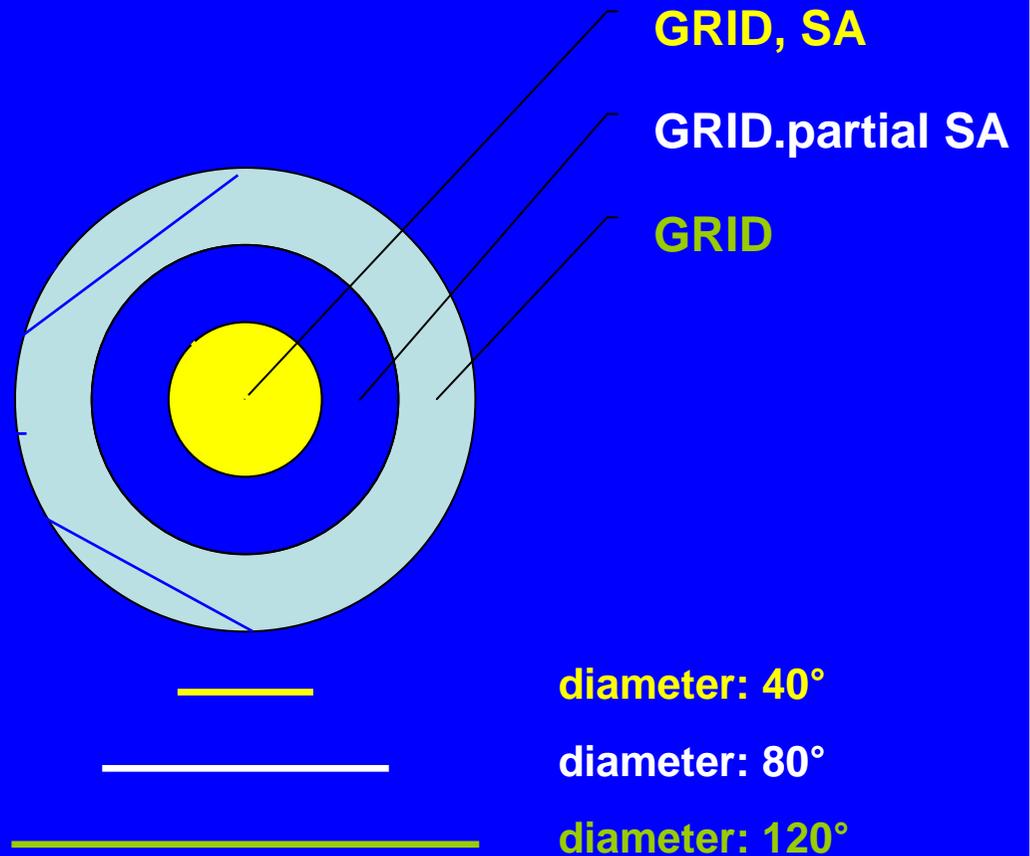
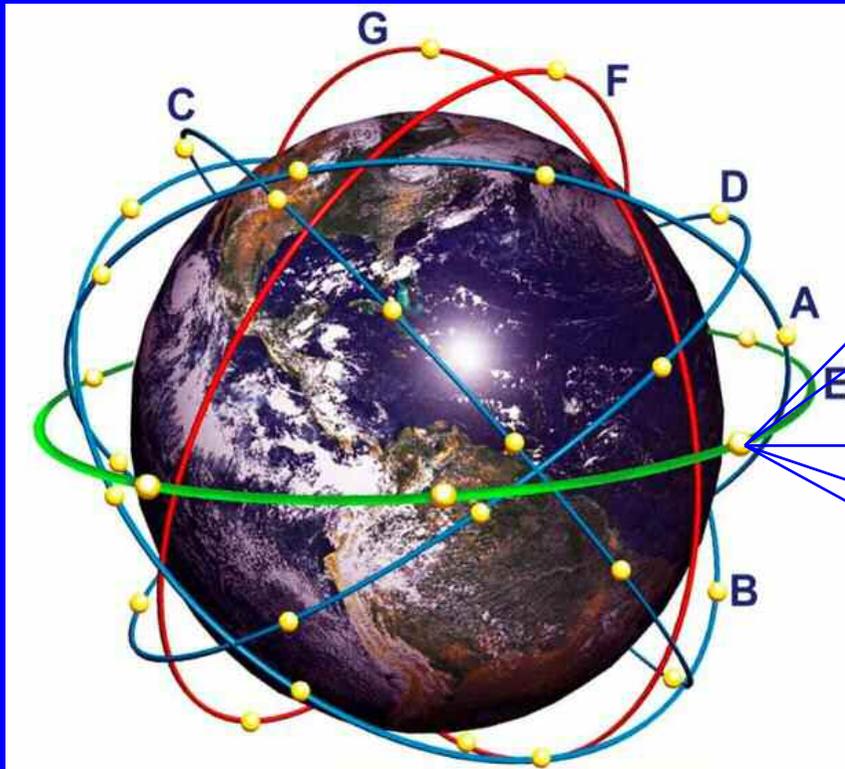
Silicon Tracker:	36844 canali
Super-AGILE:	6144 canali
Mini-Calorimetro:	60 canali
Anticoincidenza:	16 canali

