Om agnim ile purohitan
yajnasya devam rtvijam
hotaram ratnadhatamam
Rig Veda, I, 1

AGILE in orbit

M. Tavani

on behalf of the AGILE Team

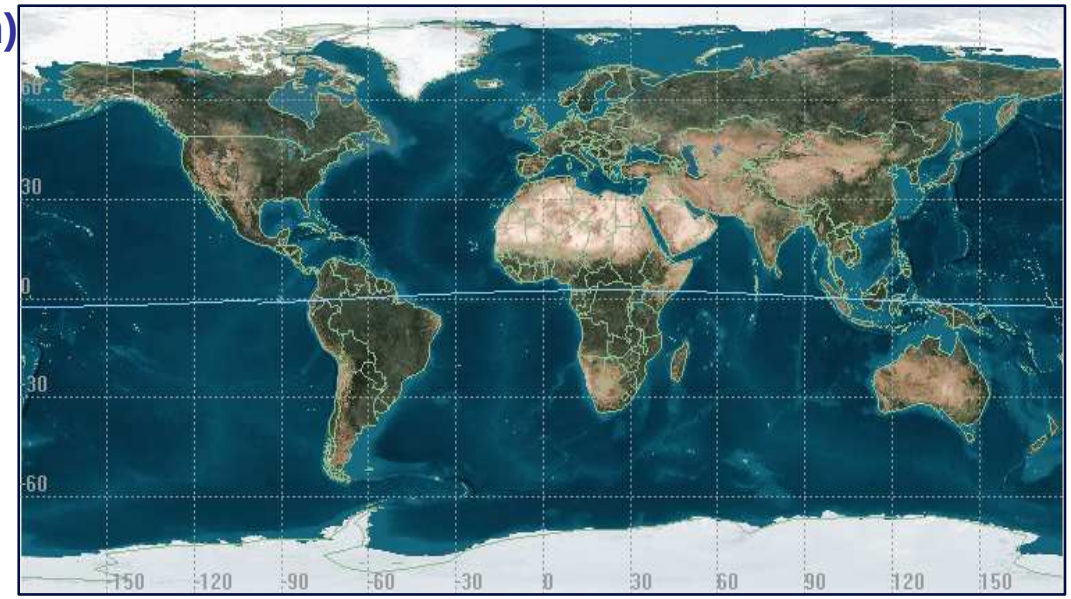
Integral Meeting,
Oct. 17, 2007

AGILE orbital parameters

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

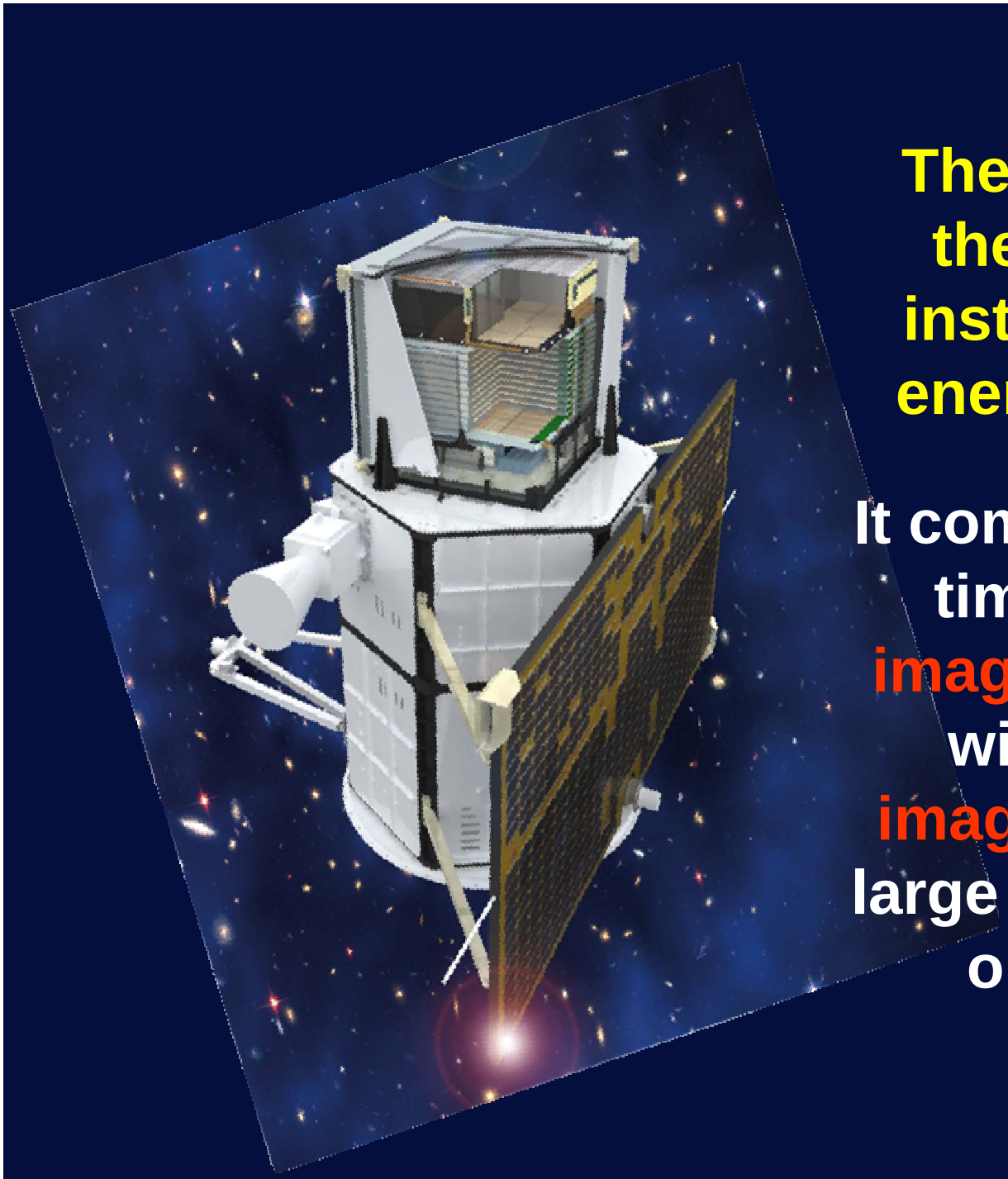
Inclination angle: 2.48° (±0.04°)
Requirement: < 3°

Eccentricity: 0.002 (±0.0015)
Requirement: < 0.1°



In-orbit background analysis (preliminary results)

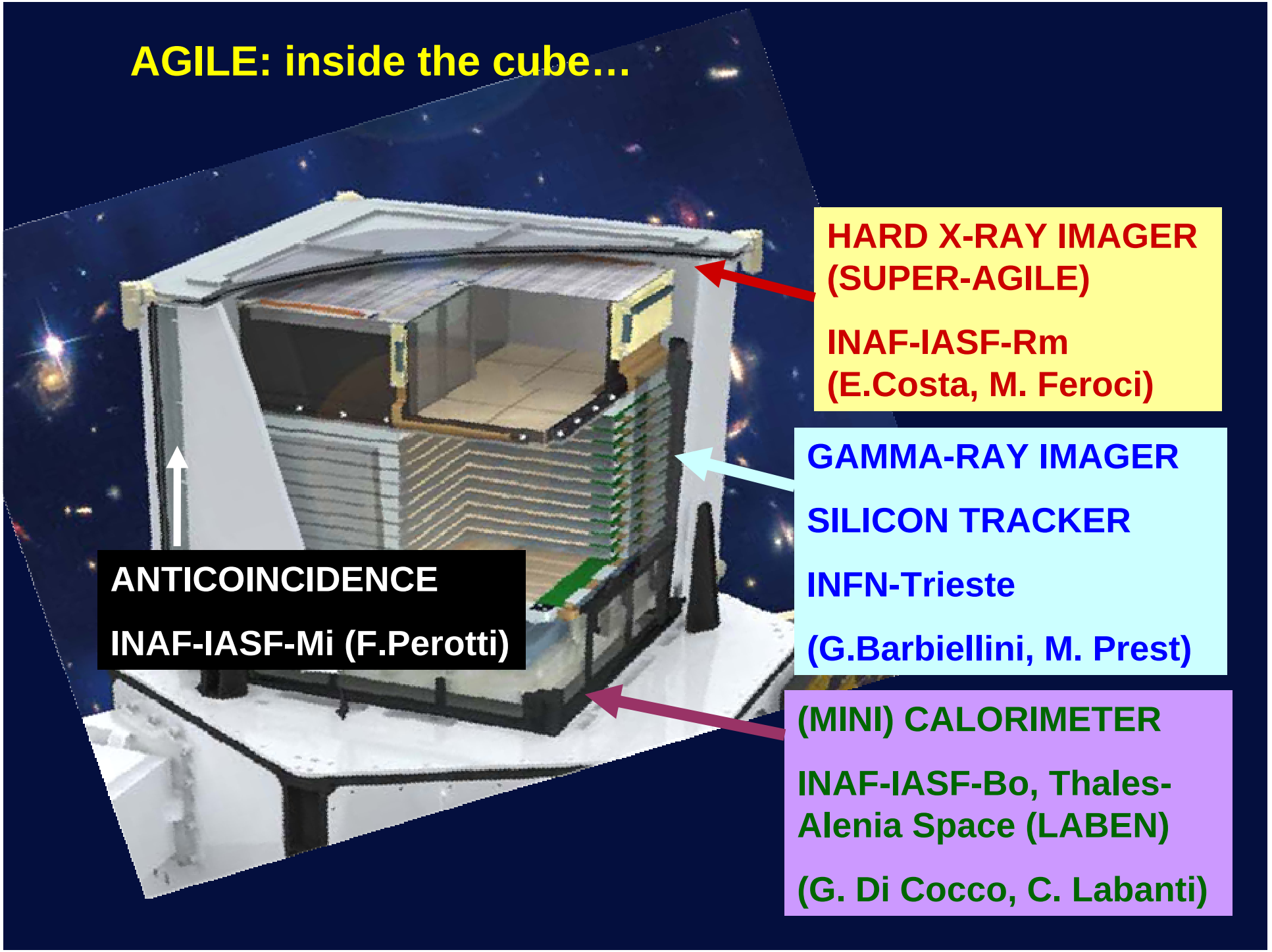
- **proton background as expected (and measured by PAMELA)**
- **electron/positron background lower by a factor of 2-3 compared to pre-launch expectations**



