

The AGILE Team Multiwavelength Program

M. Tavani

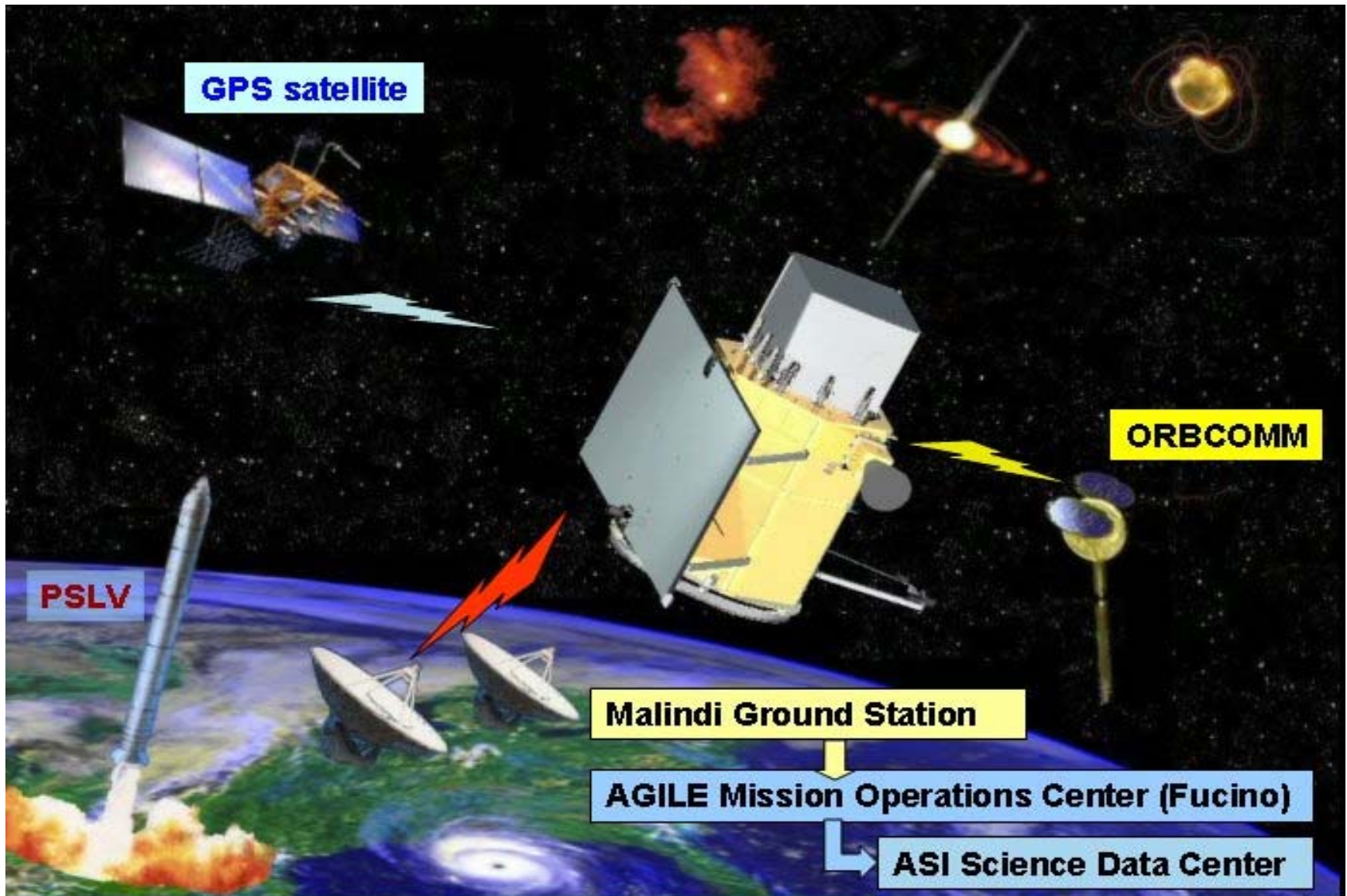
Rome, February 3, 2005

Main goals

- **Propose and discuss guidelines for scientific collaboration between the AGILE Team and other groups**
- **Bi-lateral Agreements**
- **establish an AGILE Multiwavelength Group (AMG)**
 - overall coordination
 - feedback on the AGILE Pointing Program

Science topics (AT focal scientist to be assigned)

- **AGN studies**
- **TeV sources**
- **PSR studies**
- **Unidentified gamma-ray sources**
- **X-ray compact sources**
- **GRBs**
- **Fundamental Physics**
- **HEAPNET**



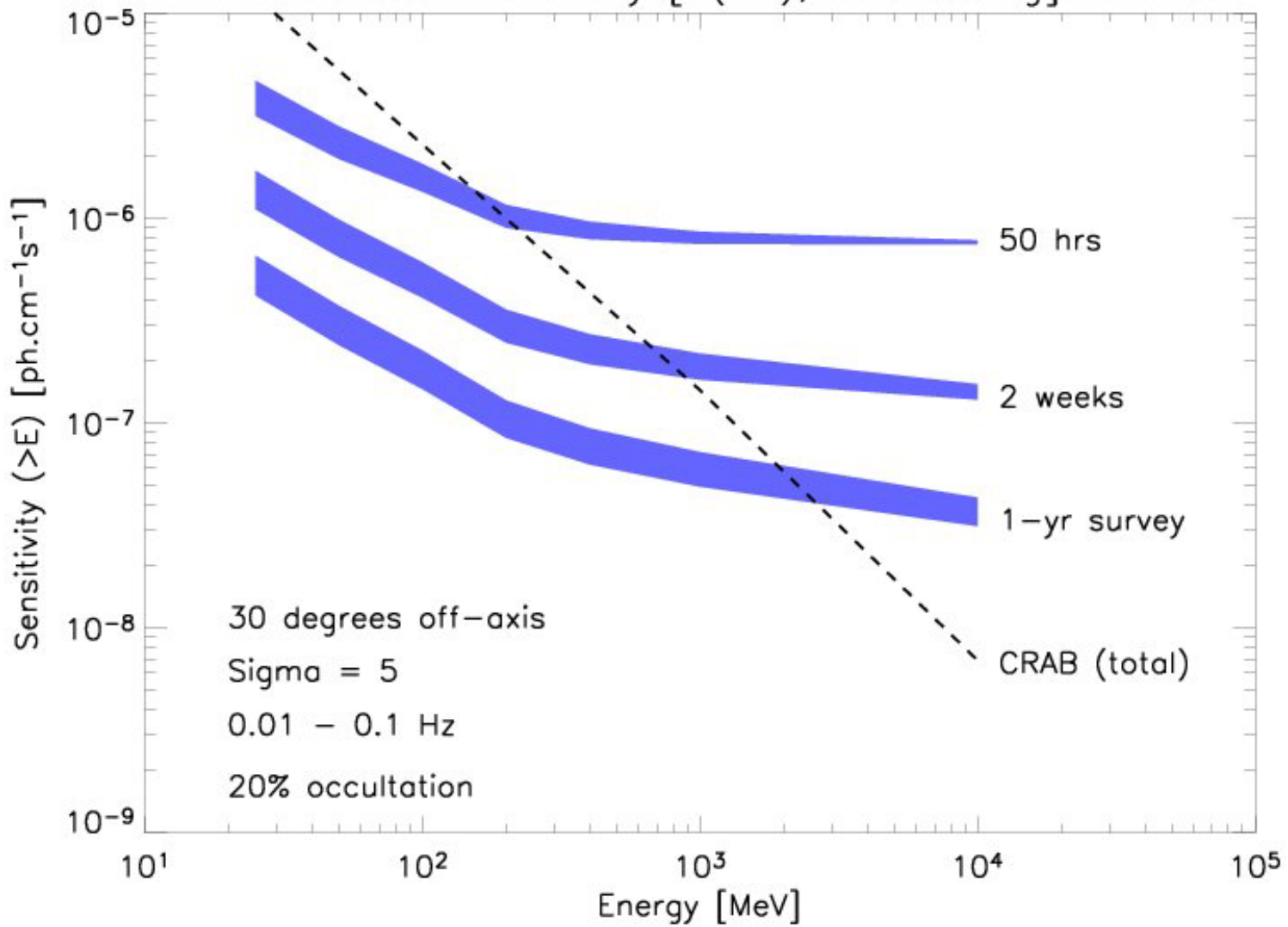
According to the *AGILE Science Management Plan*, data of the gamma-ray imager (GRID) are considered for two different scientific programs:

- **The AGILE Team Projects**
- The AGILE Guest Observer Program (GOP)

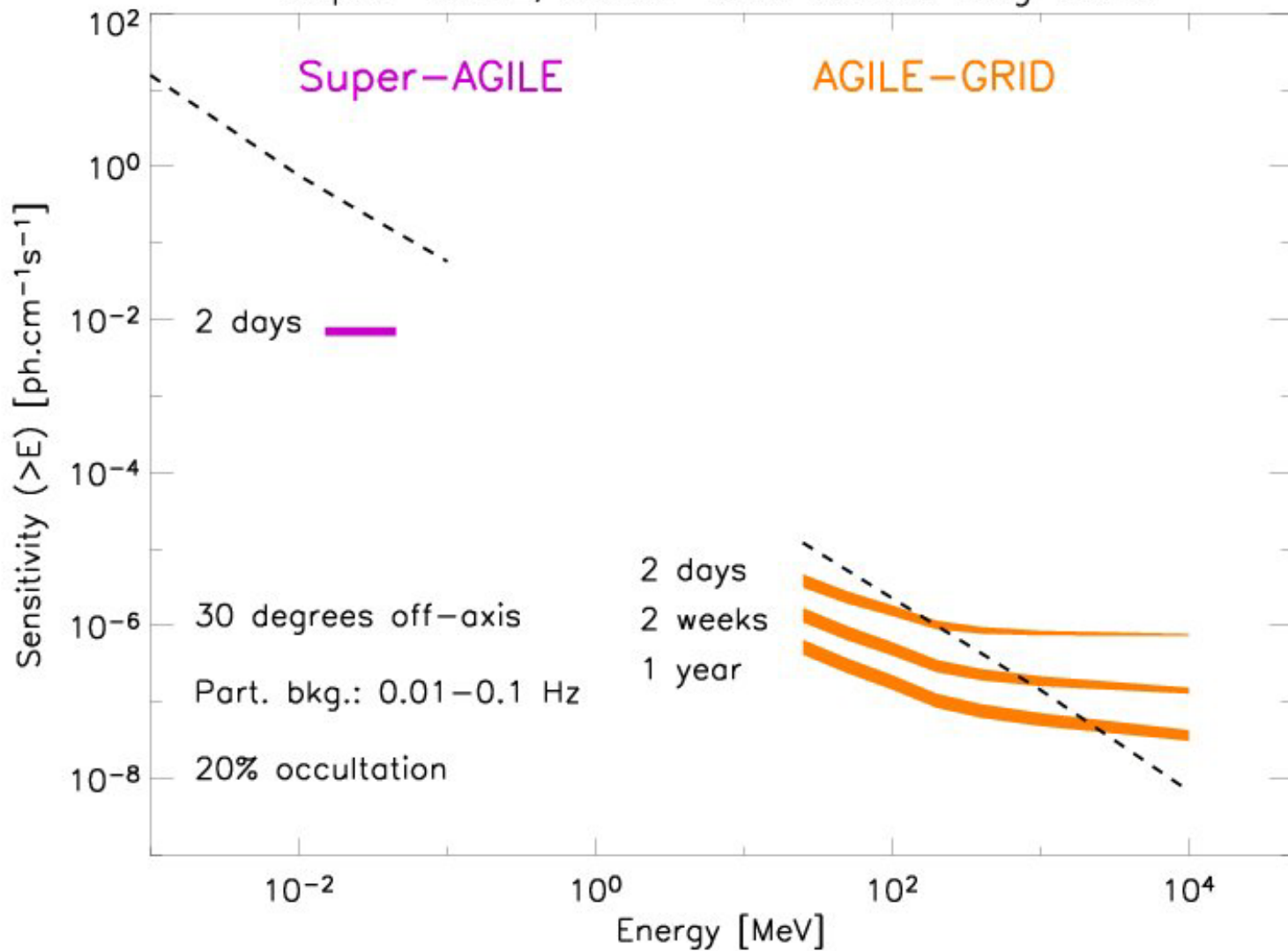
All AGILE-GRID data will be subject to the proprietary rules normally applied to observatory-type space data: there will be a 1-year proprietary period starting from the date the GOP observer or the AT scientist receives the data in a format that is suitable for analysis and subsequent publication.

- The **AGILE Team Projects** consist of investigations that can be carried out and successfully completed through a systematic analysis of a large amount of data, and/or requiring unique instrumental expertise. The AGILE Team Projects are:
 - Diffuse Galactic Radiation
 - Extragalactic Background
 - A selected list of gamma-ray sources (to be specified in the AO).
 - New gamma-ray sources (not listed in the 3rd EGRET Catalog)
 - Gamma-ray Bursts.

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

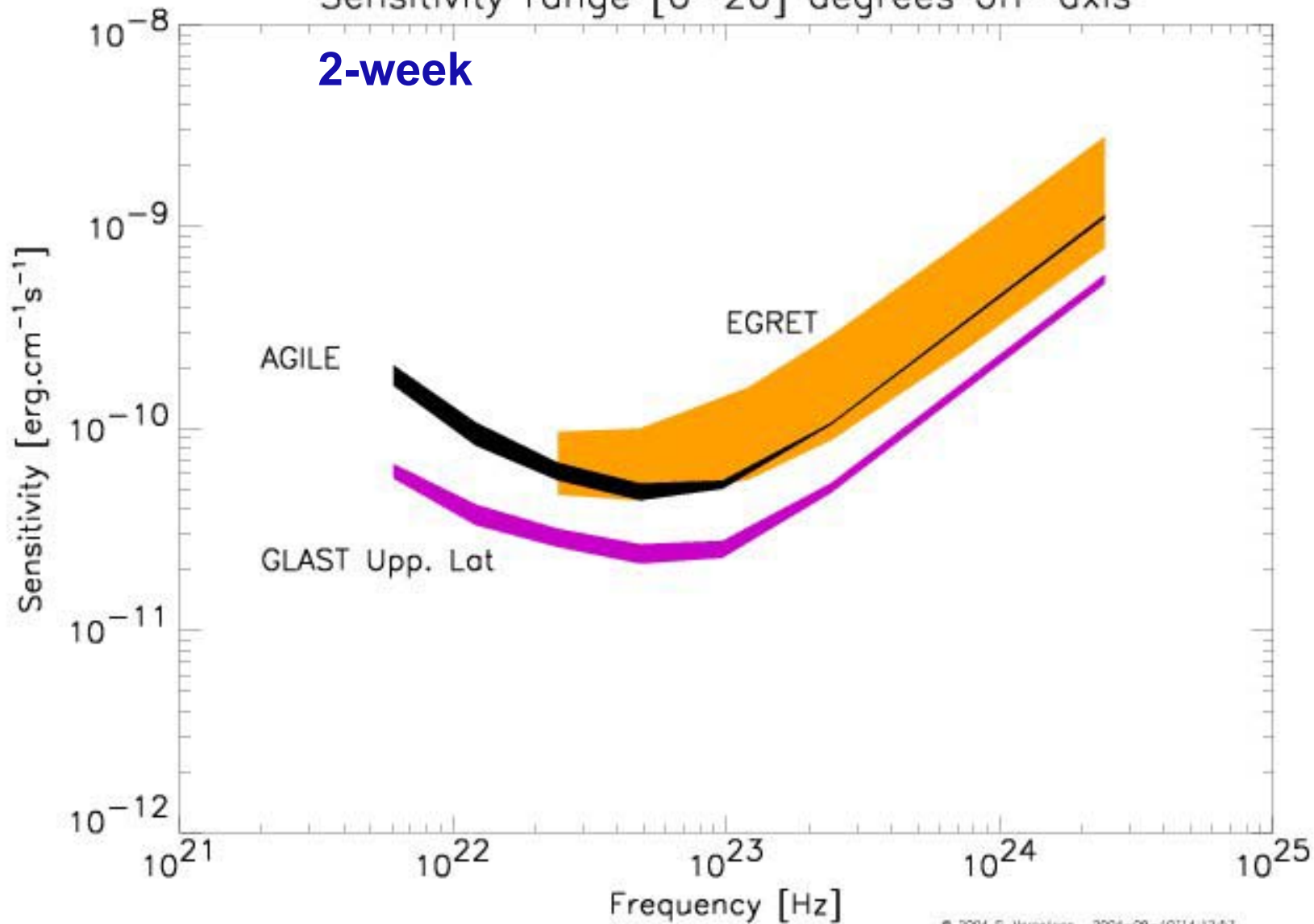


Super-AGILE, AGILE-GRID $|b| < 10$ deg Sens.