OBT (rispetto all`UTC): $\Delta t < 2\mu s$
Marcatura temporale – GRID: $\Delta t < 2\mu s$
Marcatura temporale – SA, MCAL: $\Delta t < 5\mu s$
Ricostruzione d`assetto: ~ 1 arcmin.

AGILE GRB ON-BOARD SEARCH PROCEDURE



Alerts for GRB and other transients: **AGILE Fast Link (ORBCOMM)**



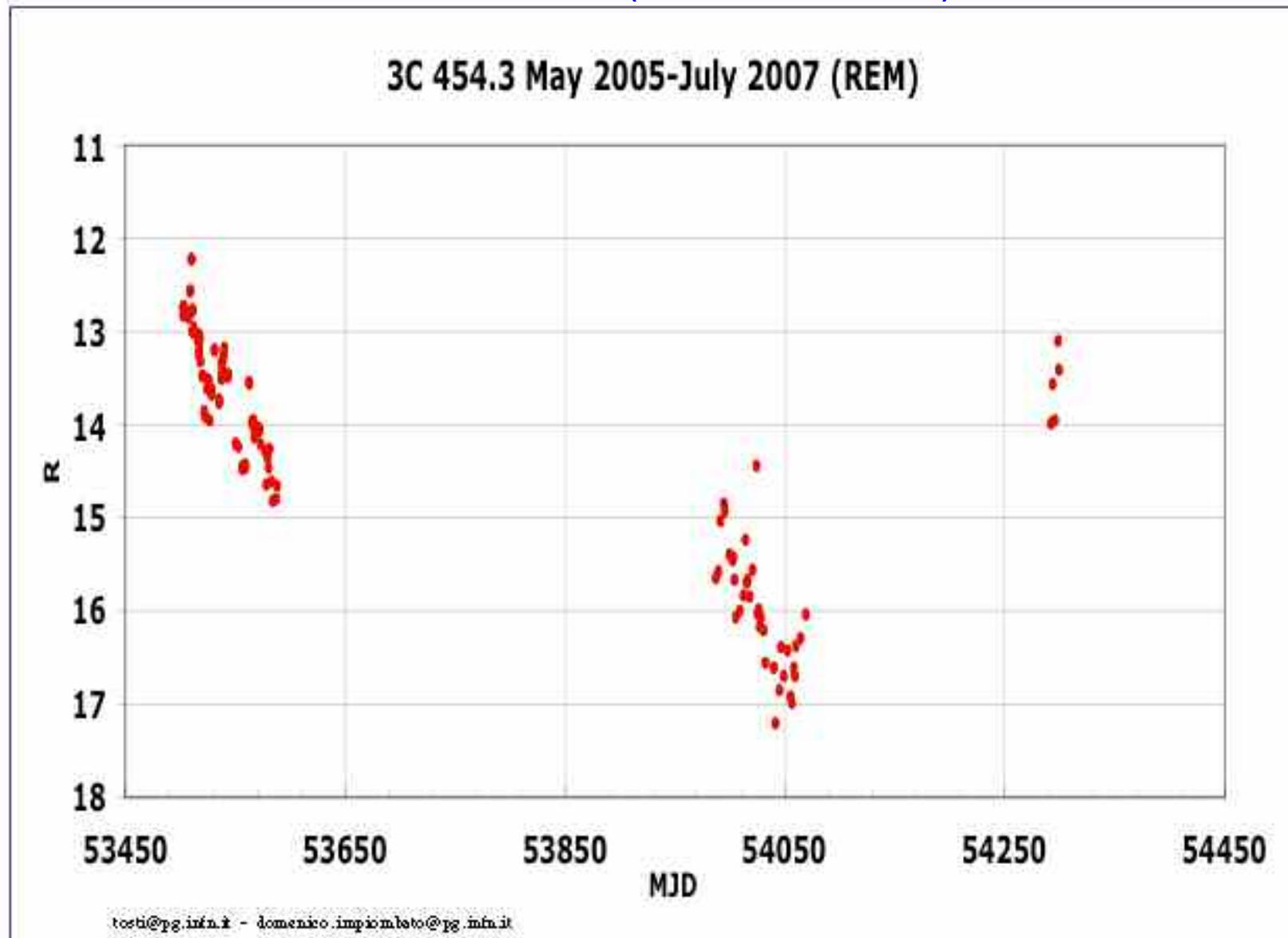
AGILE detects the strongest gamma-ray flare from 4C 454.3