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

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)

(MINI) CALORIMETER

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

(G. Di Cocco, C. Labanti)

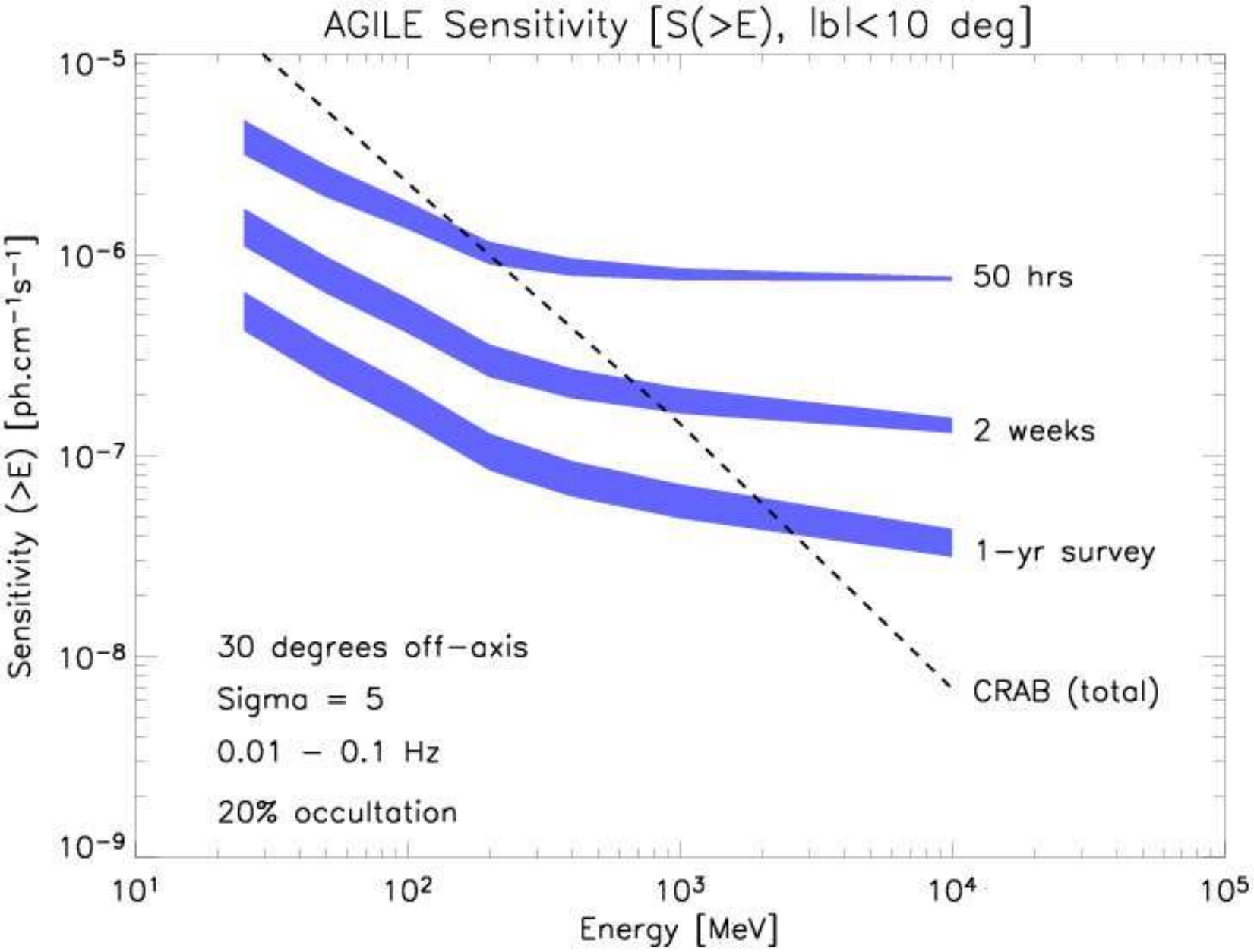
ANTICOINCIDENCE

INAF-IASF-Mi (F.Perotti)

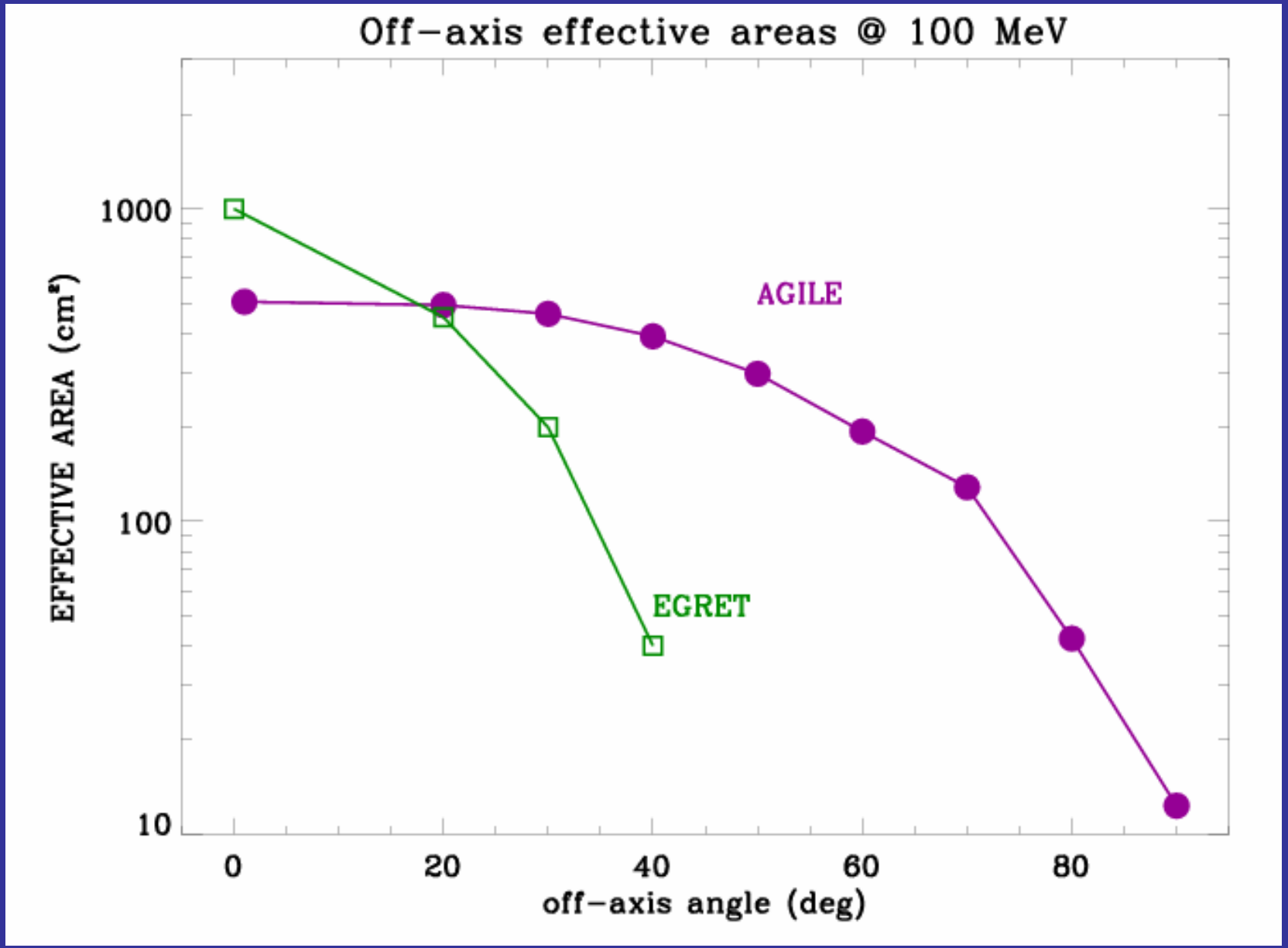
After the first 6 months in orbit:

- **AGILE covers ~ 1/5 of the sky with nominal sensitivity.**

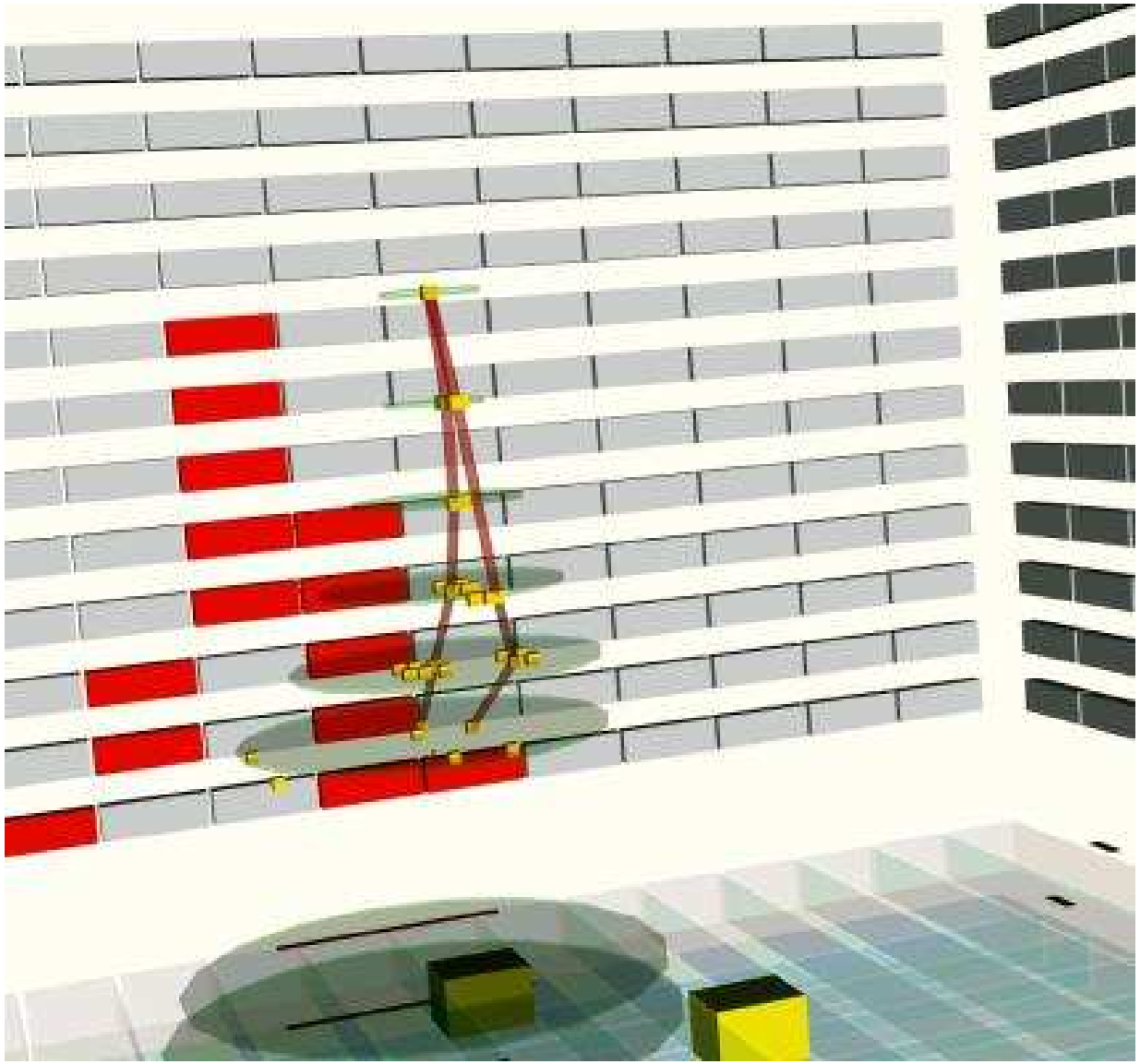
- **AGILE shows a nominal performance of all its detectors. In particular, its gamma-ray and hard X-ray imagers are working together as expected.**


AGILE Sensitivity [S(>E), |b|<10 deg]
Sensitivity (>E) [ph.cm⁻¹s⁻¹]
10⁻⁵
10⁻⁶
10⁻⁷
10⁻⁸
10⁻⁹
10¹
10²
10³
10⁴
10⁵
Energy [MeV]
50 hrs
2 weeks
1−yr survey
CRAB (total)
30 degrees off−axis
Sigma = 5
0.01 − 0.1 Hz
20% occultation

AGILE-GRID angular response vs. EGRET

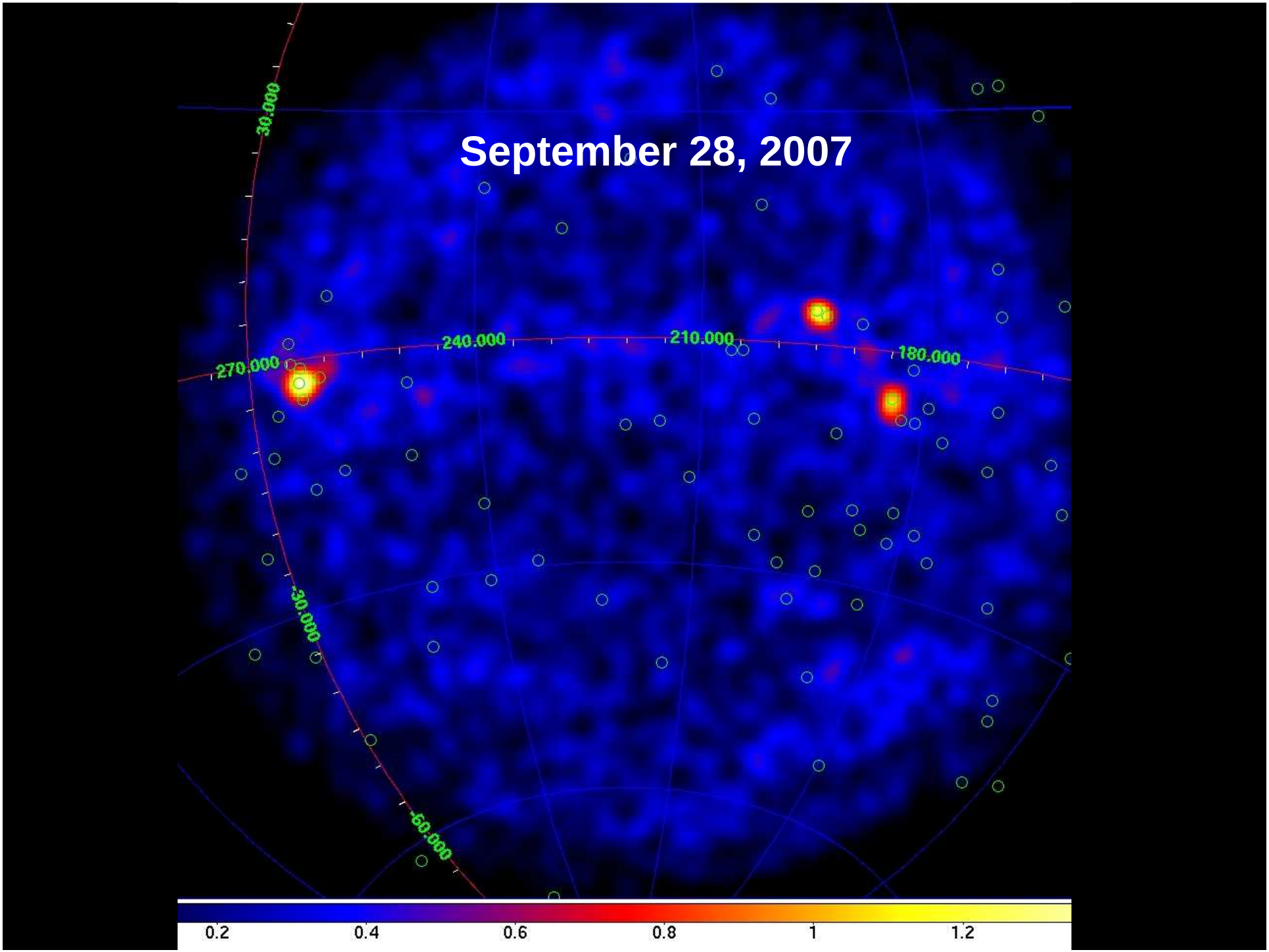


First gamma-ray detected in orbit with the nominal GRID trigger configuration (May 10, 2007)