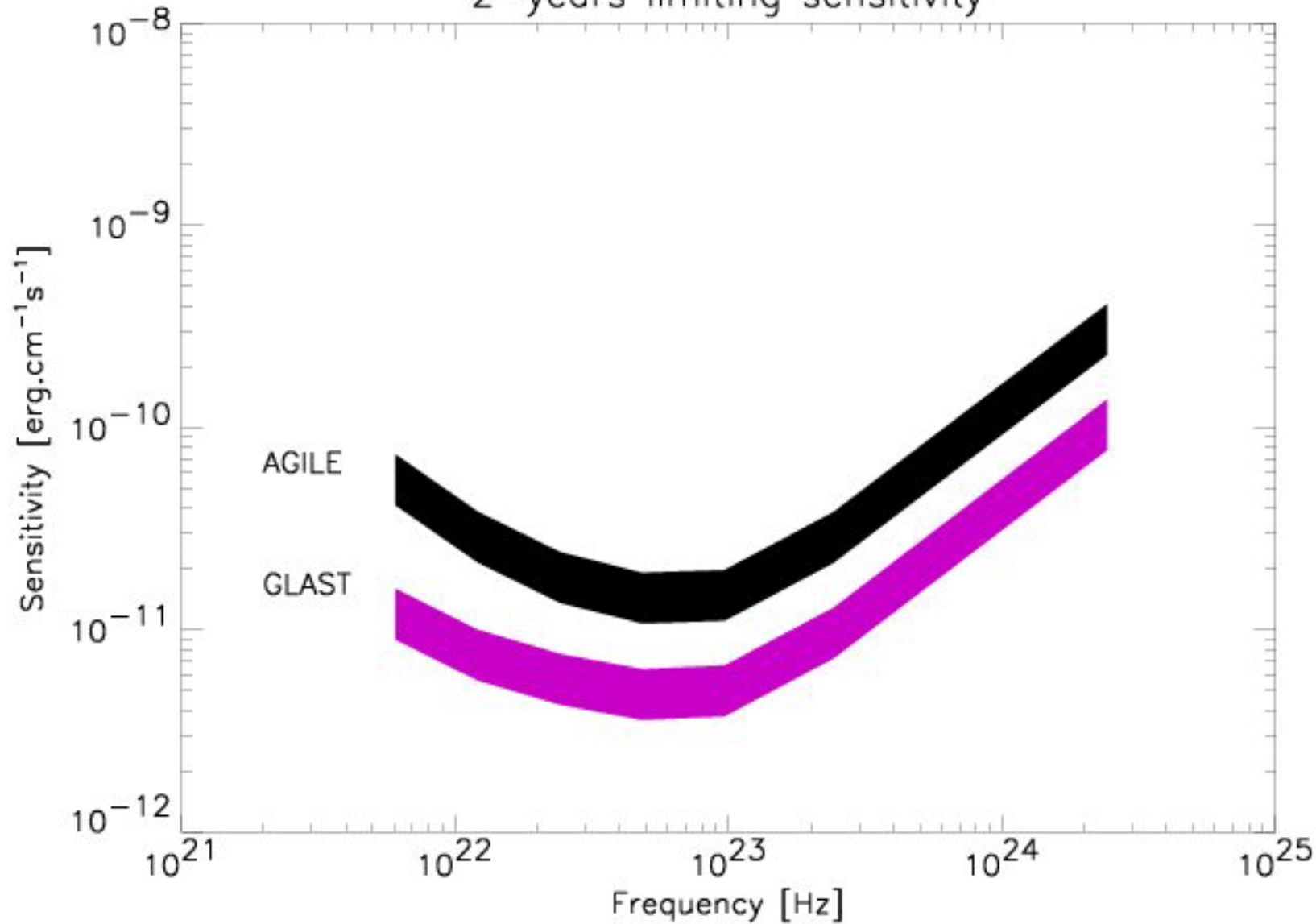


Sensitivity range [0–20] degrees off-axis

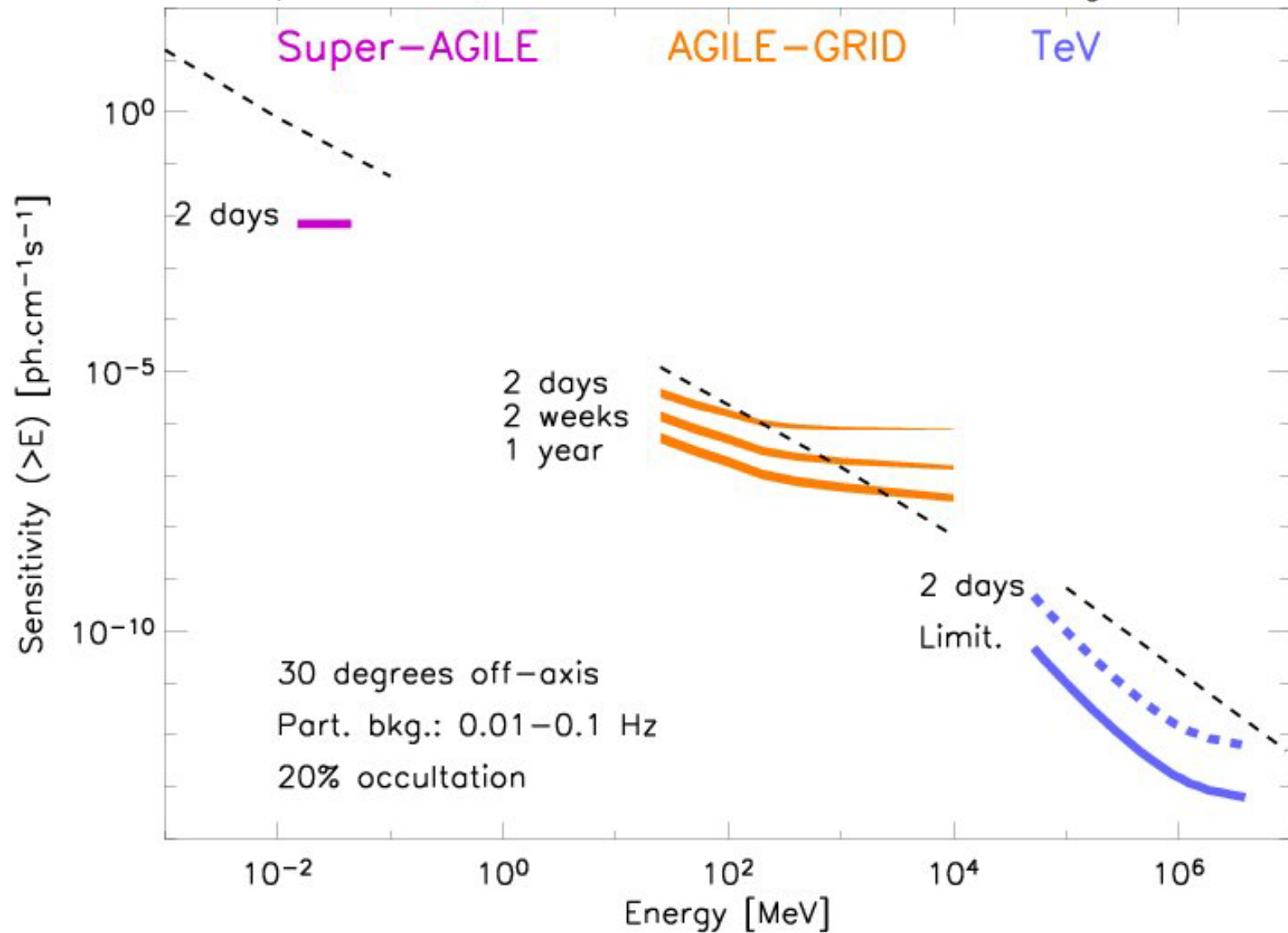
2-week



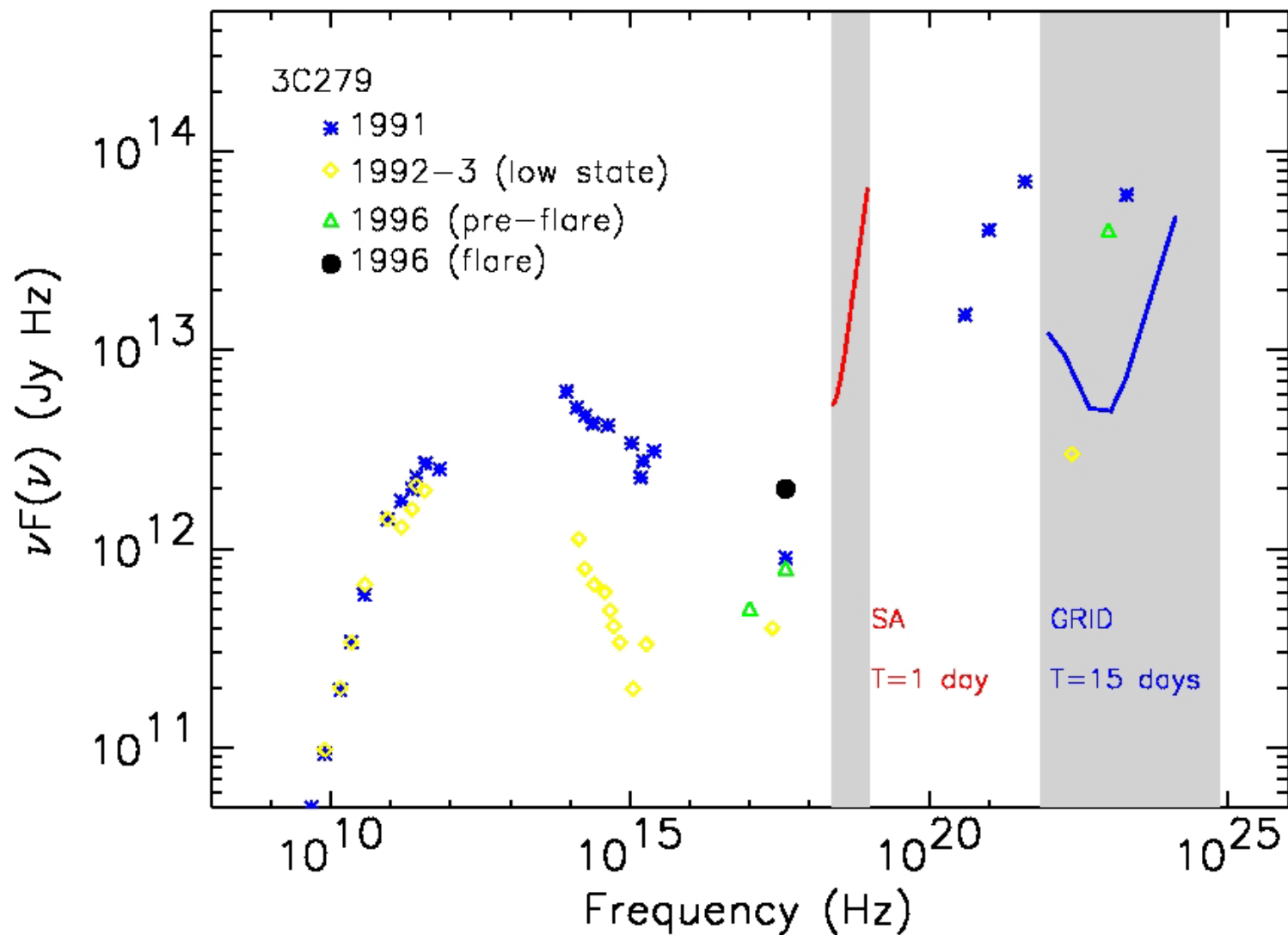
2-years limiting sensitivity



Super-AGILE, AGILE-GRID & TeV $|b| < 10$ deg Sens.