- **AGILE repointing following the optical flaring alerts (July 19-20)**
- **Start: Jul. 24, 4:30 pm**
- **End: Jul. 30, 12:00am**
- **Early detection already after the first orbits**
- **July 26, ~ 5 sigma.**
- **July 27, further tests, detection firmly established, Astron.Telegram n. 1160.**
- **Aug. 2, total period significance: 10 sigma, new Astron. Telegram n. 1167.**

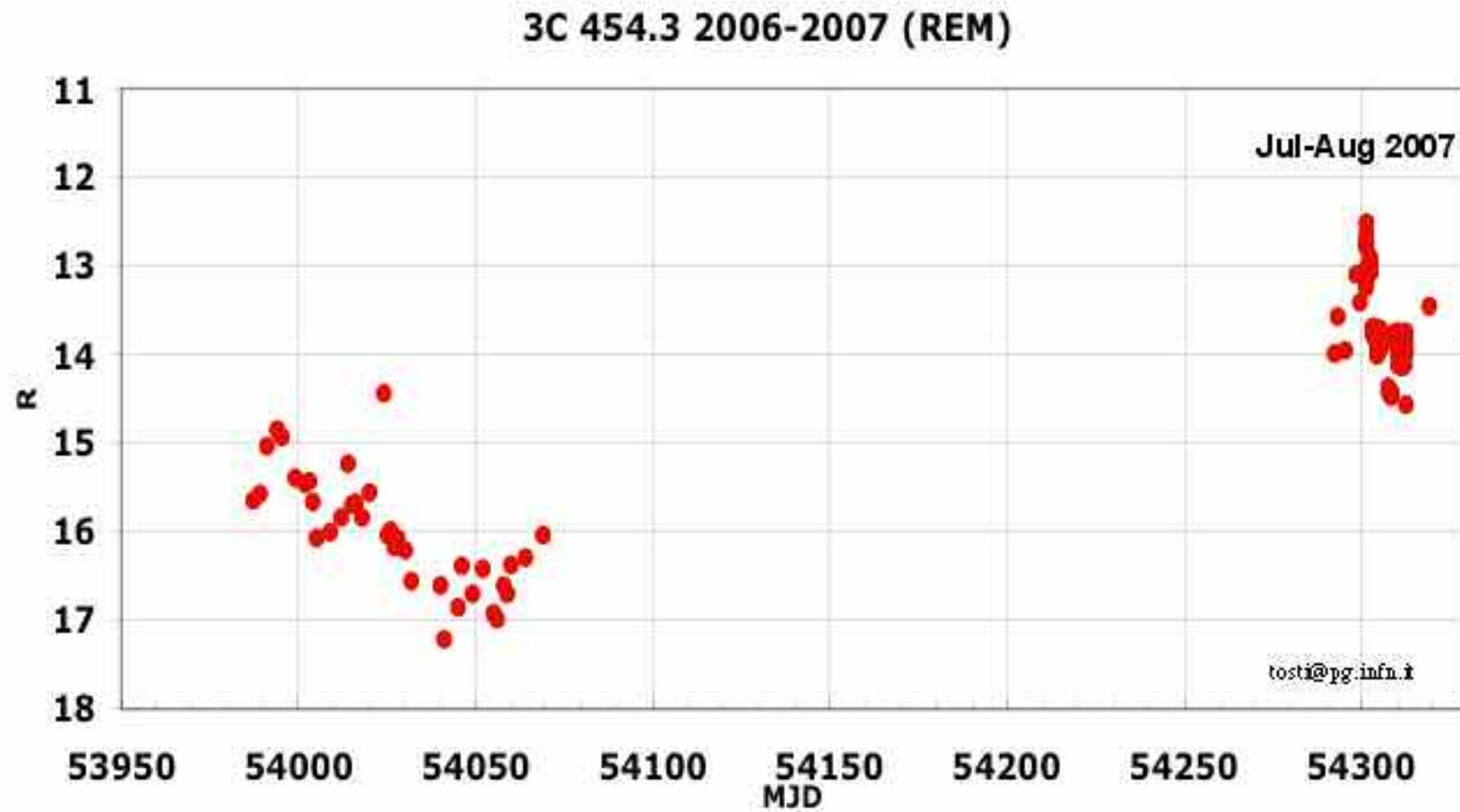
**“blink...
and you will miss it...”**

???

REM data (G. Tosti et al.)