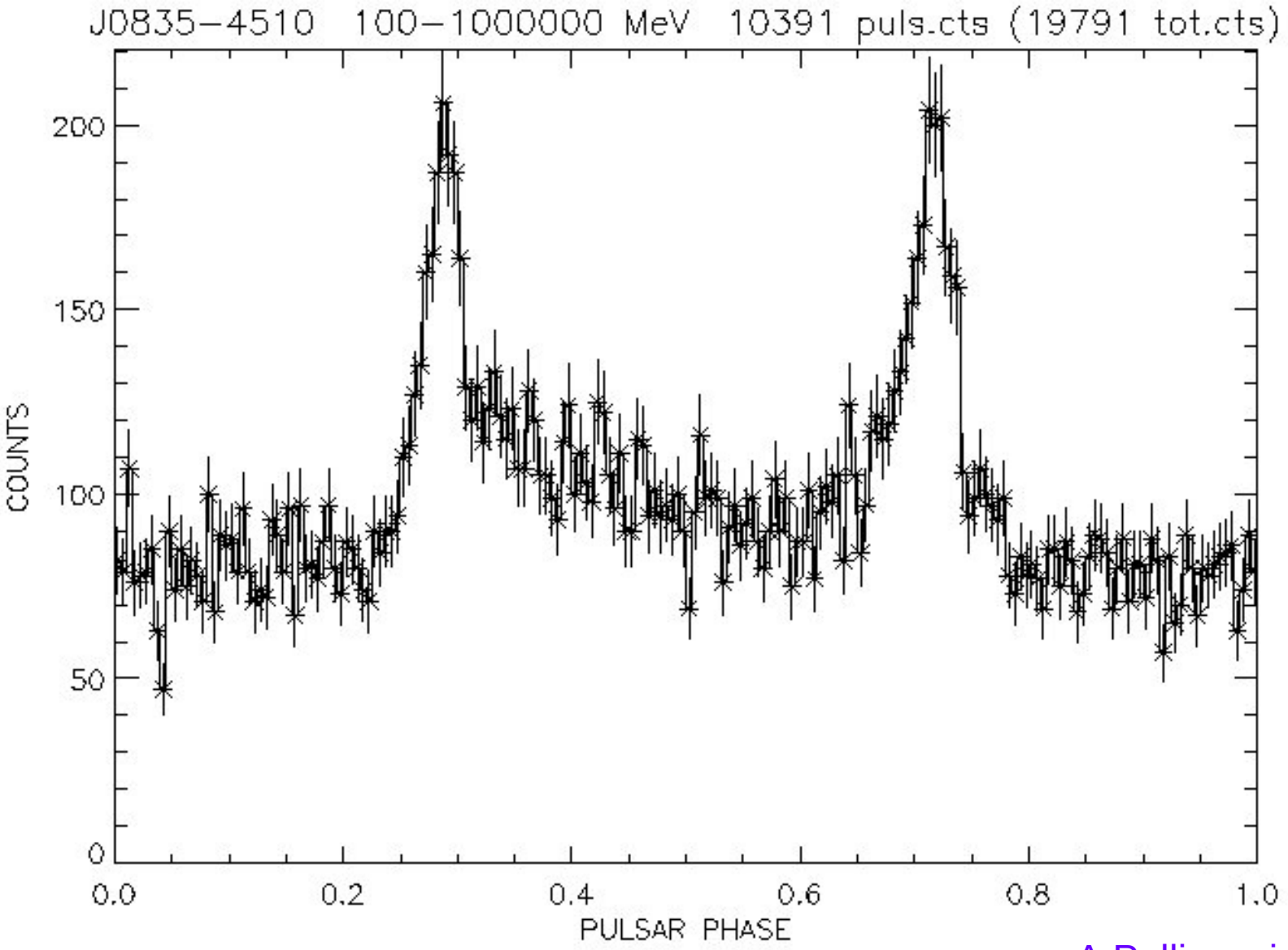


AGILE first results (July-August, 2007)

- **Vela PSR calibration**
- **Several Galactic hard X-ray sources**
- **4 detections of blazars**
  - **3C 279**
  - **3C 454.3**
  - **HB 1510-089**
  - **TXS 0716+714**
- **Several GRBs detected (MCAL detects ~ 1/week)**


September 28, 2007
30.000
240.000
210.000
180.000
270.000
-30.000
-60.000
0.2
0.4
0.6
0.8
1
1.2

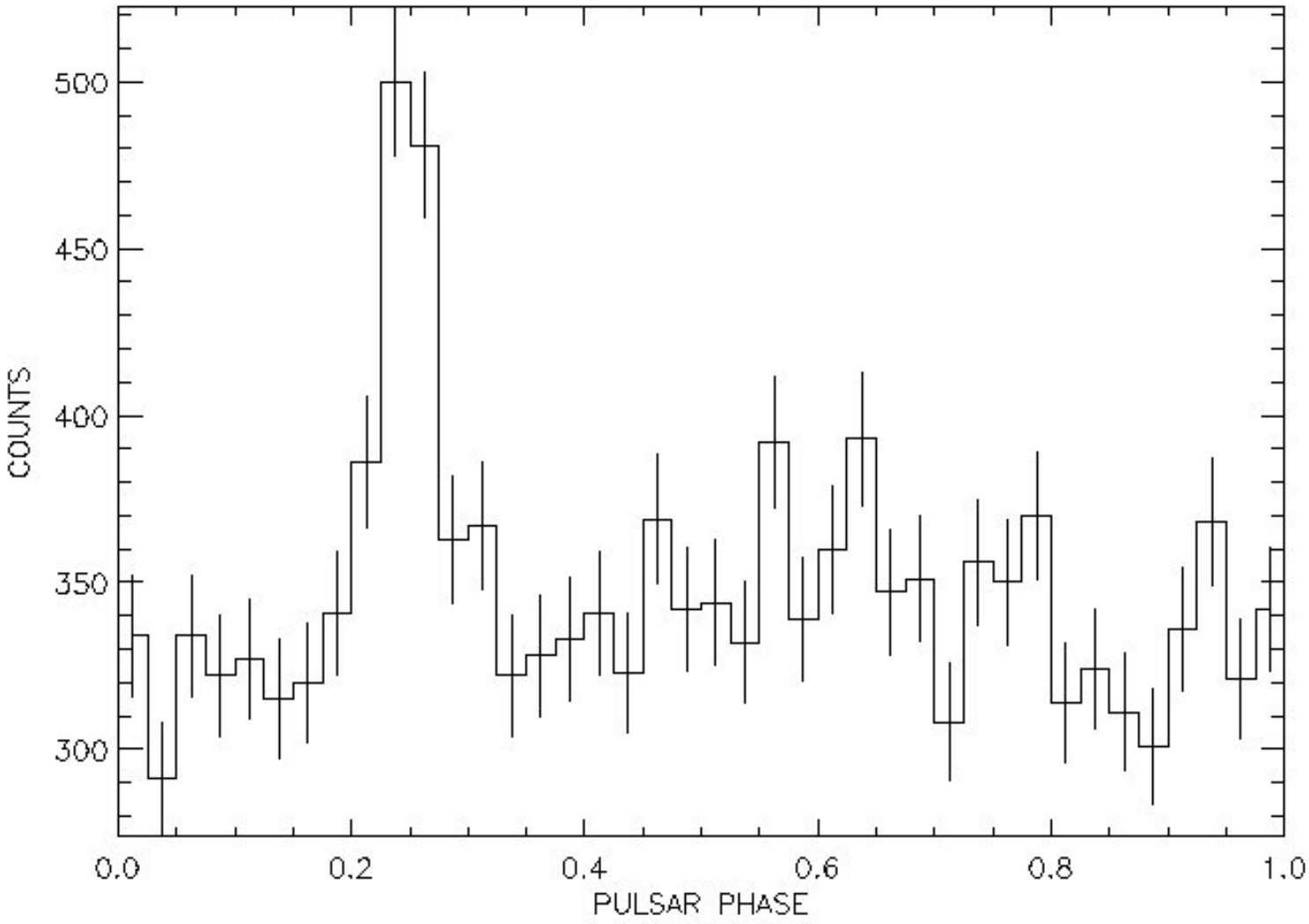
Vela PSR light curve (E>100 MeV), **~20 day integration**,
(calibration observation blocks, July-August, 2007). 0.5 ms time bins.