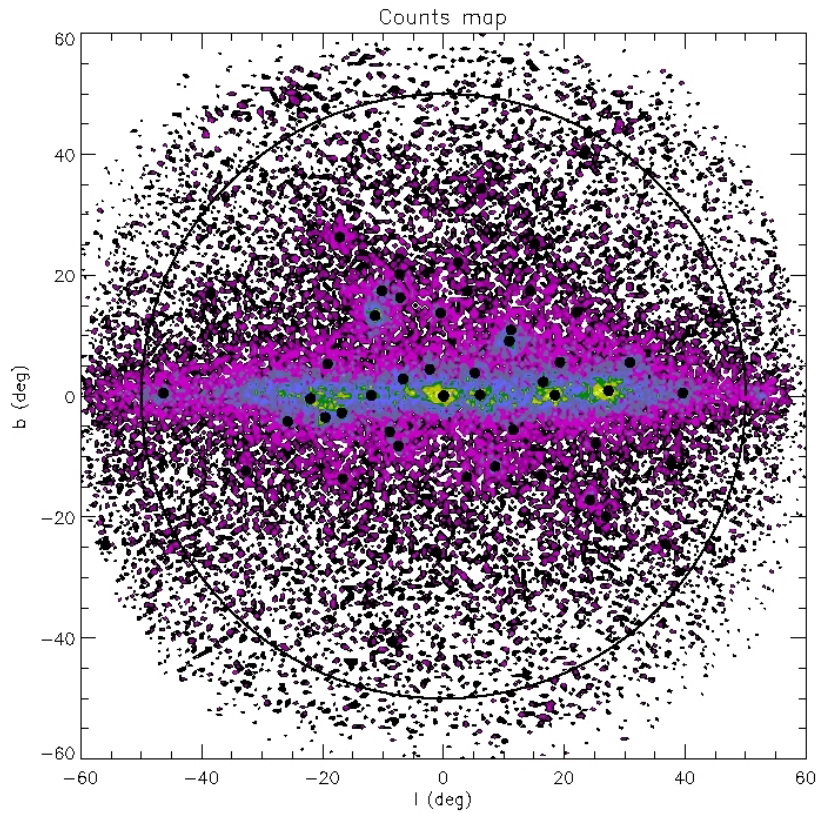


3C 279 SED

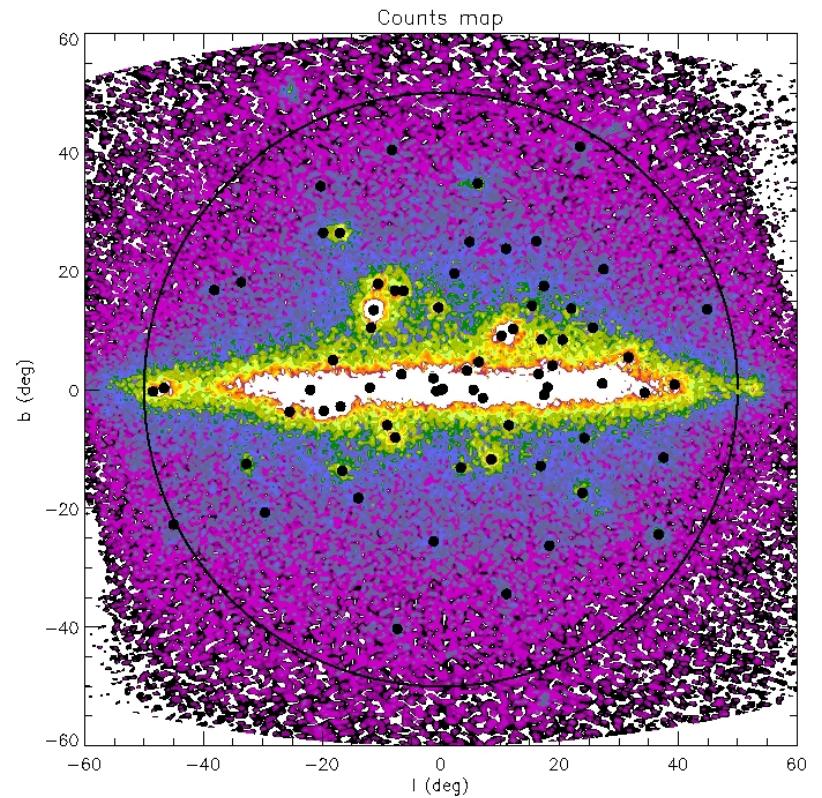


AGILE pointing simulation of the Galact. Center

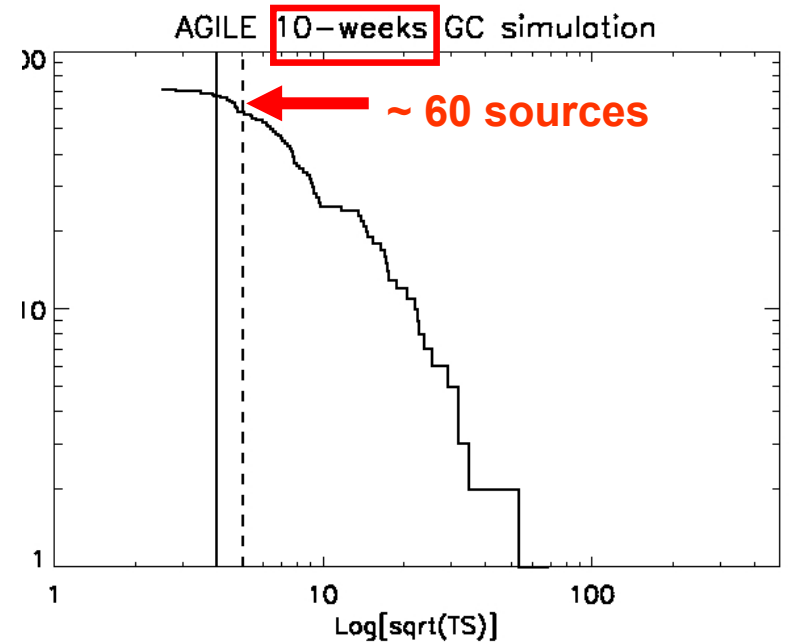
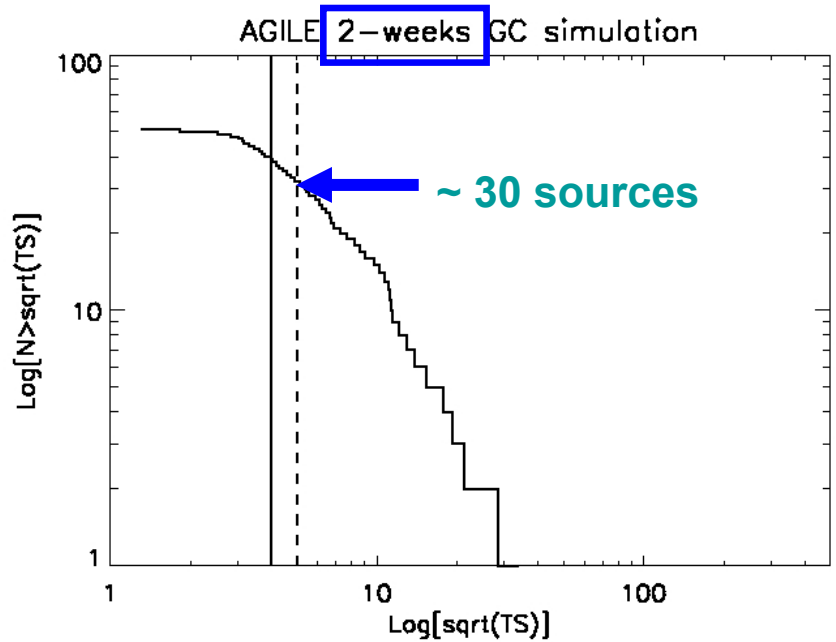
2 weeks



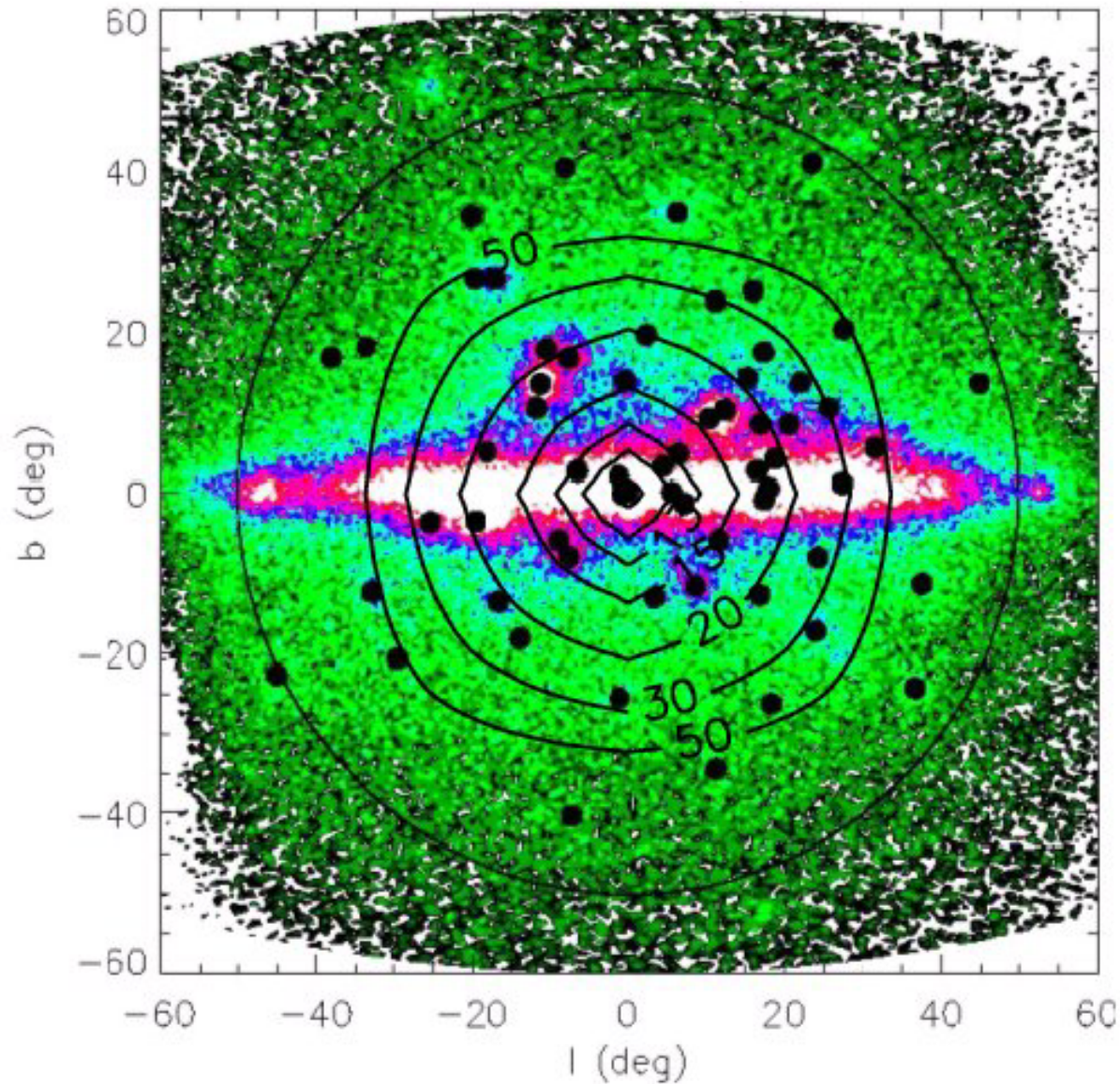
10 weeks



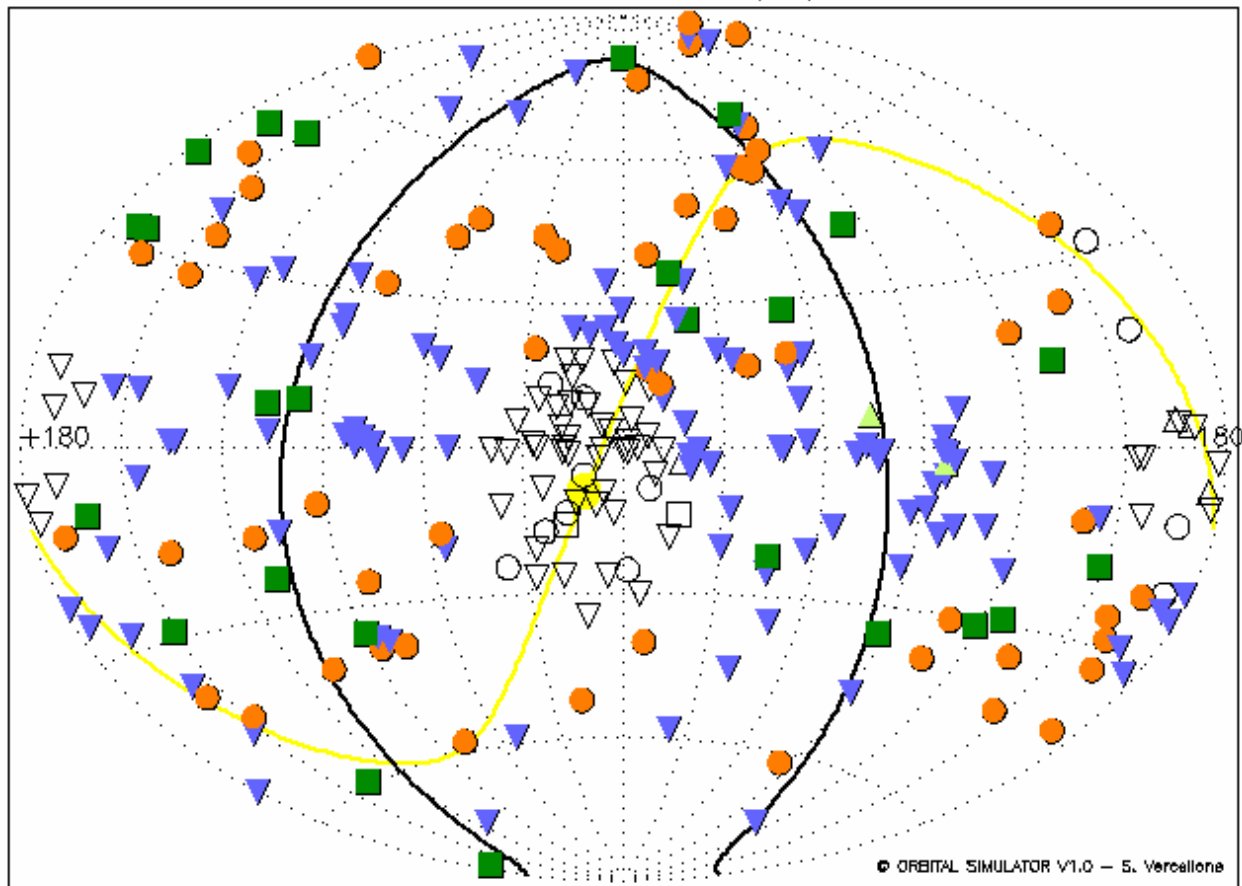
AGILE GAMMA-RAY SOURCE MONITORING (Likelihood simulations)



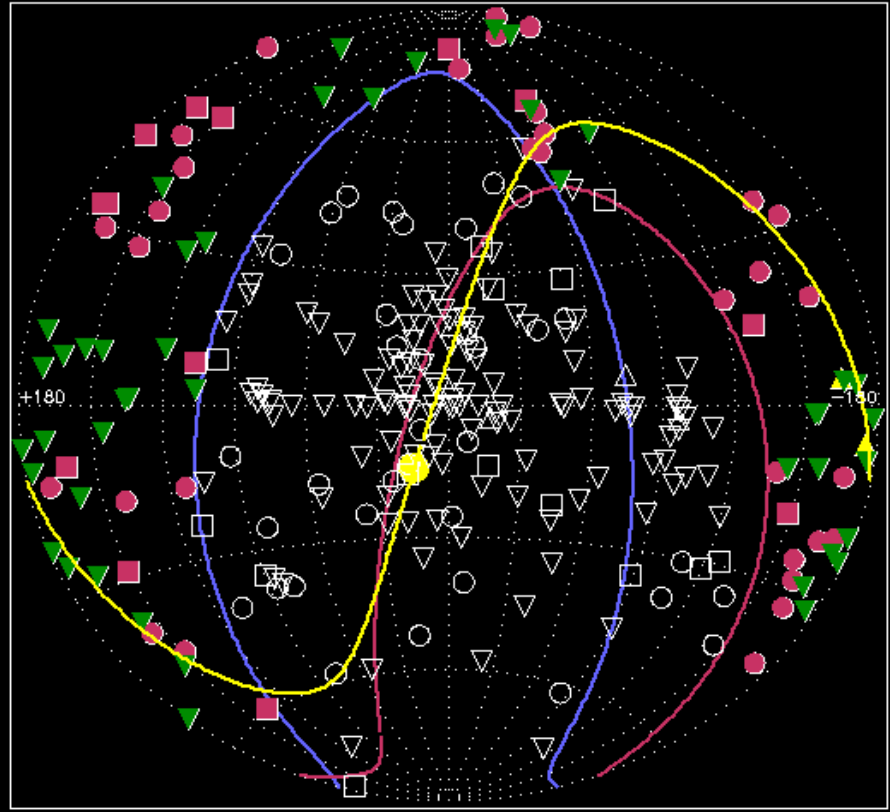
AGILE: simultaneous X-ray/gamma-ray detection