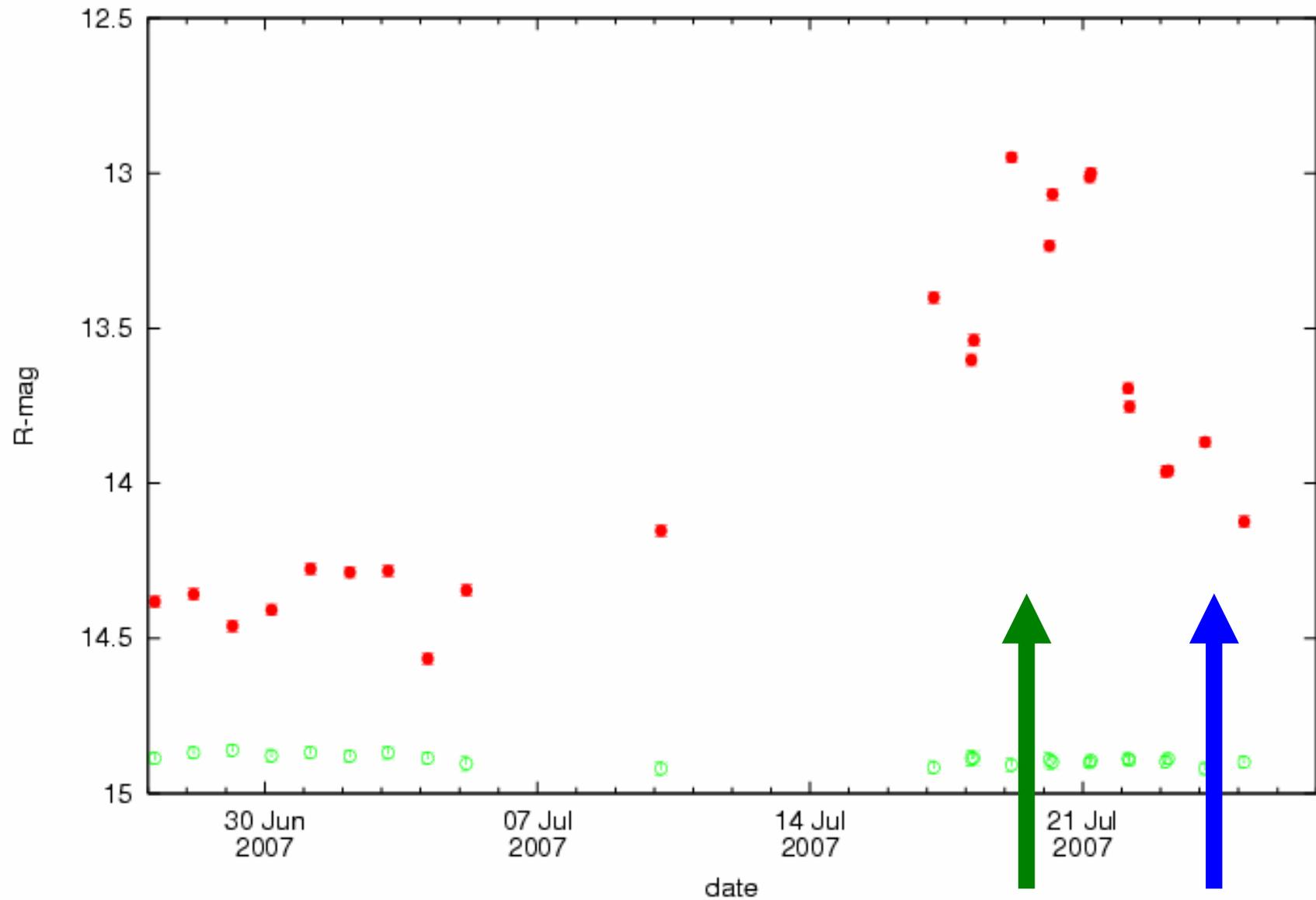


REM data (G. Tosti et al.)



Tuorla Obs. data

3C_454.3



AGILE repointing request

repointing

AGILE Mission Board

PI: M. Tavani (Chair)