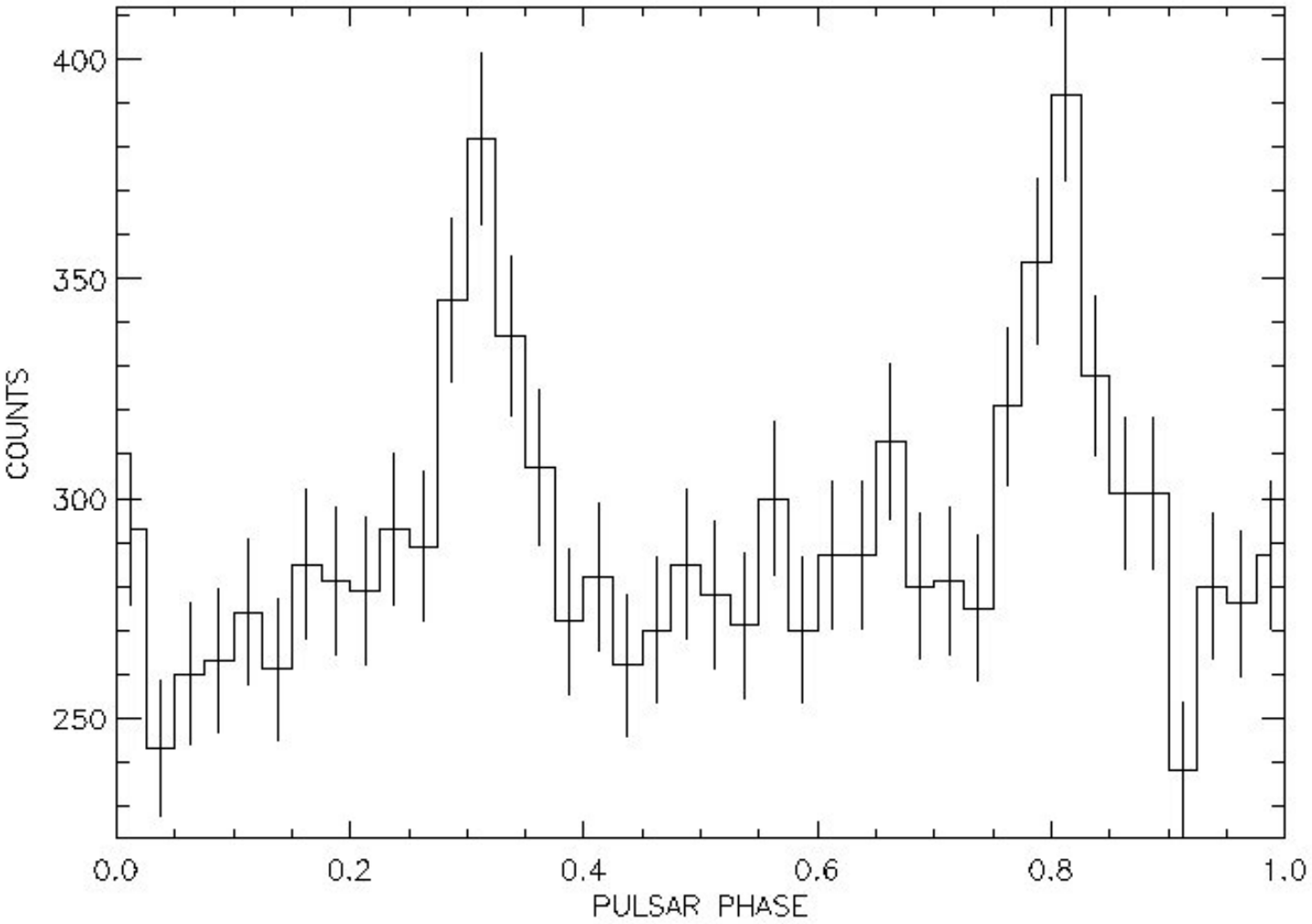
A.Pellizzoni

Crab PSR

10 day integration, 5-50 degrees



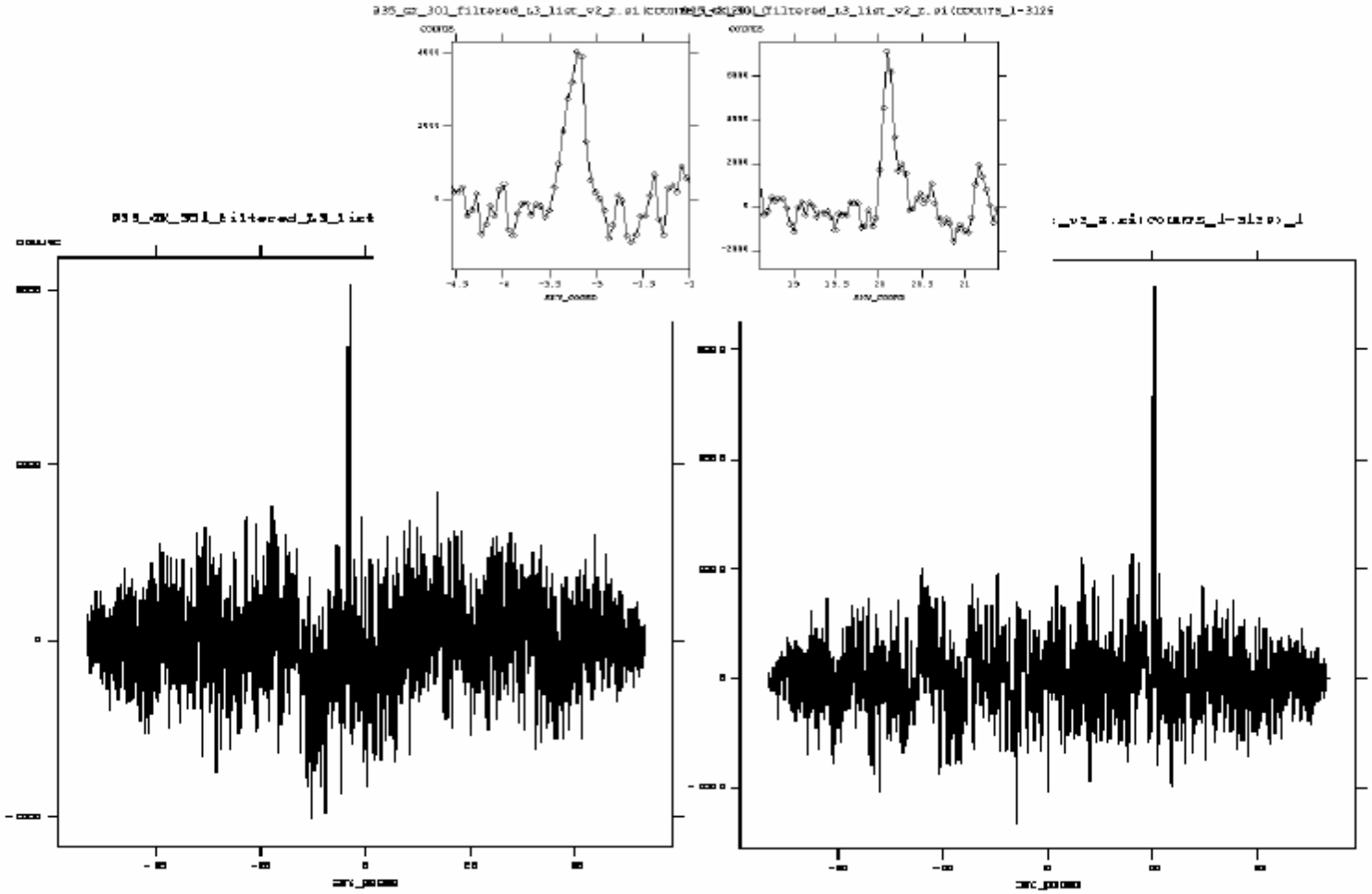
Geminga PSR
~ 10 day integration, 5-50 degrees