Sources visible on JD 2453736.5 1/1/2006 $D \leq 60.0$



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



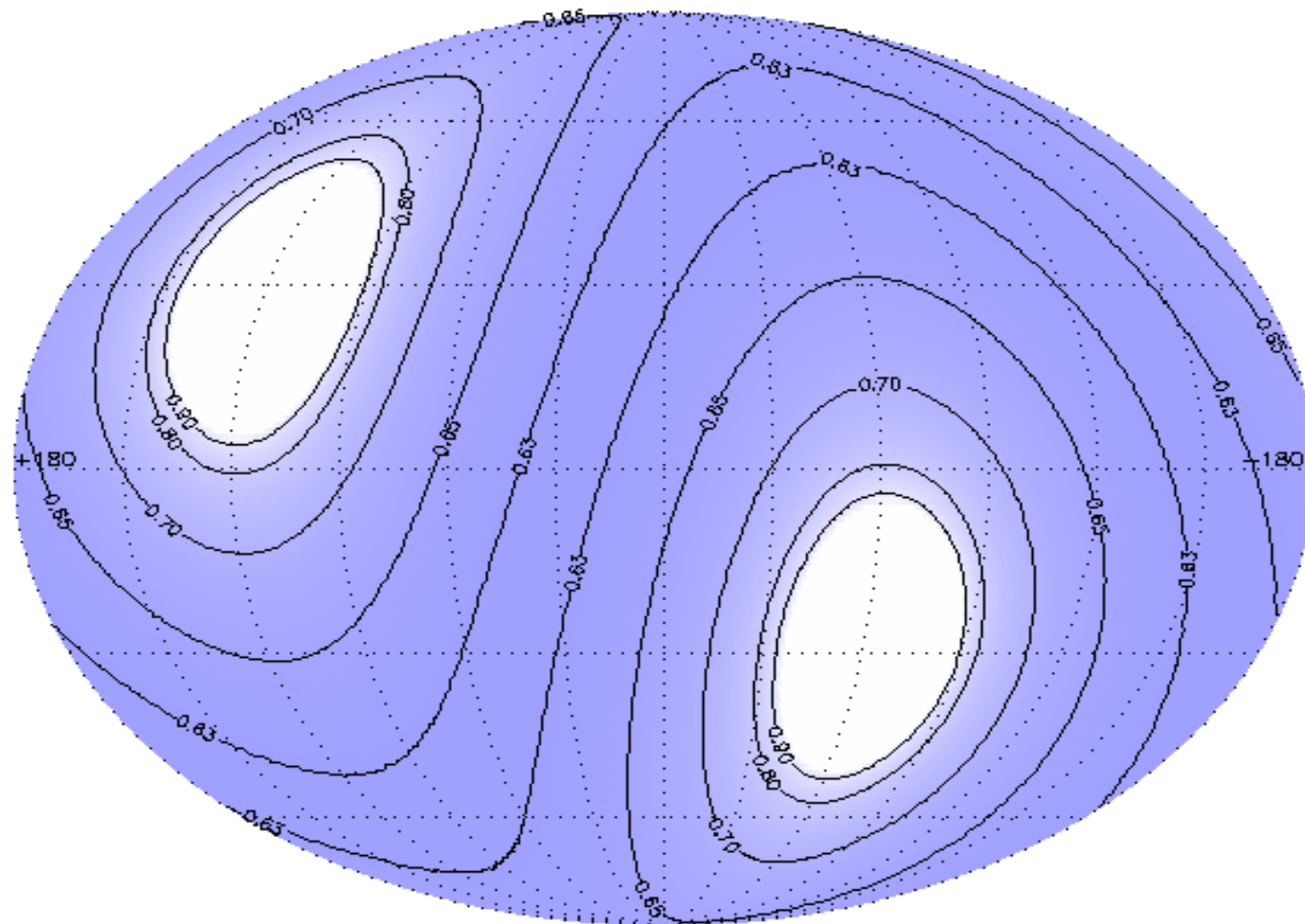
IDENTIFIED AGNs : 32

CANDIDATE AGNs : 13

GAMMA-RAY PSRs : 2

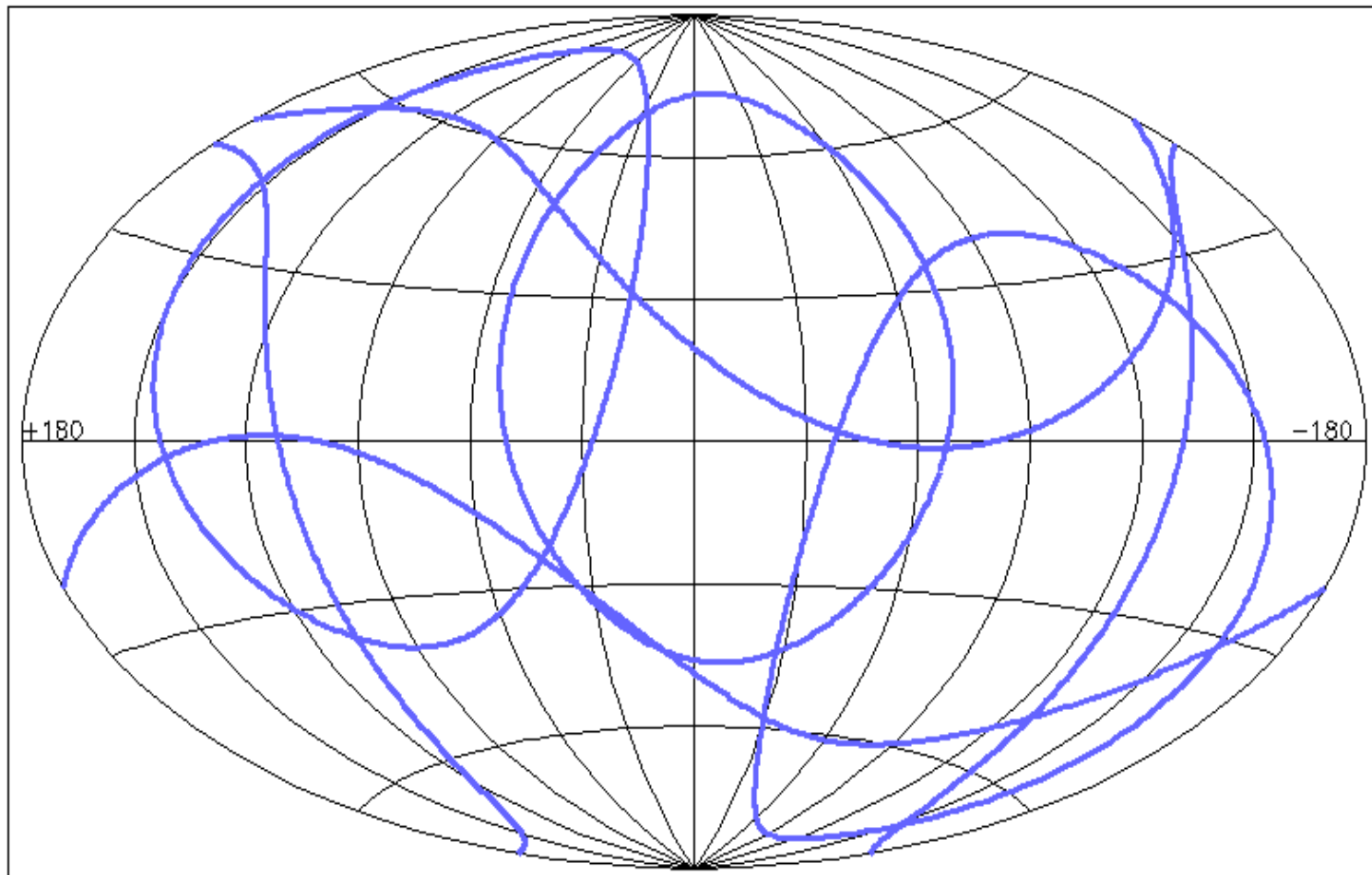
UNIDENTIF. SRCs : 45

EARTH OCCULTATION PATTERN (Galactic Coordinates), 550 Km, incl.=5 deg

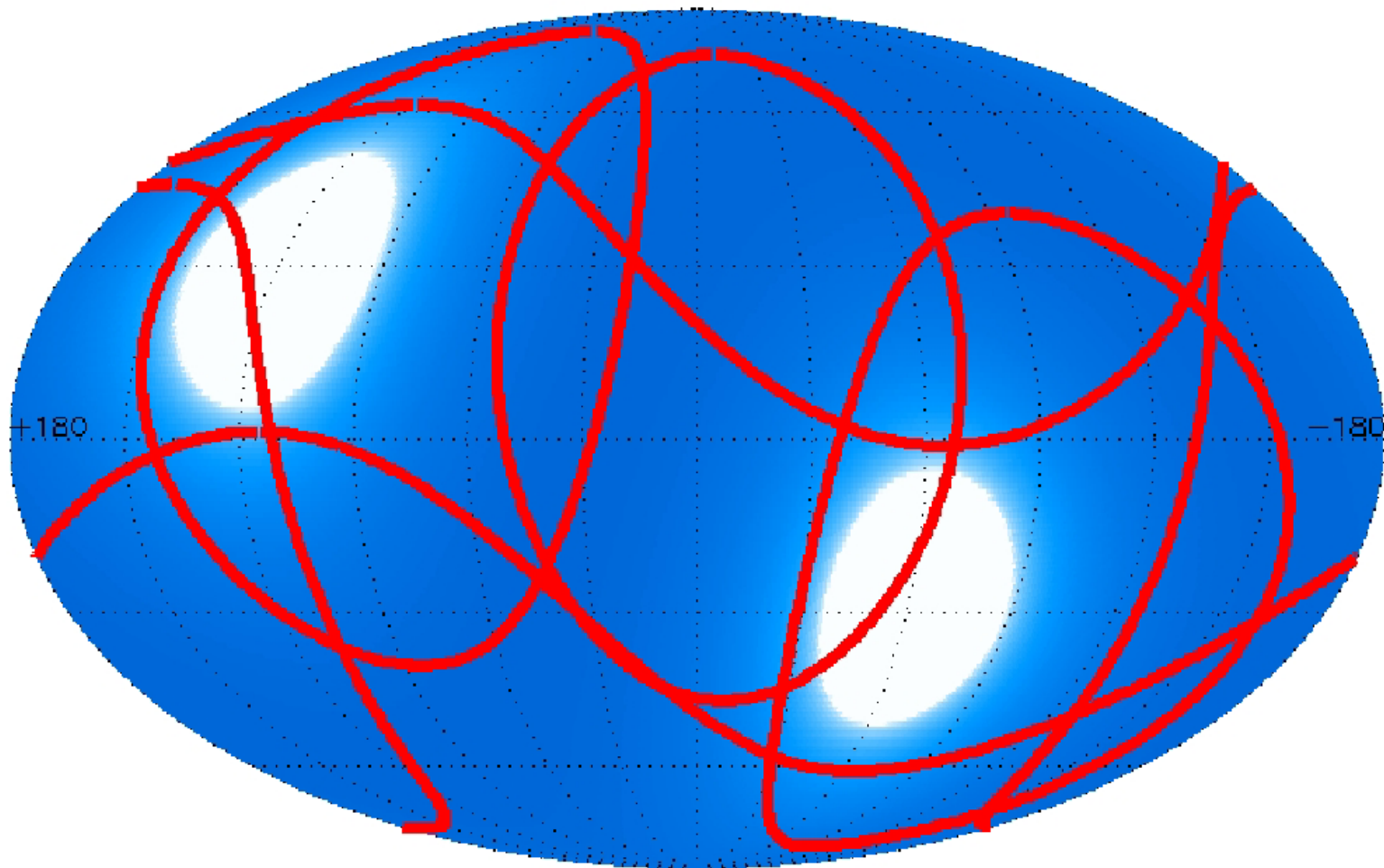


Plan n.1
(all-sky quasi-uniform coverage)