Co-PI: G. Barbiellini

ASI Representative: P. Giommi

ASI Representative: S. Colafrancesco

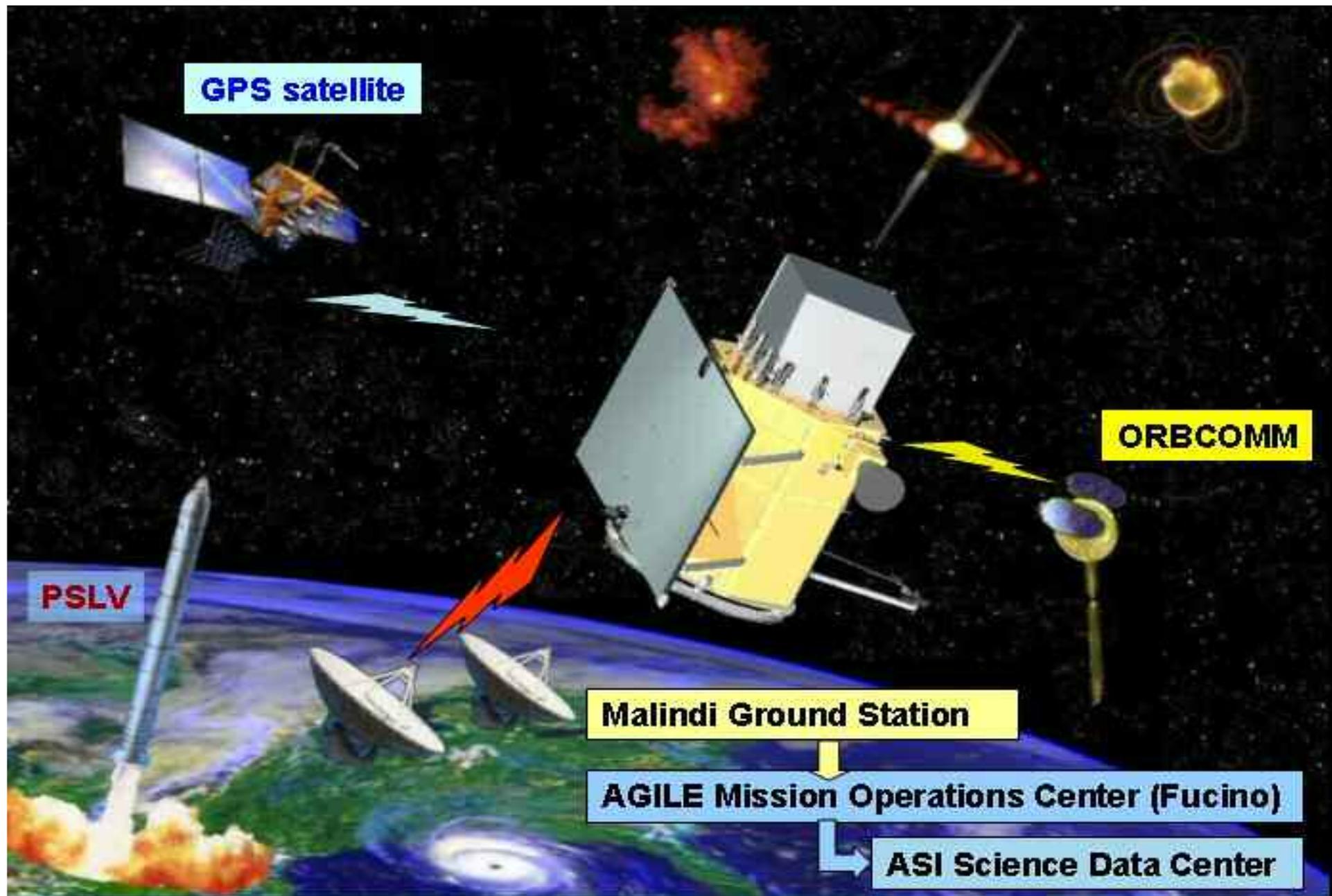
ASI Mission Director: L. Salotti

AGILE Mission Director:

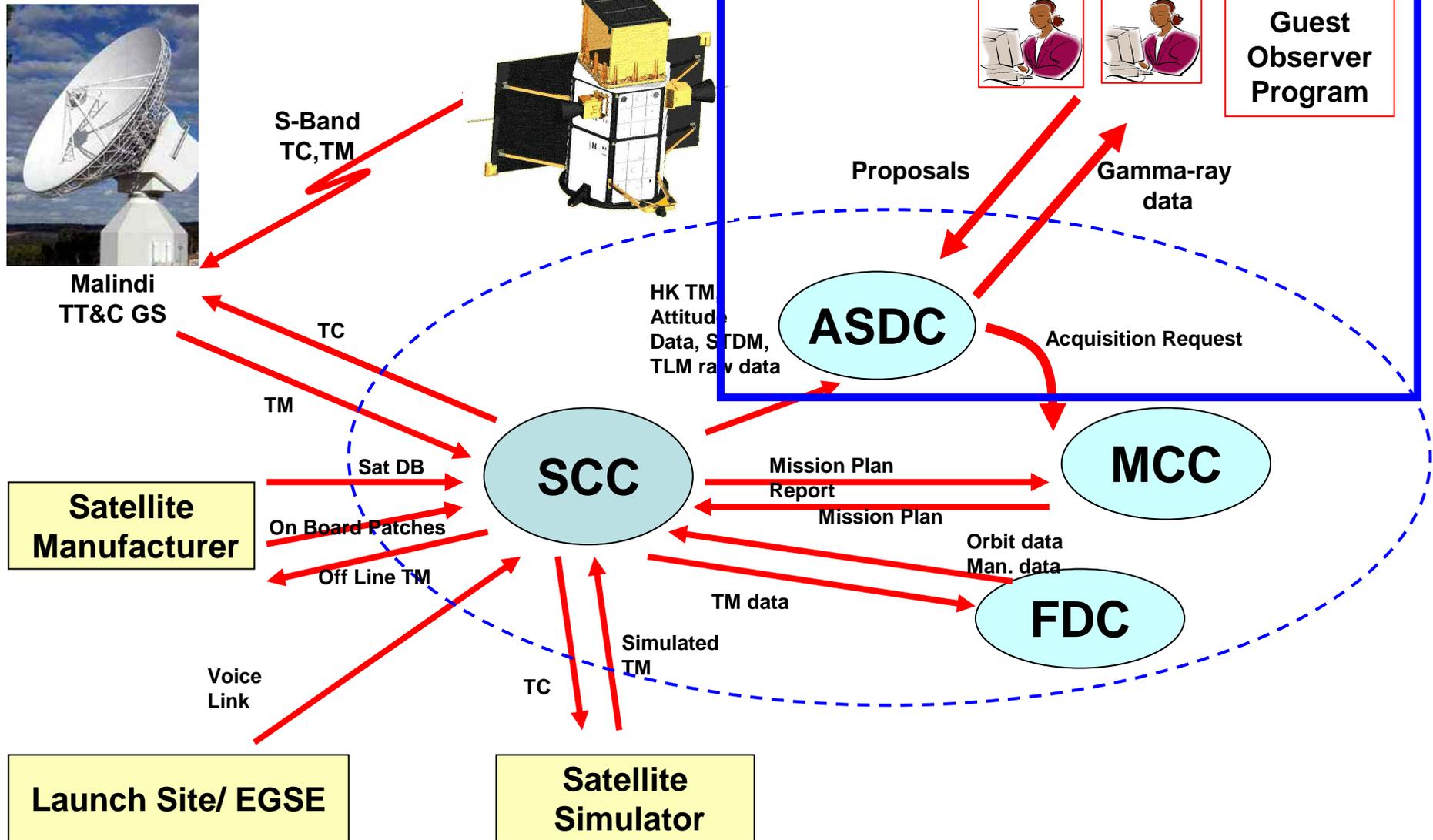
L. Salotti

New gamma-ray data

- **Aug. 27-31, 2007, $l = 330$, $b = 10$**
- **First view of the Galactic Center region**



AGILE Ground Segment



Quicklook analysis results

- Available to the community on the **AGILE Team and ASDC web sites**
 - Current pointing details
- **Announcement of flaring source activity:**
 - Source name or position
 - 1-3 day reaction

AGILE Quicklook analysis results, check

<http://agile.iasf-roma.inaf.it>

<http://asdc.asi.it>

AGILE Science Program 2007-2008

- **AGILE Pointing Plan**
 - **Cycle-1 (December, 2007 – December, 2008)**
- **AGILE Guest Observer Program (Cycle-1)**
 - **Announcement of Opportunity to be issued in September, 2007.**
 - **Deadline: end of October, 2007.**
- **AGILE Science Workshops:**
 - **September/early October, 2007 Mini-Workshop**
 - **December, 2007/early January 2008 Conference**
 - **Spring 2008 Workshop**
 - ...

Conclusions

- **The AGILE scientific performance in orbit is nominal**
- **X-ray and gamma-ray data on Galactic and extragalactic sources**
- **Optimized for transient sources**
- **AGILE Cycle-1 program to start in December**

2 gamma-ray missions in orbit in 2008:

wonderful !