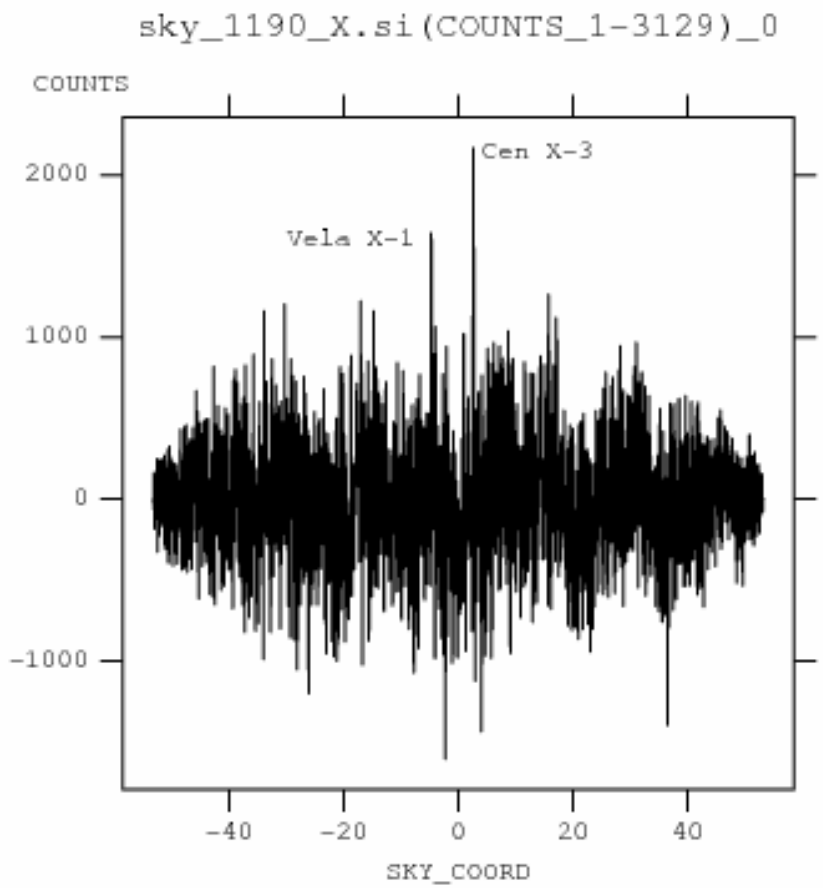
Super-Agile imaging

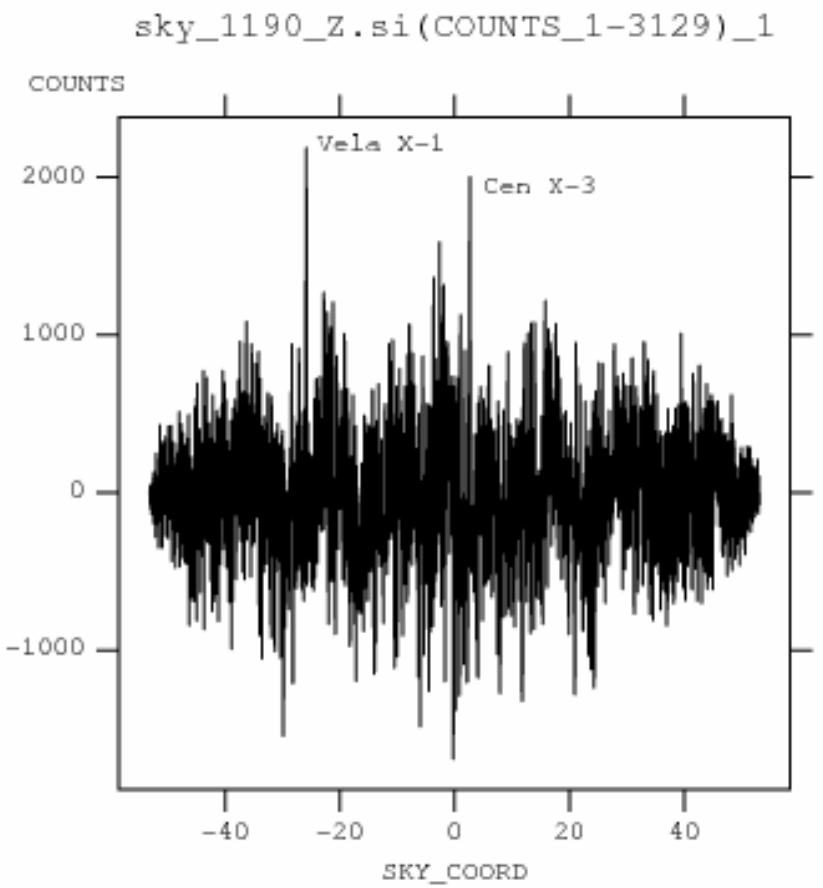
Super-Agile first source detection, June 28, 2007: GX 301-2

On-ground Imaging: first light (orbit 935)



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





GRBs…

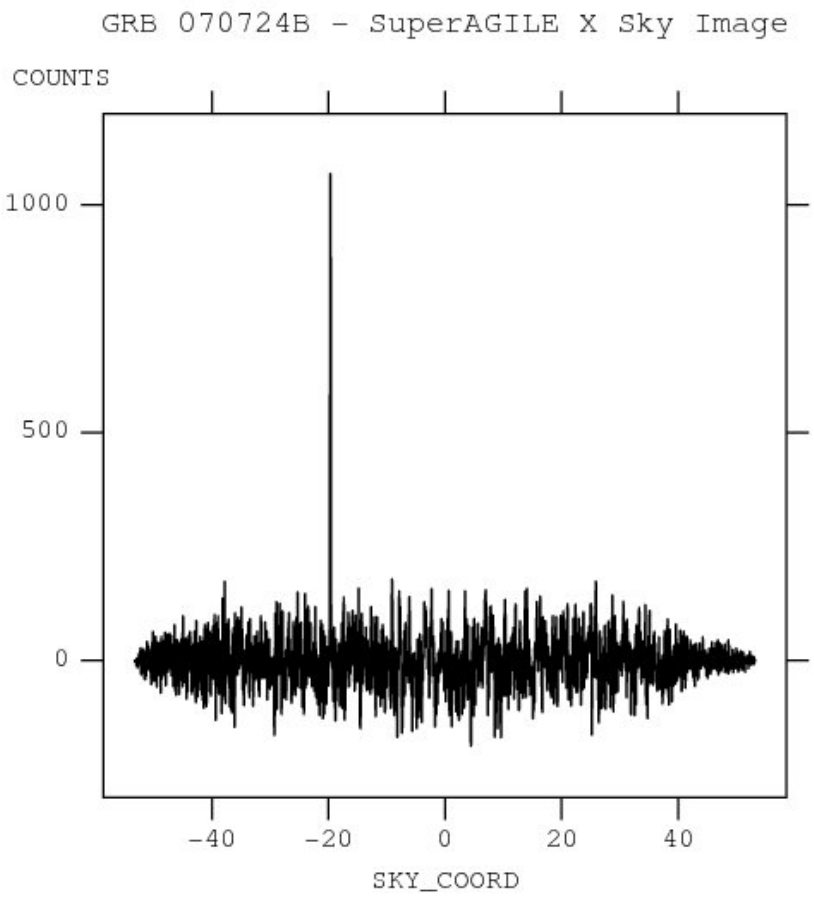
- ~ 10 interesting GRBs since July
- only 2 (Swift) GRBs in the inner FOV
- MCAL detects ~ 1 GRB/week above 350 keV

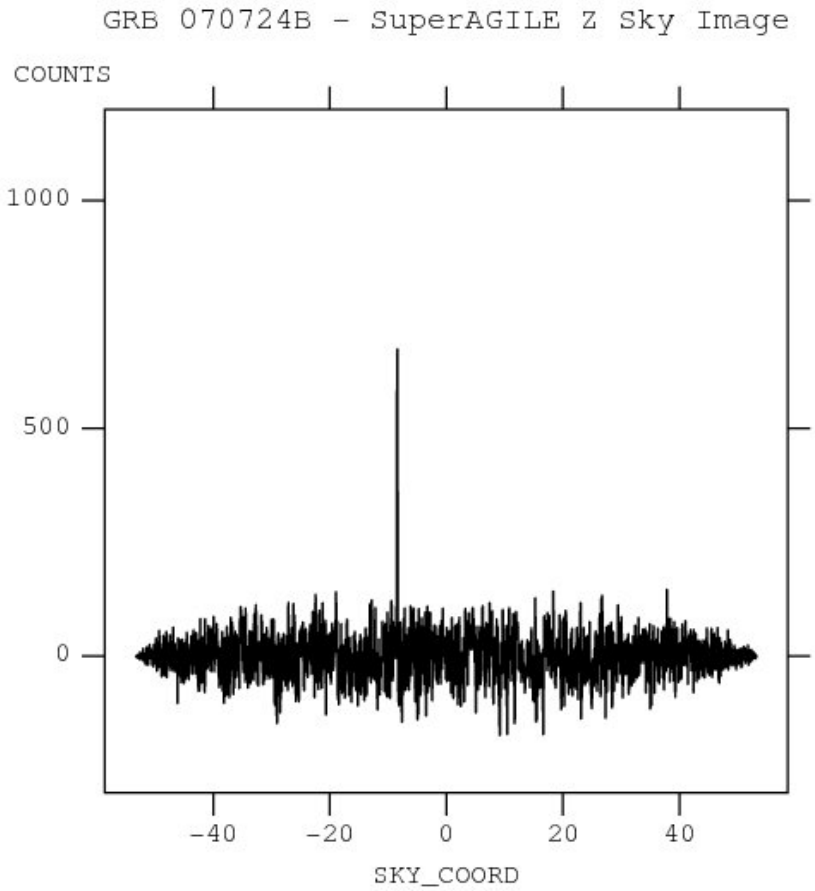
- GRB fast trigger search not active yet
(it will be in November)