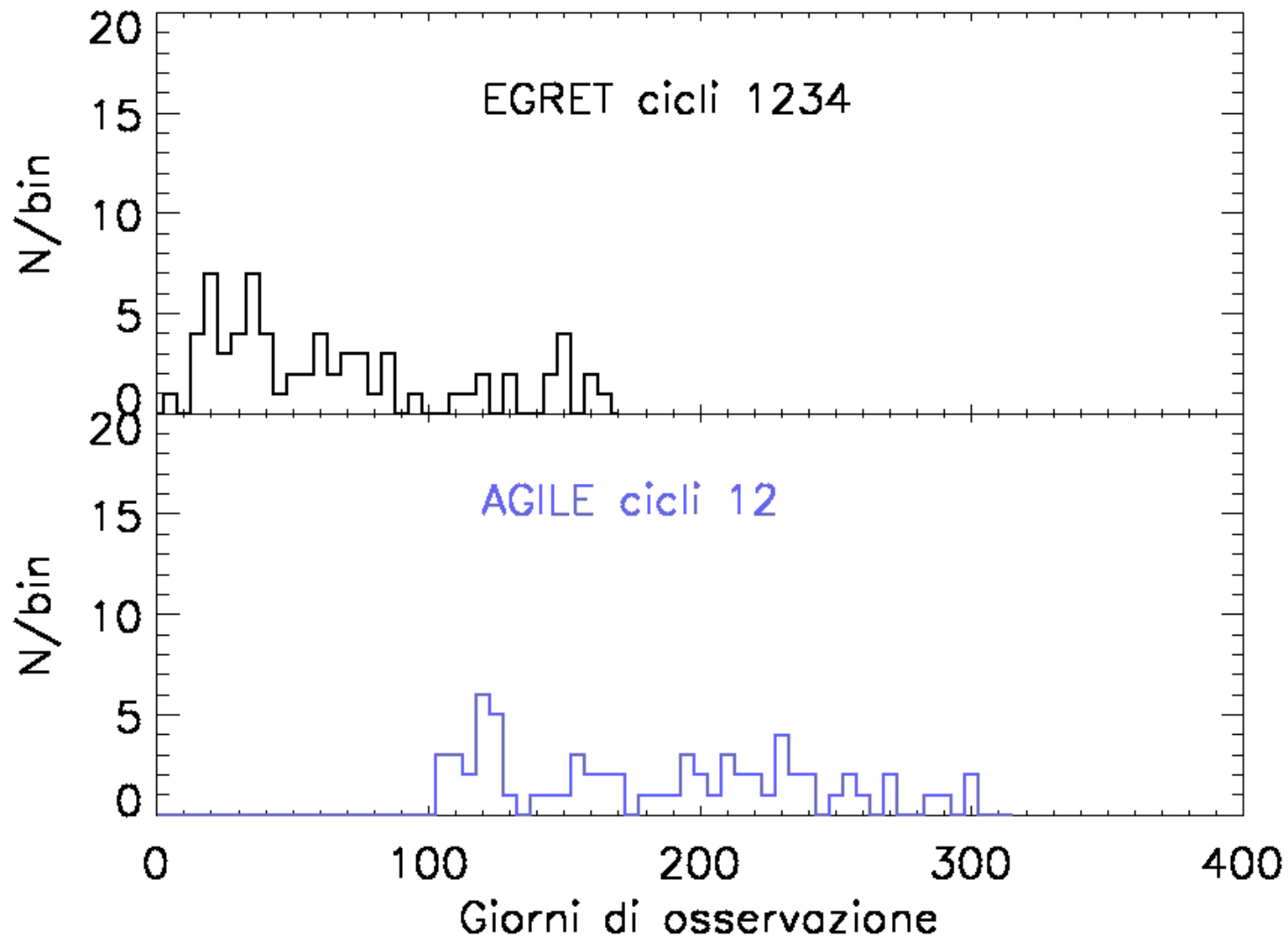
AGILE Possible Cycle 1 Pointings



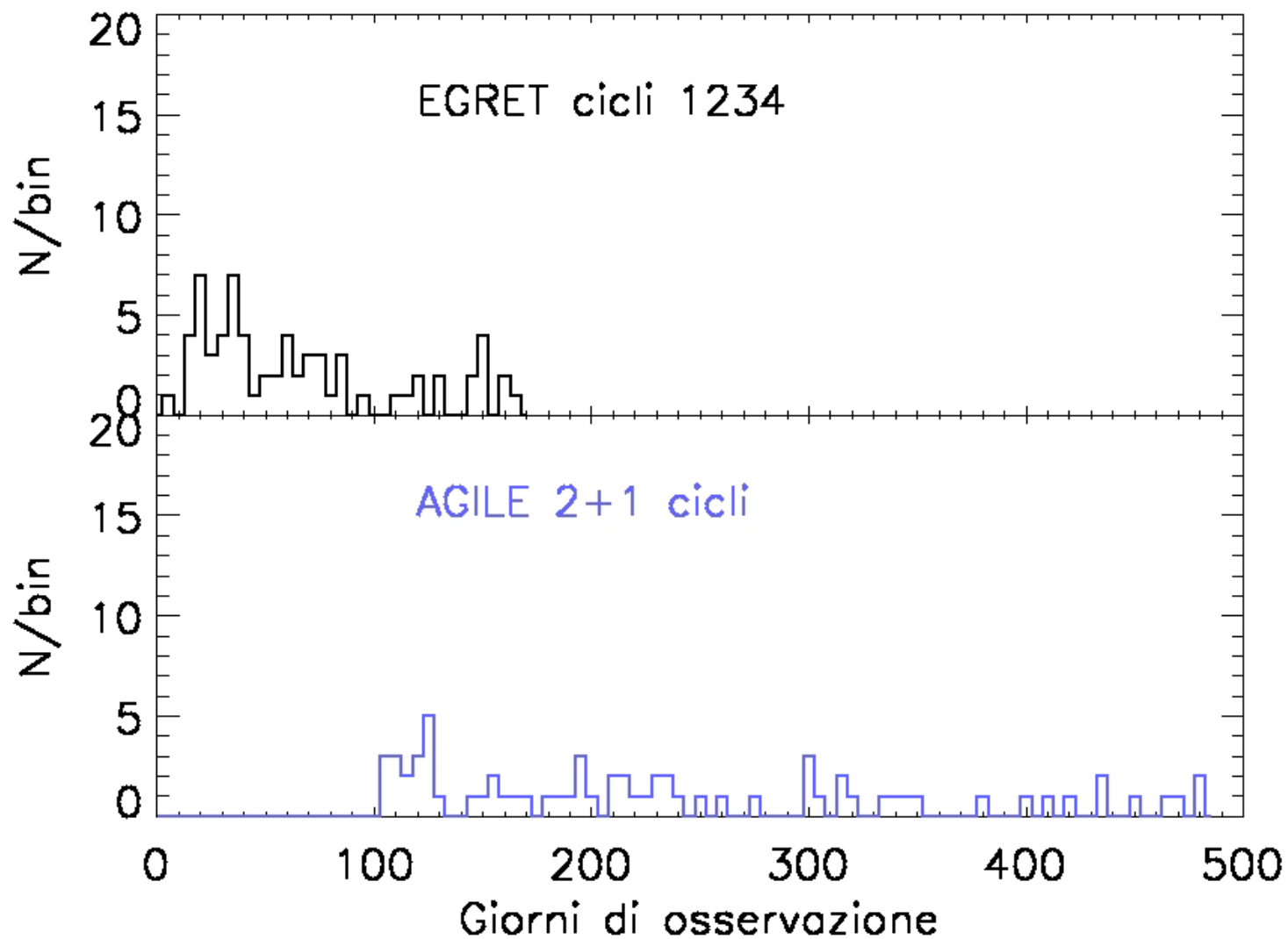
AGILE Possible Cycle 1 Pointings

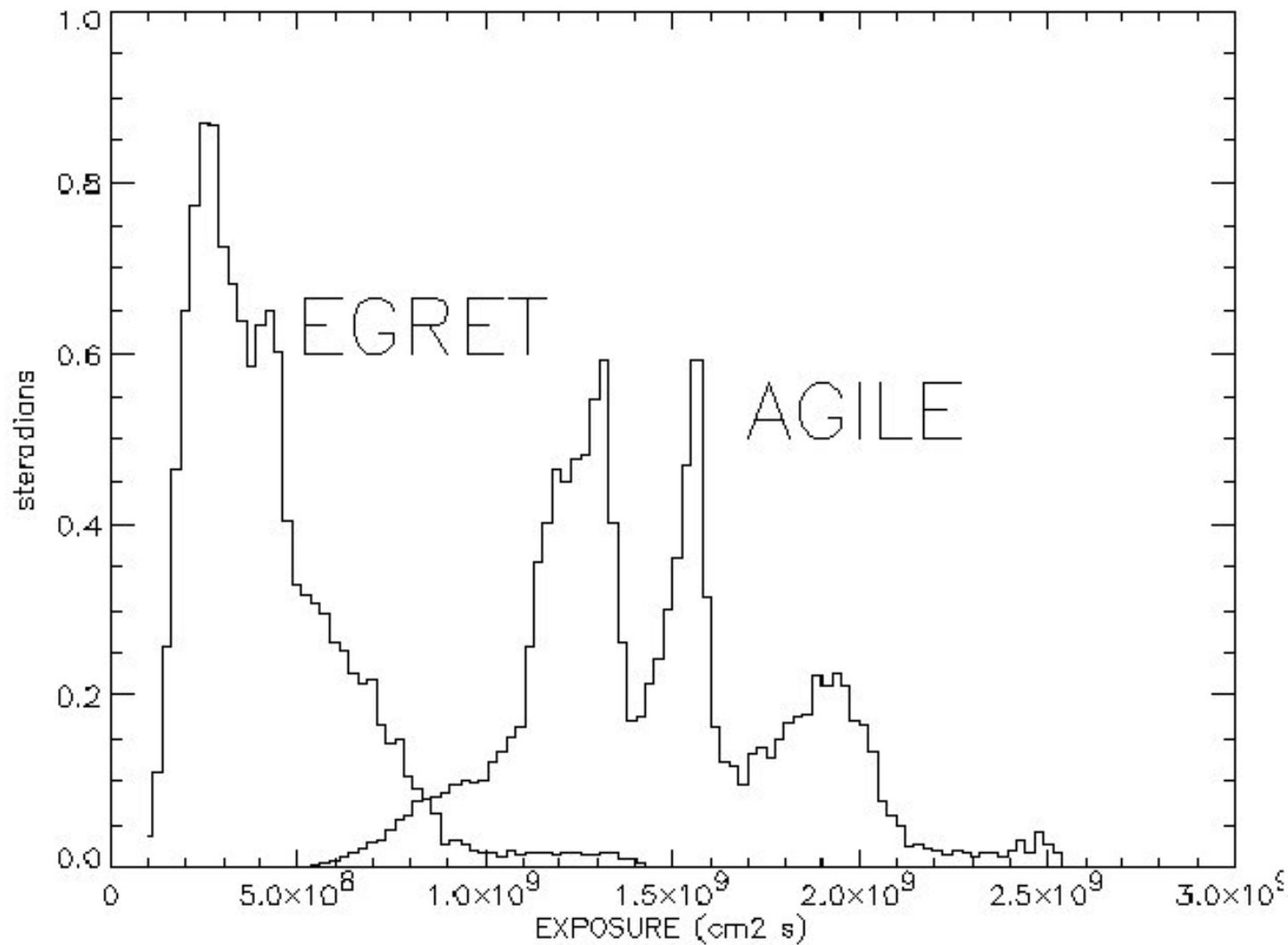


EGRET-AGILE

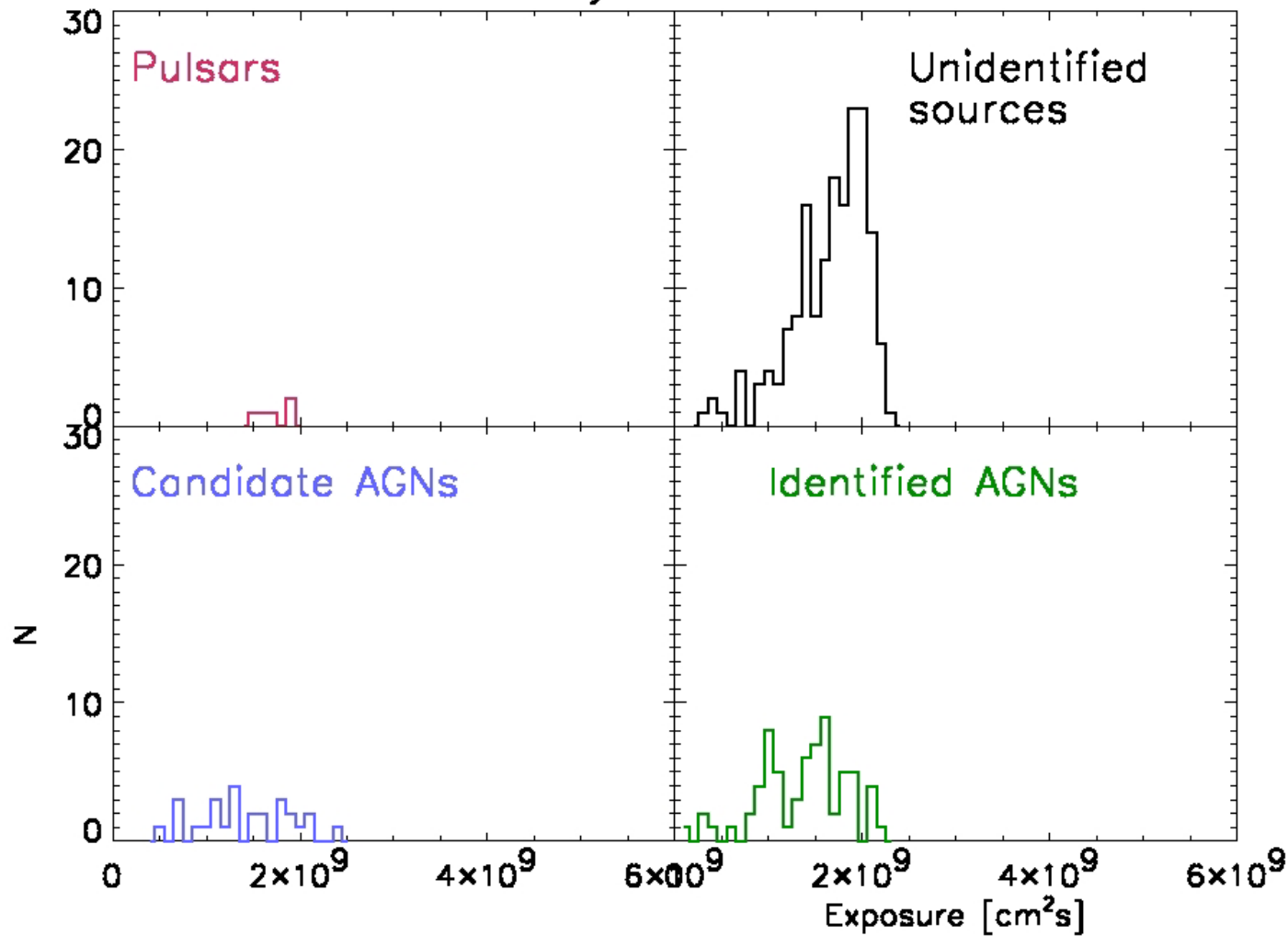


EGRET-AGILE

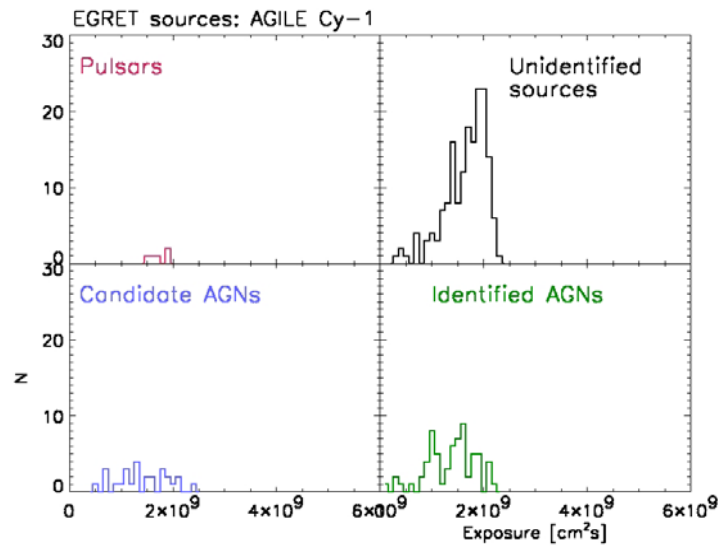
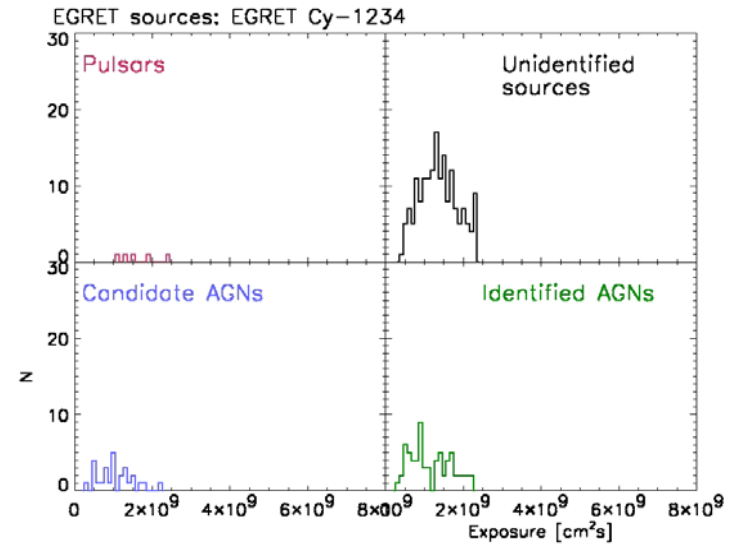
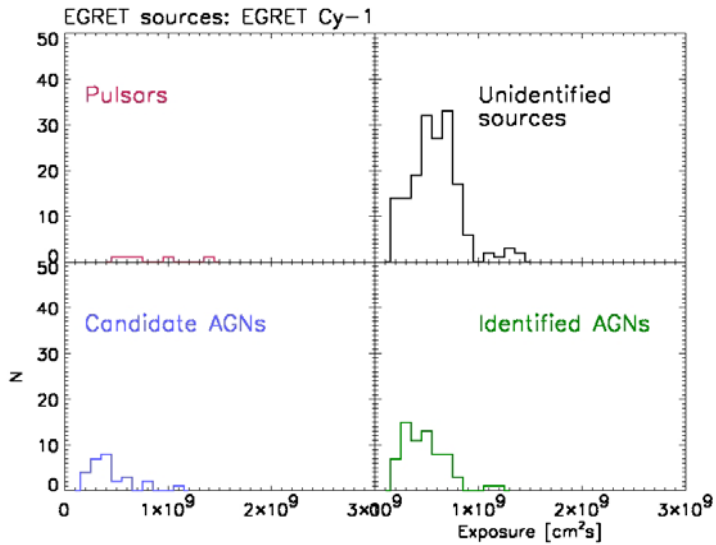




EGRET sources: AGILE Cy-1

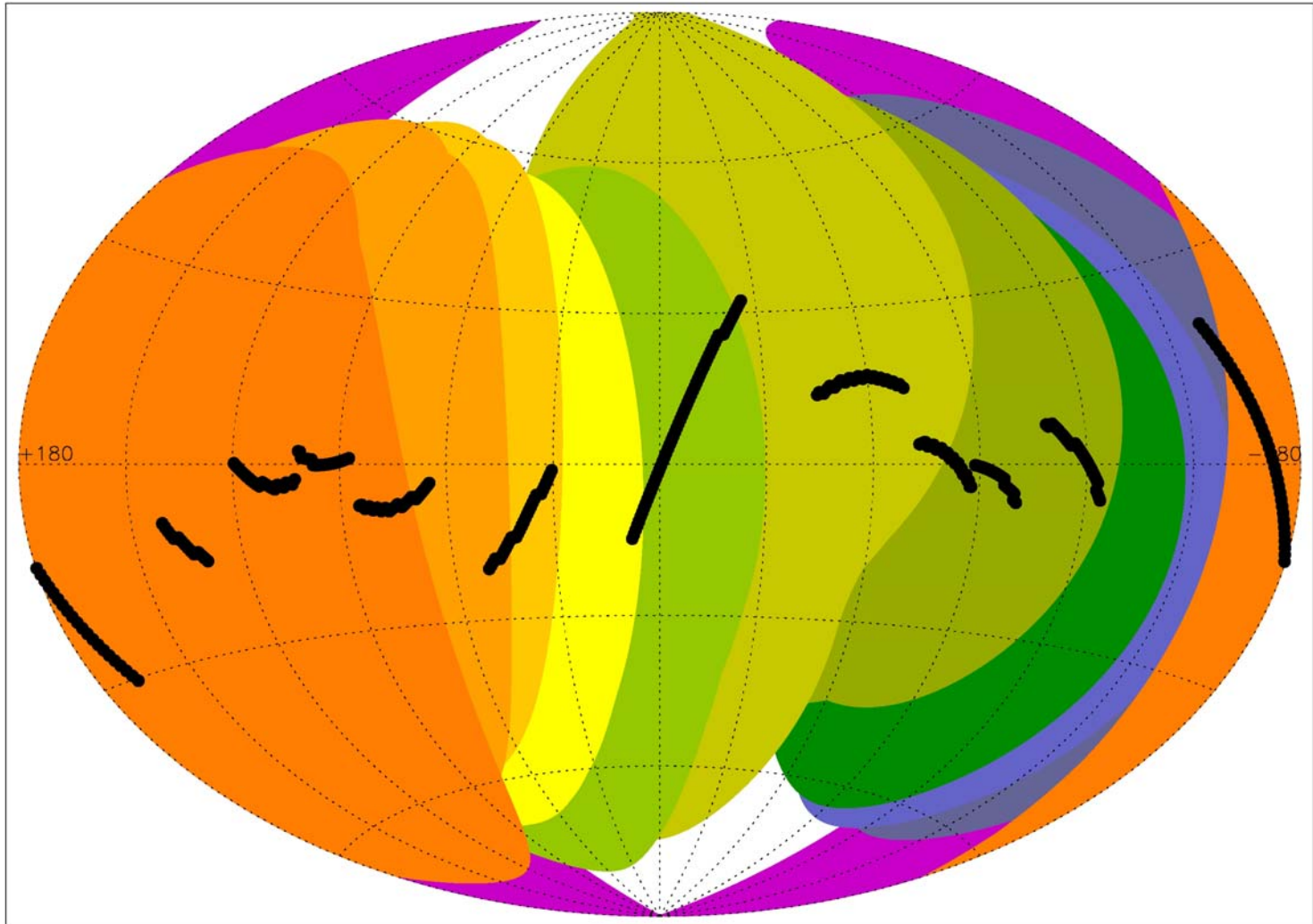


source statistics



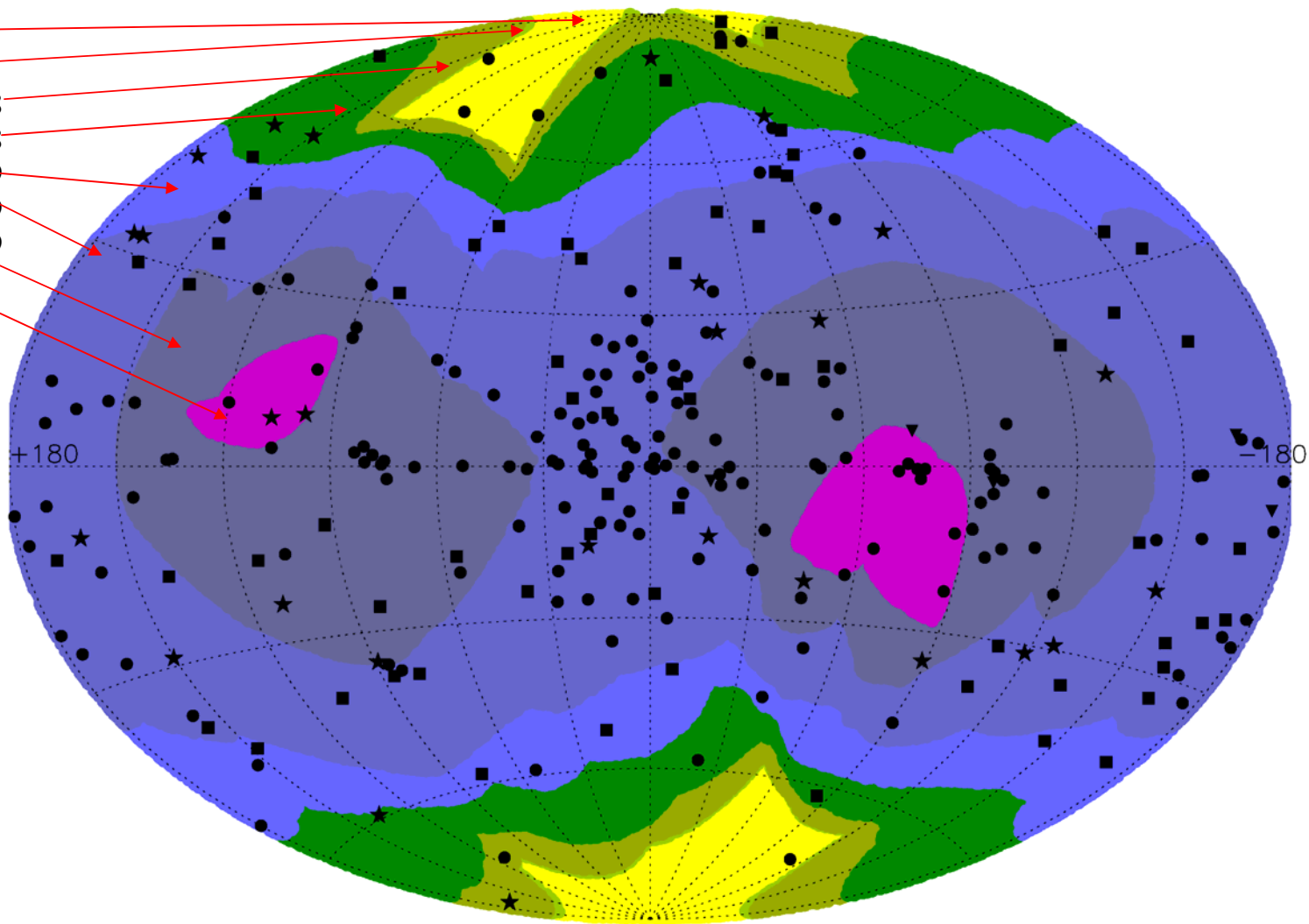
Plan n.2
(Galactic plane “scan”)

AGILE GALACTIC PLANE SCAN POINTINGS

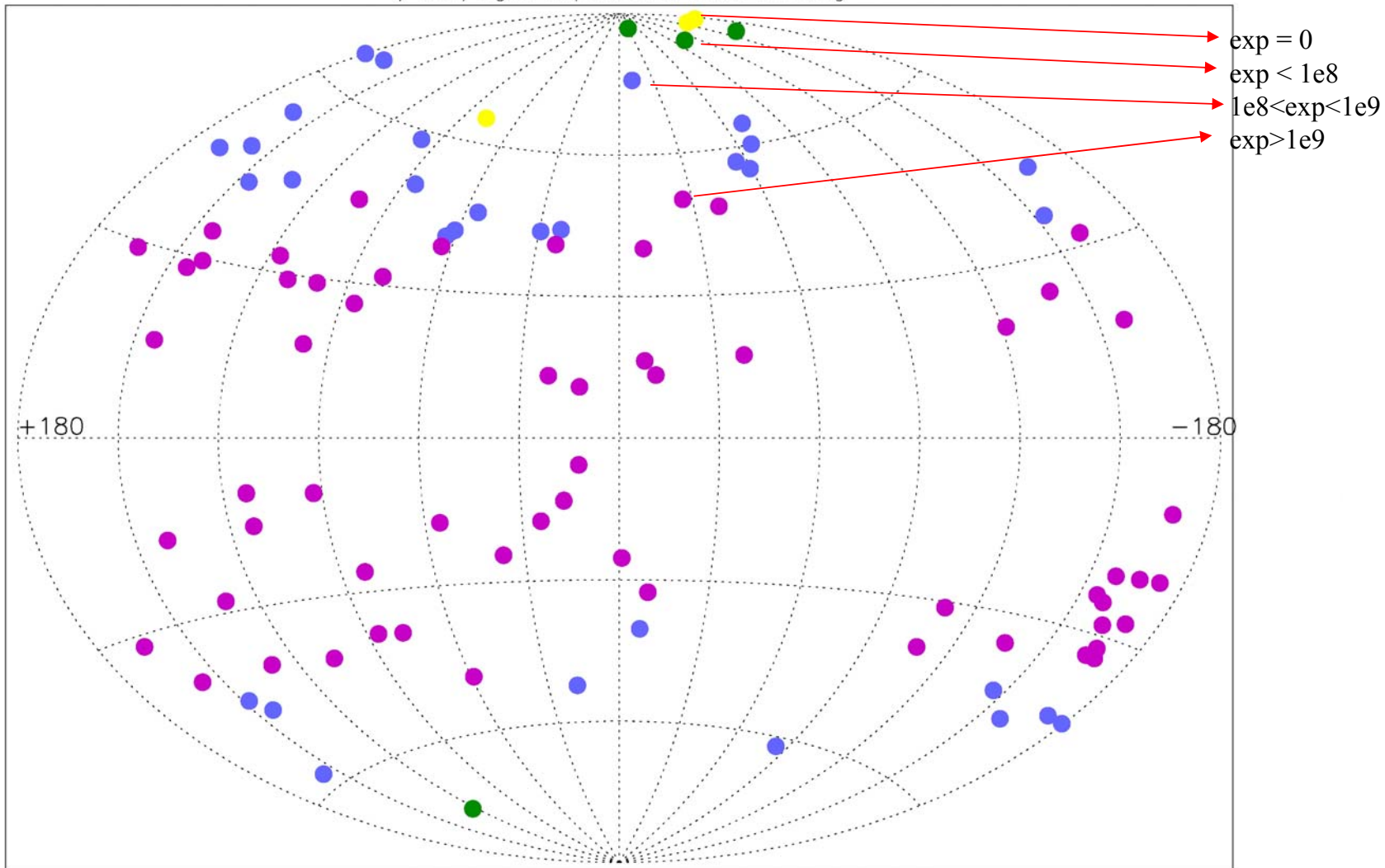


AGILE GALACTIC PLANE SCAN SKY COVERAGE

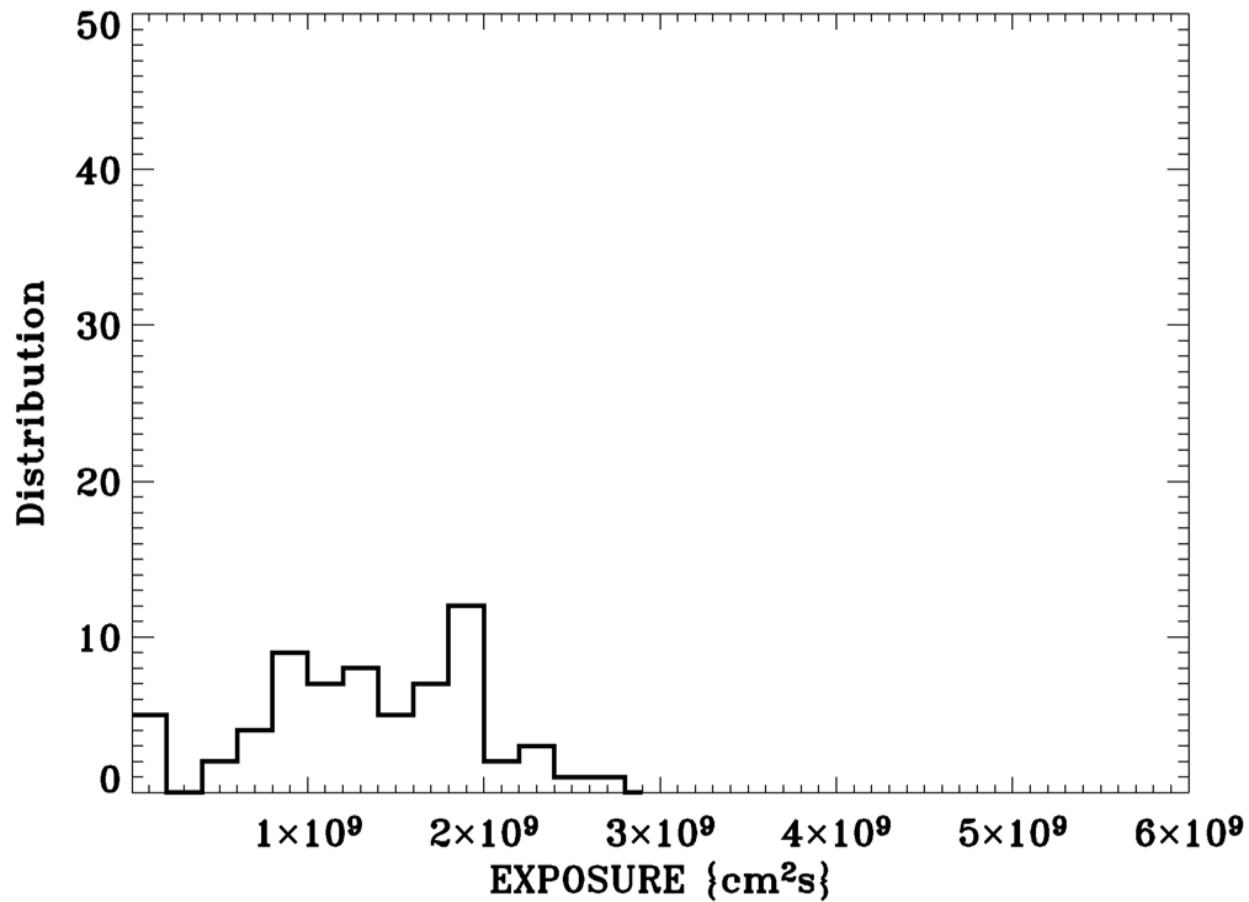
- exp = 0
- exp < 1e7
- 1e7 < exp < 1e8
- 1e8 < exp < 5e8
- 5e8 < exp < 1e9
- 1e9 < exp < 2e9
- 2e9 < exp < 3e9
- exp > 3e9