GRB 070724B: first burst in the AGILE FOV

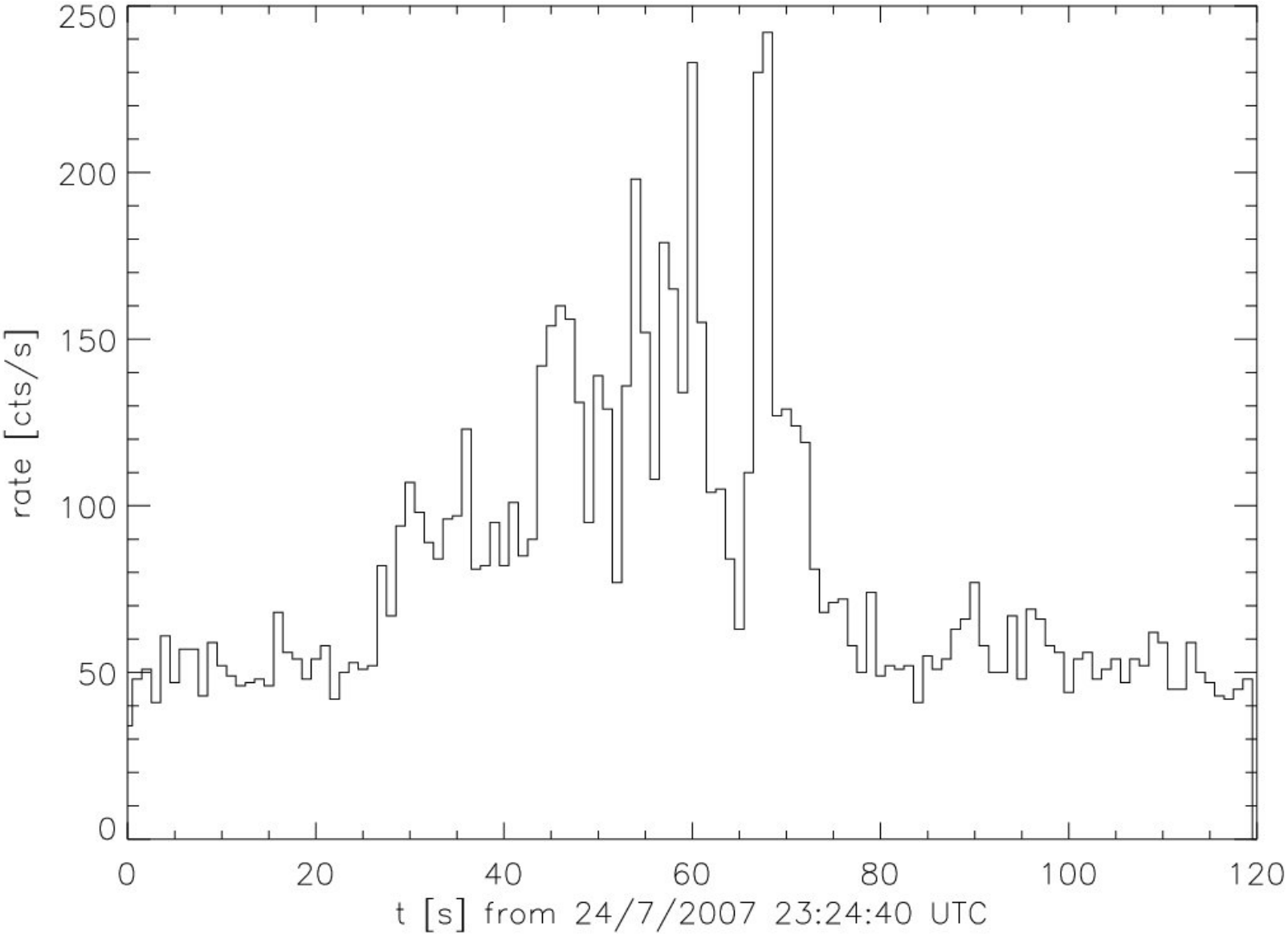
- **Promptly detected by Super-A [GCN Circ. n. 6668, Feroci et al.]**
- **No signal in the MCAL and the Tracker [GCN Circ. n. 6670, Chen et al.]**
- **“No-high-energy burst” as confirmed by Konus-Wind and Suzako**

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



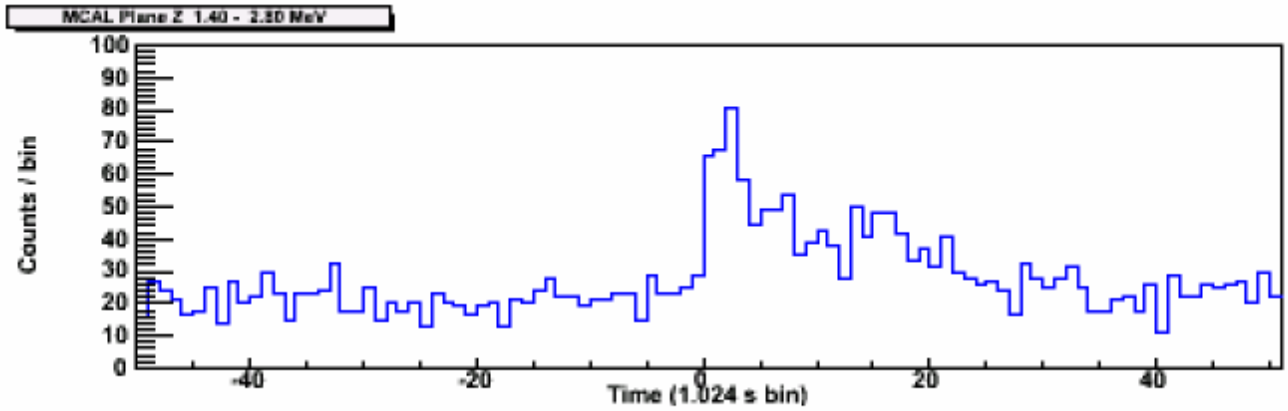


Super-AGILE X-ray lightcurve of GRB 070724B (18-60 keV)

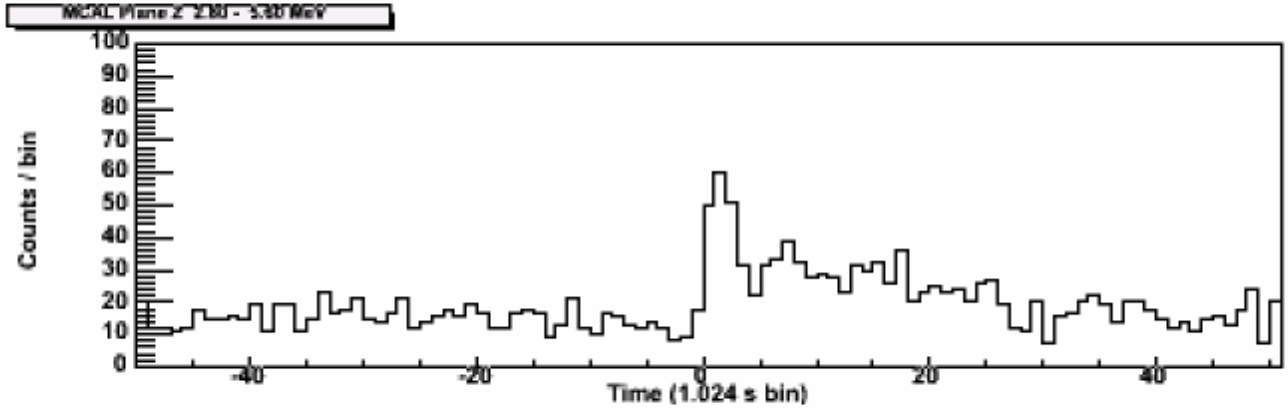


GRB 070825: burst at ~70° off-axis

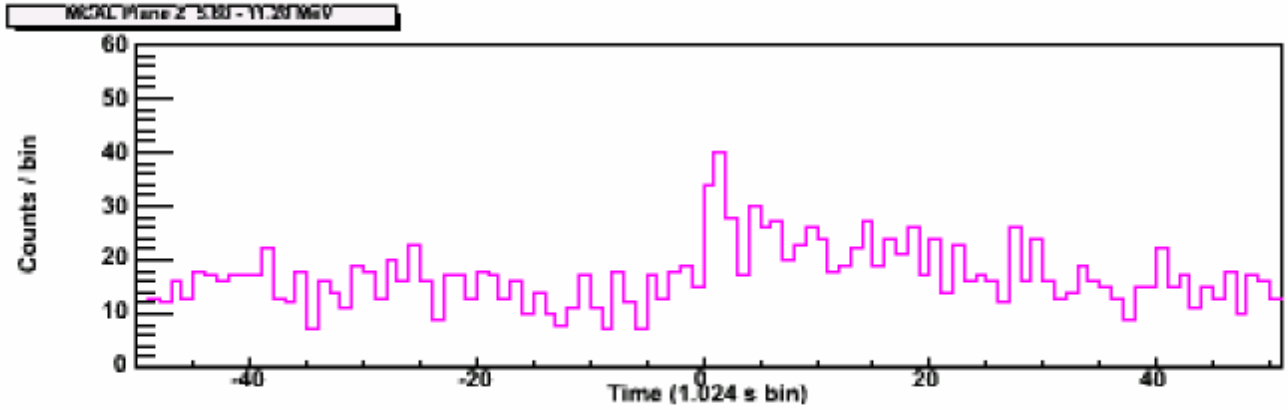
- no detection by Super-A
- strong signal in the MCAL (up to 20 MeV)
- event rate increase in the Tracker



1.4 - 2.5 MeV



2.5 - 5.5 MeV



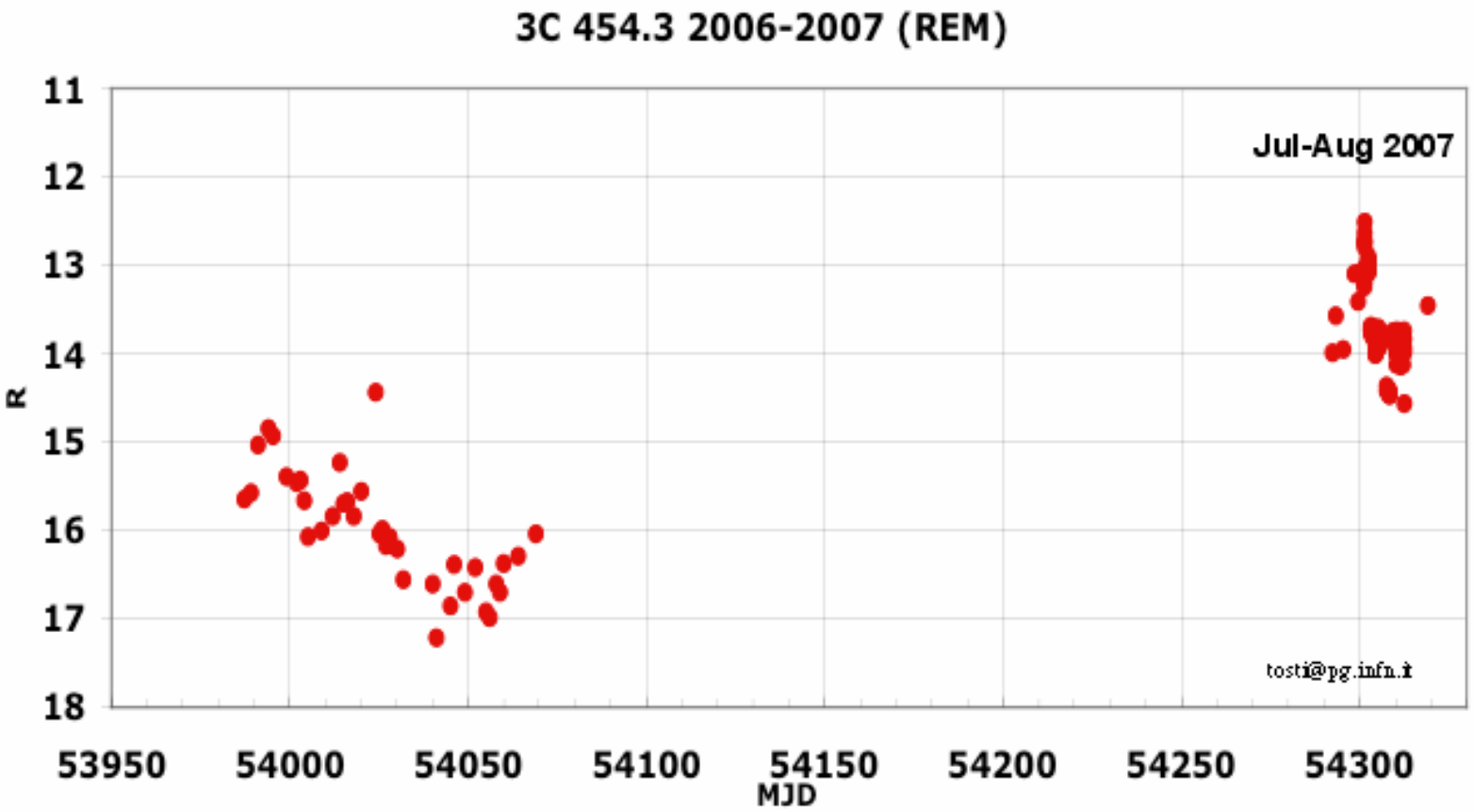
5.5 - 11 MeV

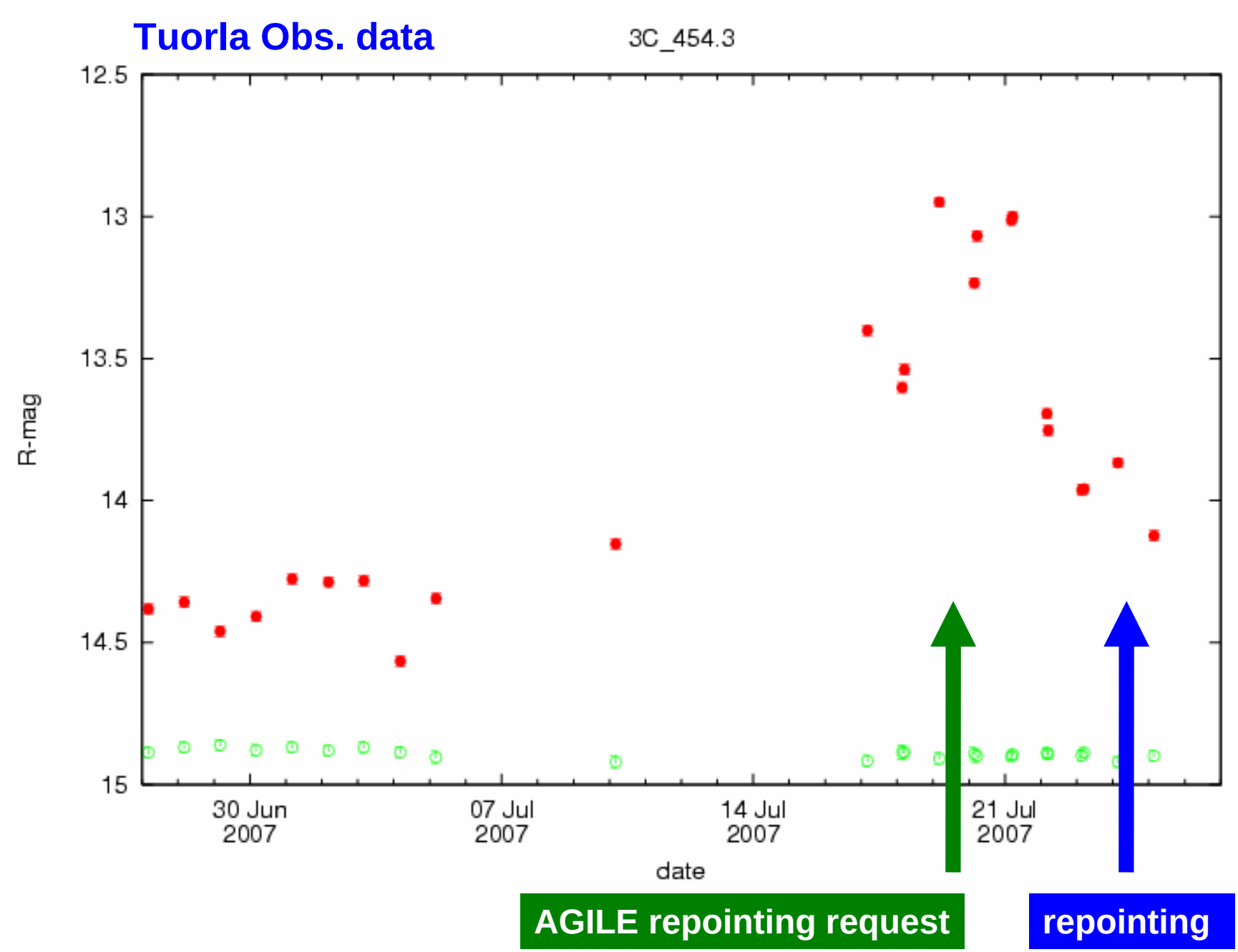
Blazars

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**

REM data (G. Tosti et al.)




Tuorla Obs. data
3C_454.3
12.5
13
13.5
14
14.5
15
R-mag
30 Jun 2007
07 Jul 2007
14 Jul 2007
21 Jul 2007
date
AGILE repointing request
repointing

- **Aug. 27-31, 2007, l= 330, b = 10**
- **First view of the Galactic Center region**
- **Detection of the blazar HB 1510-089**

- **AGILE Guest Observer Program (Cycle-1)**
  - **Announcement of Opportunity issued on October 1, 2007.**
  - **Deadline: end of October, 2007.**
  - **http://agile.asdc.asi.it**