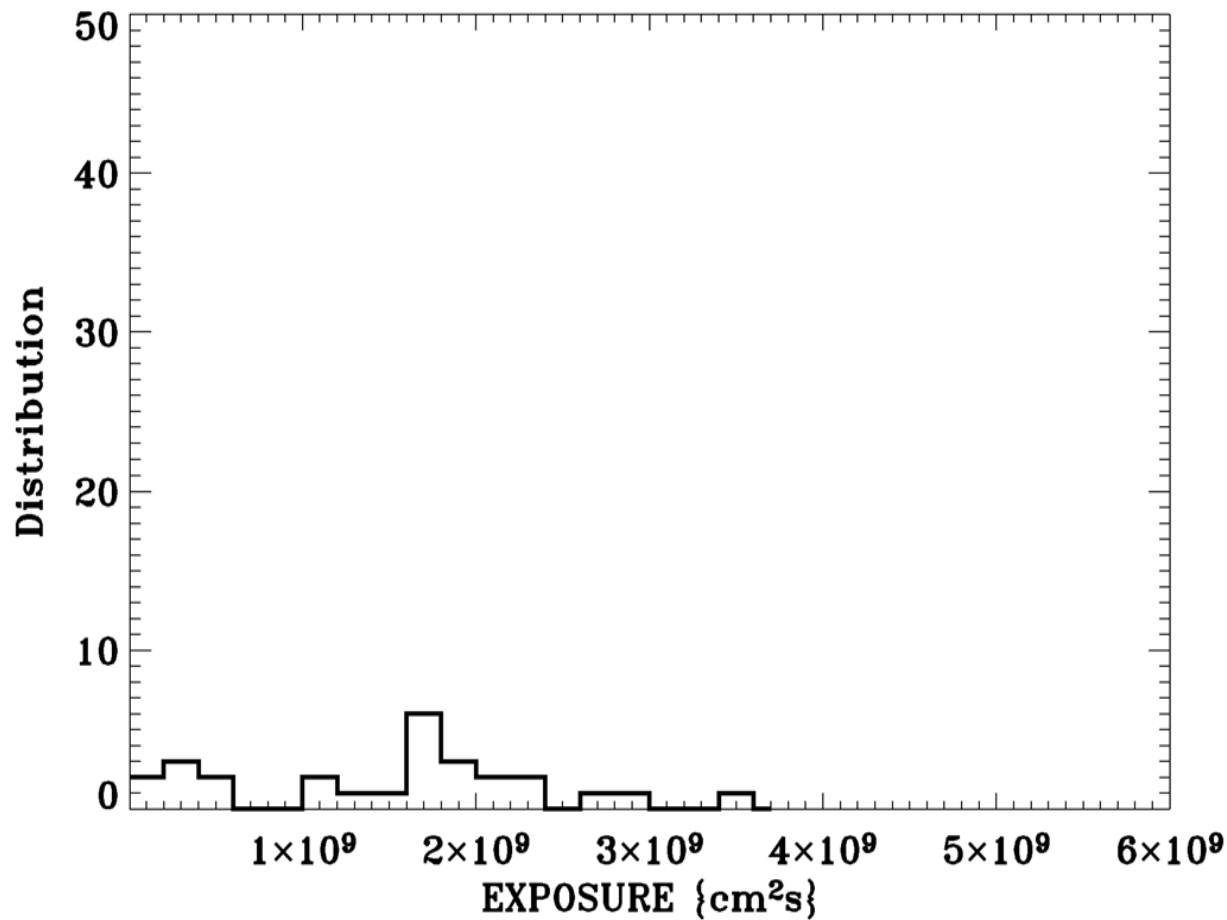
./FITS/agile_exp_GPS_ENIGMA_catalog



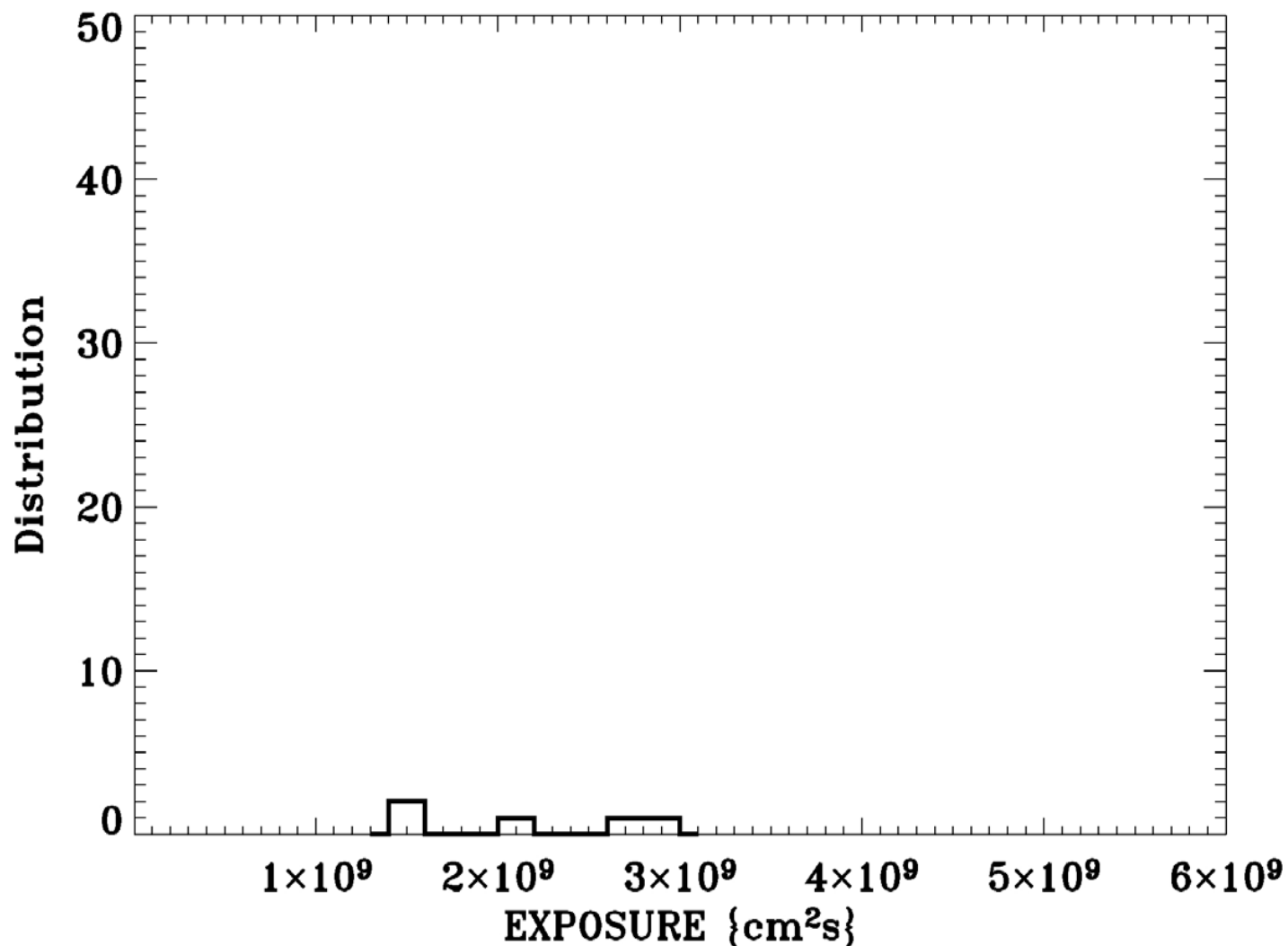
AGILE Galactic Plane Scan – AGNs



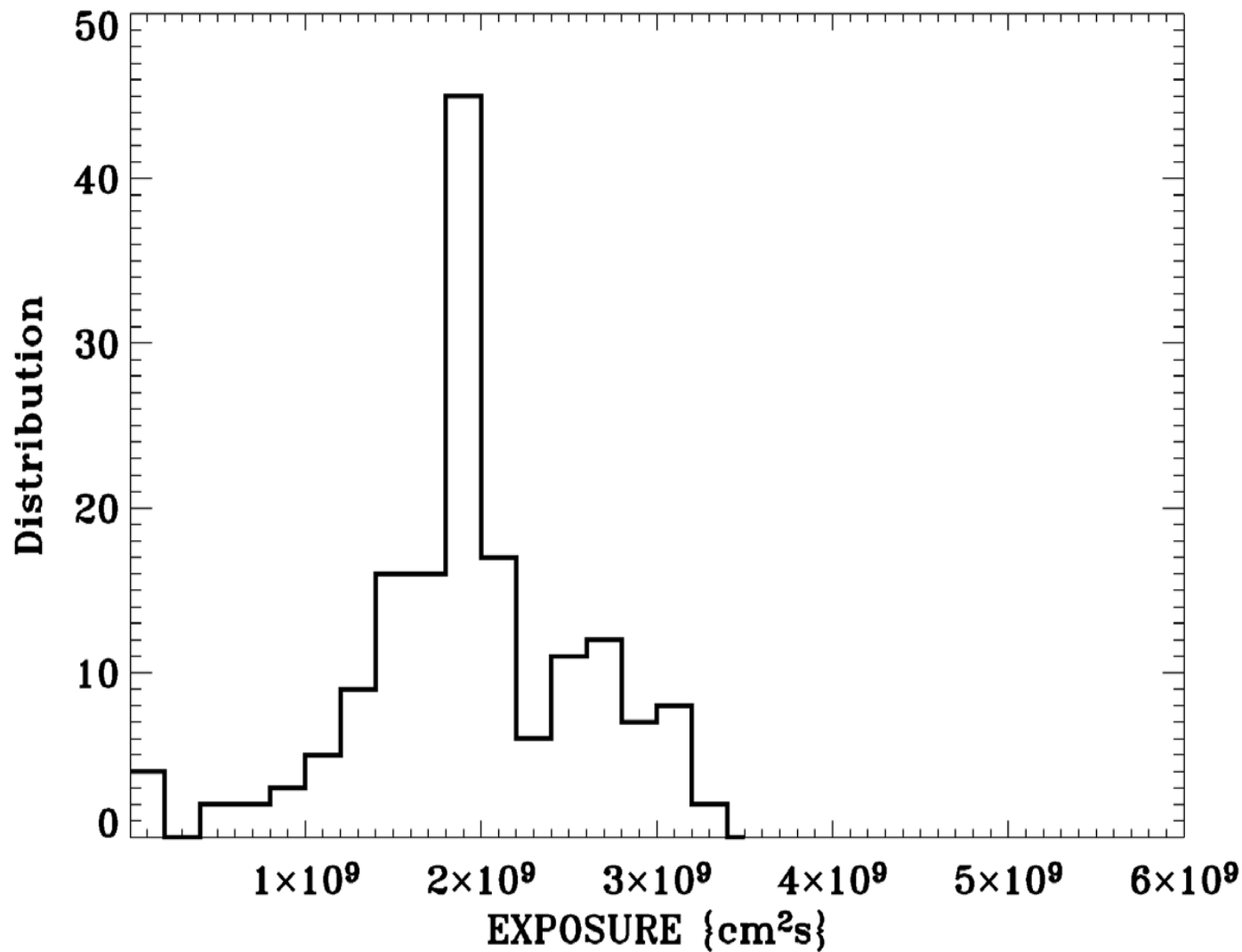
AGILE Galactic Plane Scan – Cand. AGNs



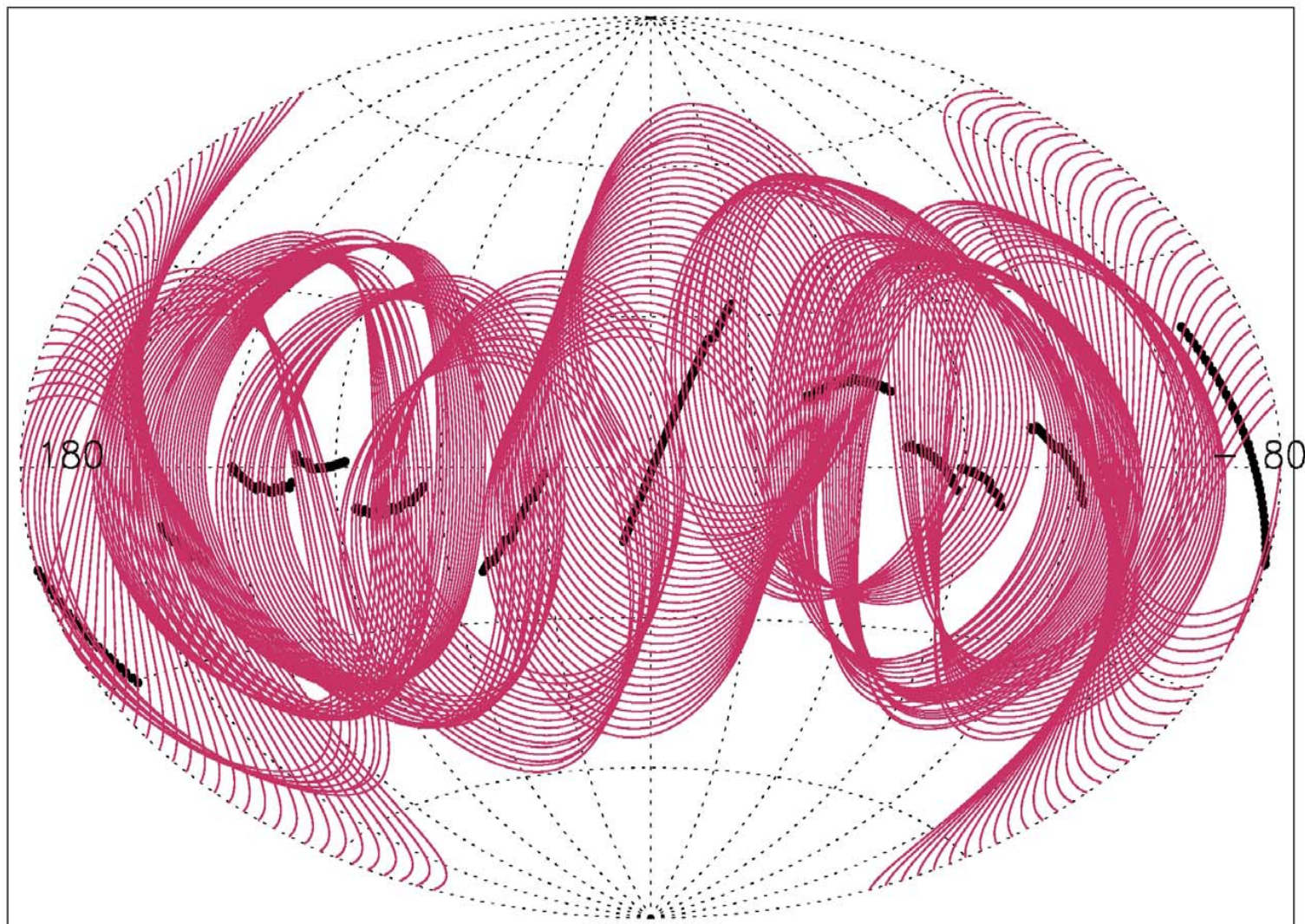
AGILE Galactic Plane Scan – PSRs



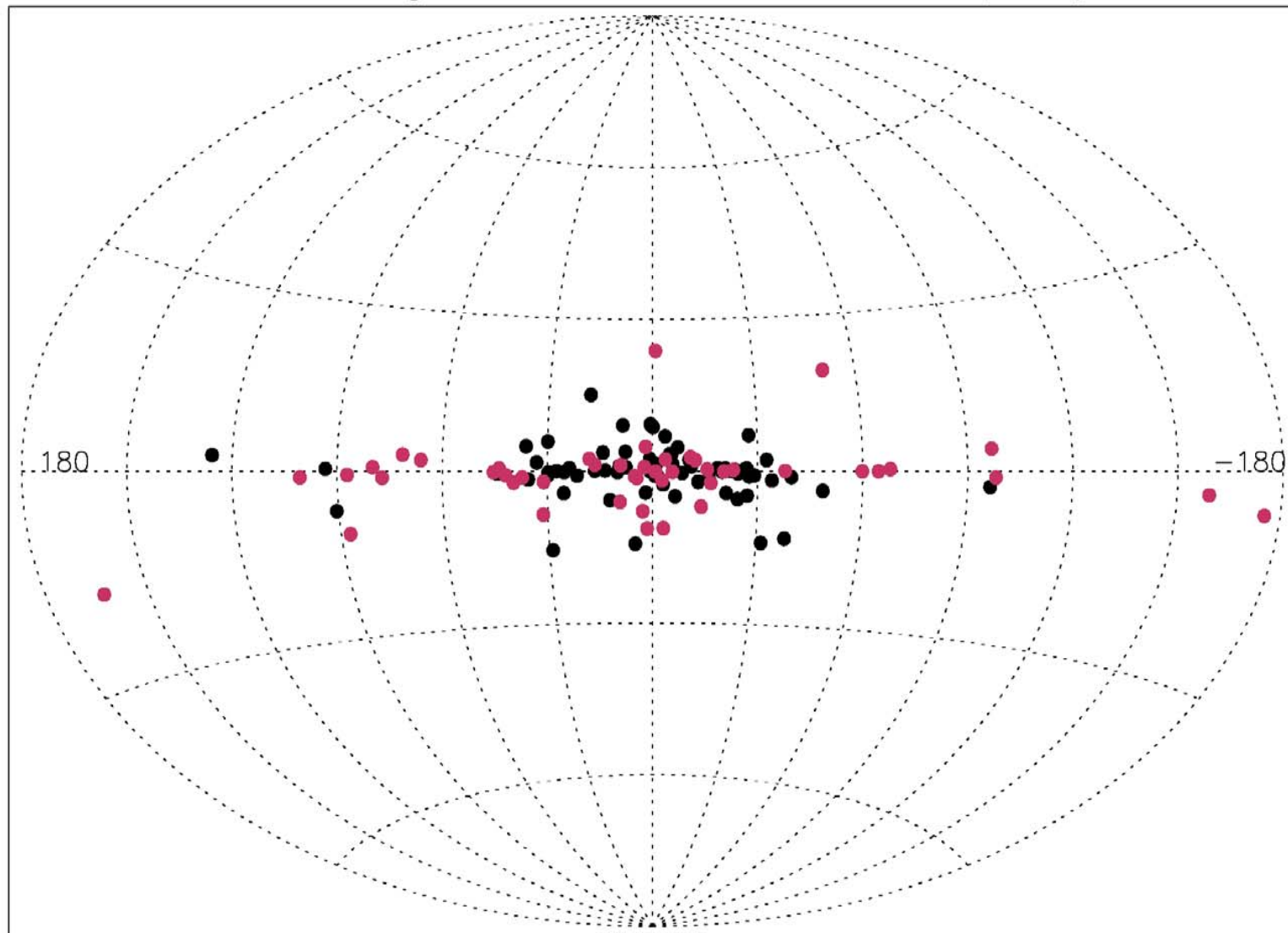
AGILE Galactic Plane Scan – UNIDs



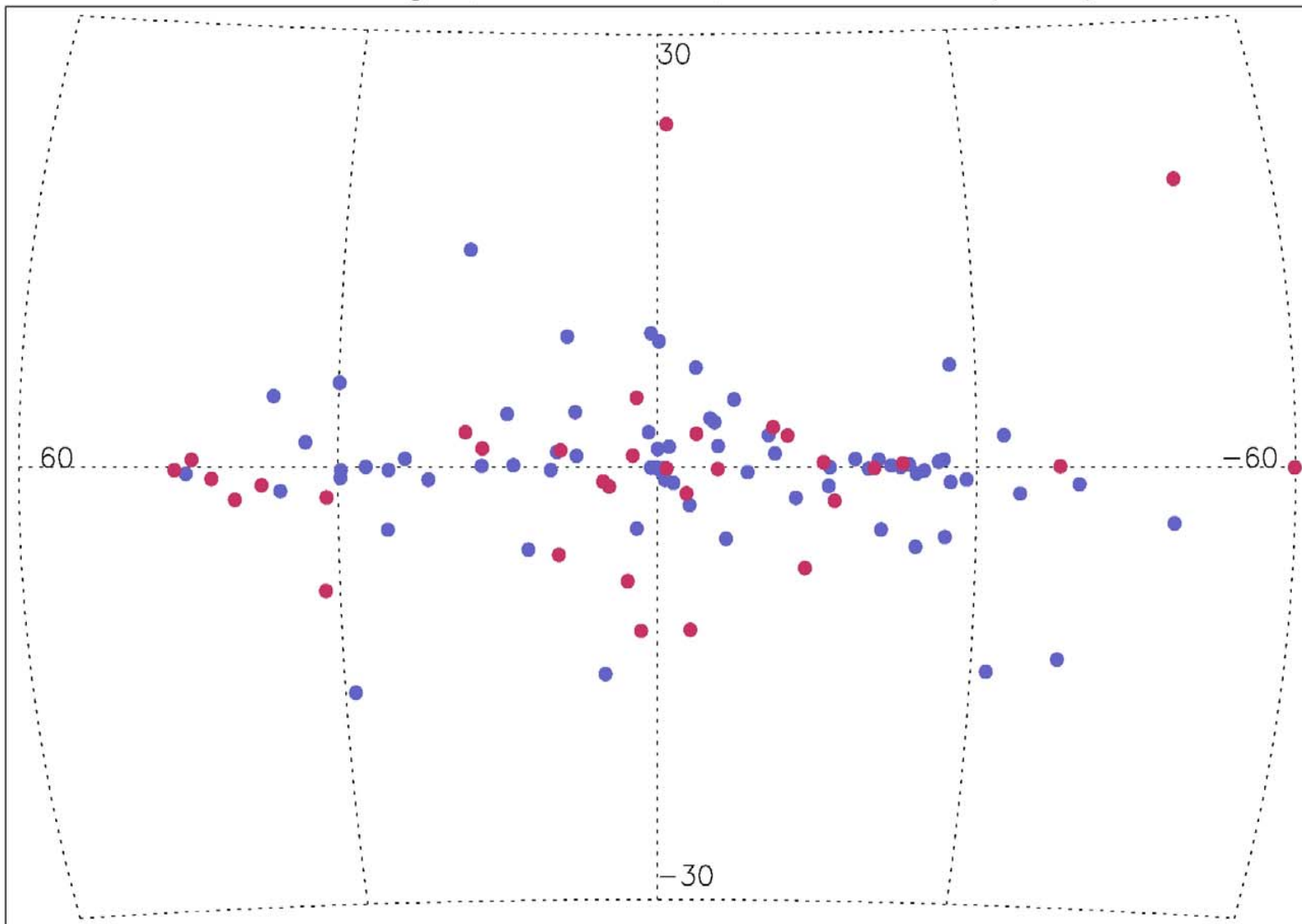
Galactic Plan Scan



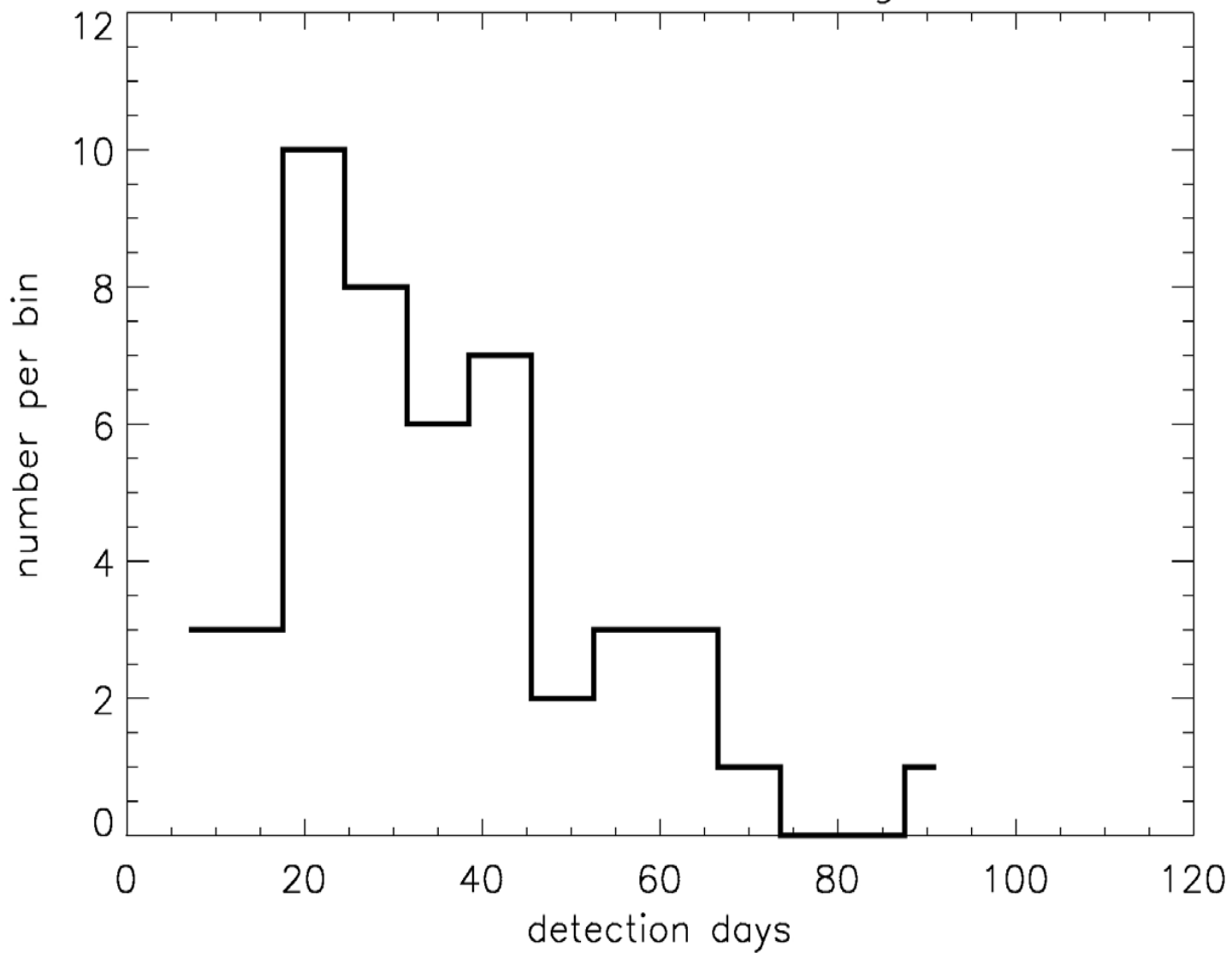
Bird Catalogue, 123 sources, 47 detected ('AND')



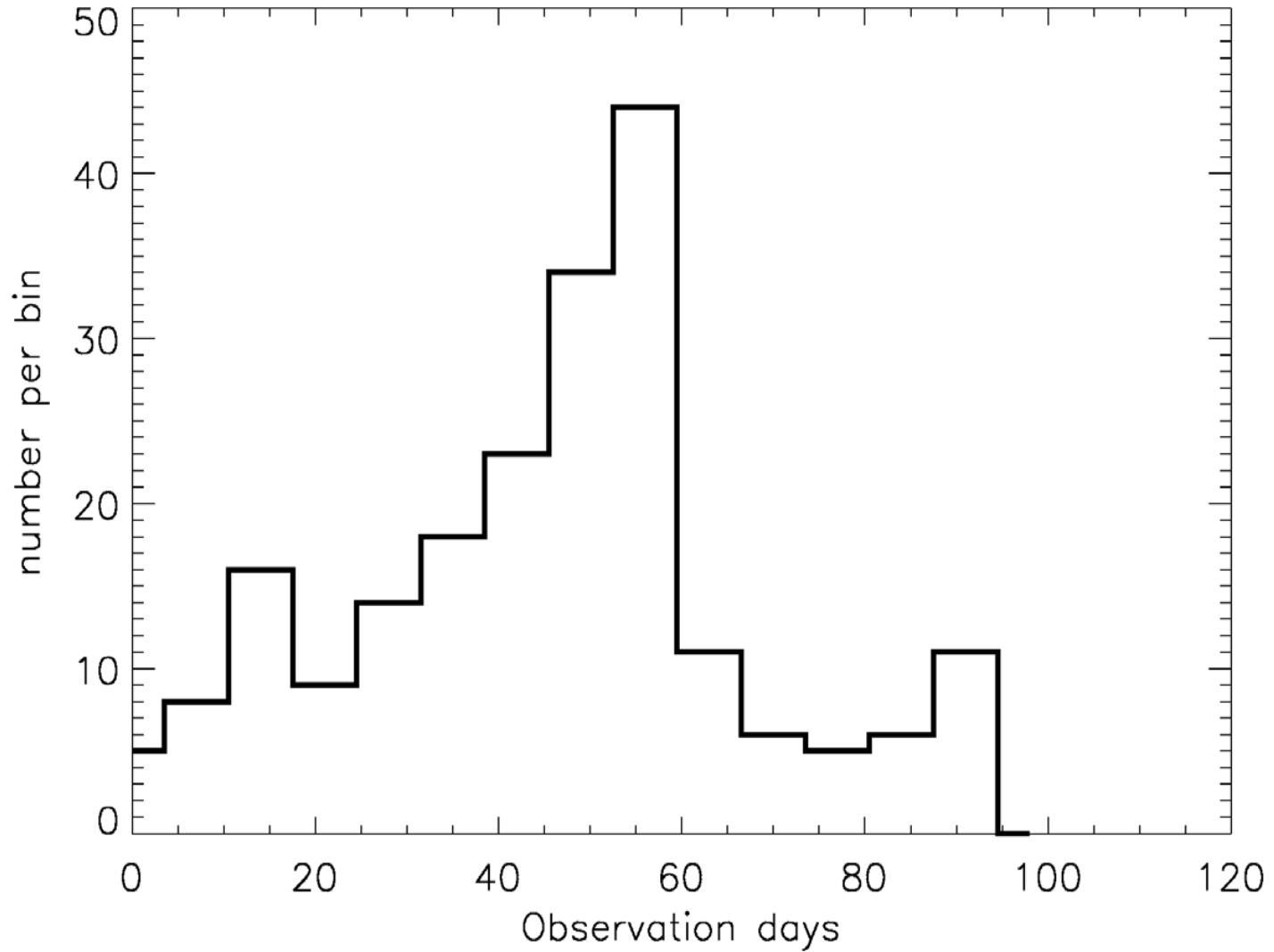
Bird Catalogue, 105 sources, 33 detected ('AND')



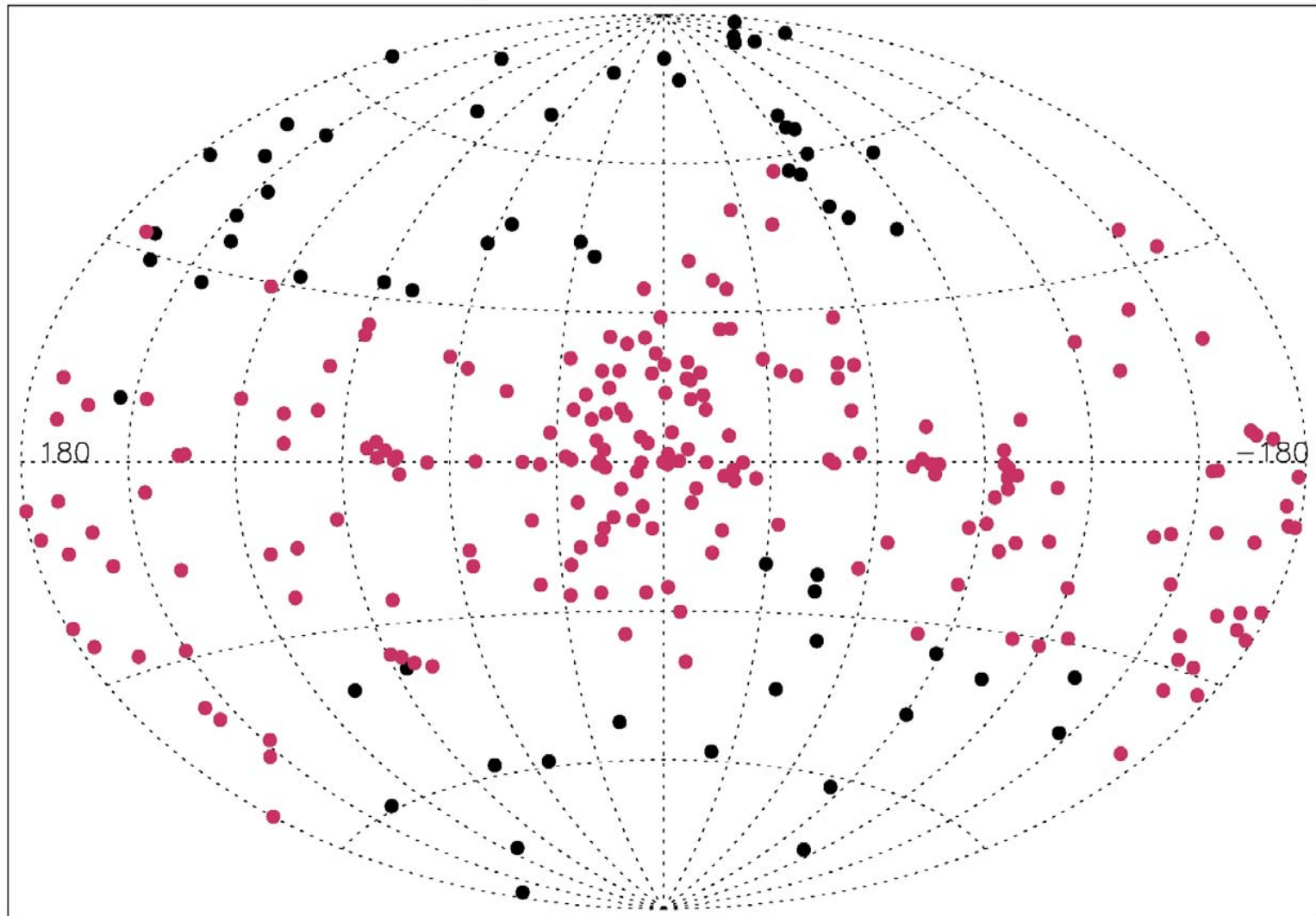
'AND' AGILE GPS – Bird Catalogue Sources



AGILE GPS – 271 3EG srcs, 210 obs.



3EG catalogue: 271 sources, 210 observed

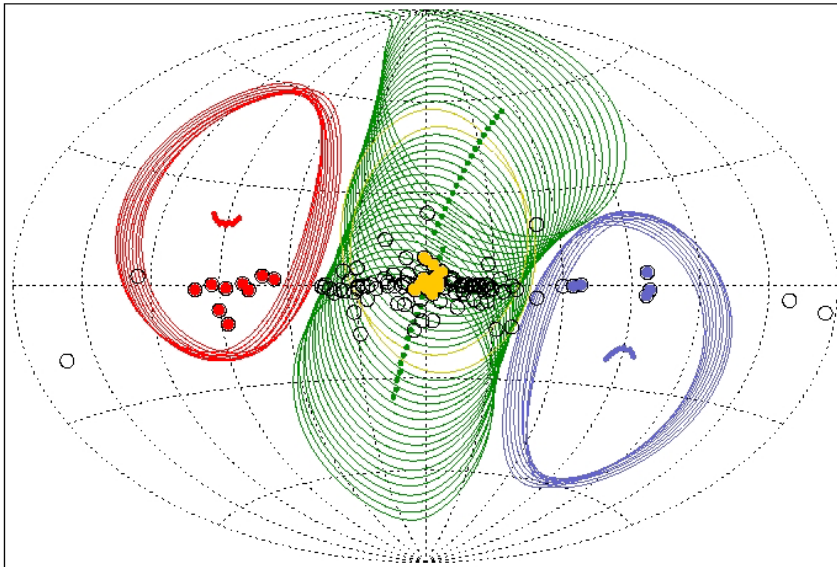


Plan n.3
(Galactic Center long-duration scan
and “eye” long exposure)

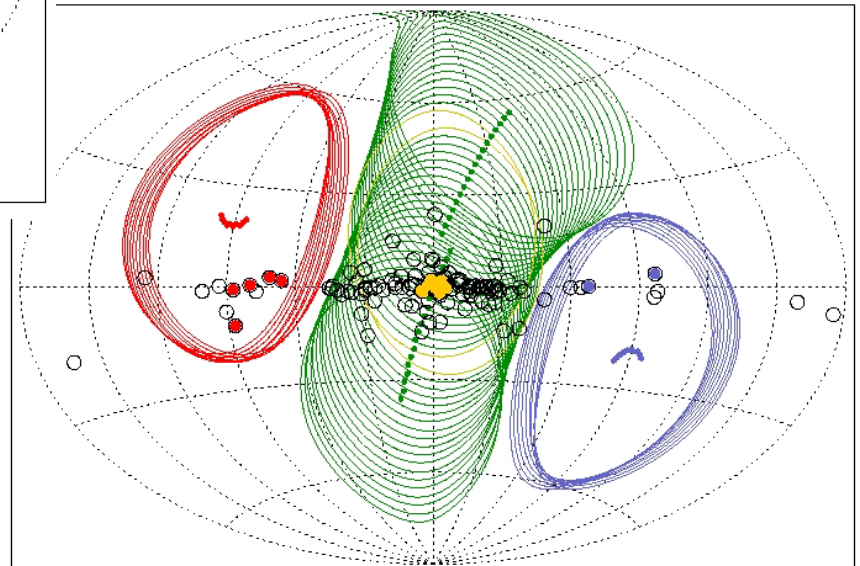
. Some examples of continuous pointings:

.**RED** and **BLUE** : sources monitored for 60 days

.**GREEN** : sources monitored for 80 days



Monitored & Detected



SA sensitivity
profile from Tavani et al., 2004 .

Plots by G. Pollini.

Science trade-off

- Discussion within the AGILE Team
- Discussion with the community and the AMG
- Proposal to the AGILE Pointing Program Committee

Scientific collaboration of the AGILE Team with the community

- **AT open to collaborate with external groups what express interest.**
- **Collaboration based on an optimal use of facilities/resources for multiwavelength programs.**
- **Collaboration formally established between the AGILE Team and Groups by implementing “Bilateral Agreements”.**

4. Guidelines that apply to all “Bilateral Agreements” to be established between the AGILE Team and other Groups (see the document AGILE-MW-DOC-01 entitled “Guidelines for scientific collaboration”).

Coordinated multiwavelength observations shall be performed according to the following guidelines:

- identification of a specific investigation for joint work;
- unrestricted access to AT proprietary data and Group data for the purpose of a joint investigation encouraging real-time feedback between different groups;
- shared gamma-ray and multiwavelength data, collected within the framework of an AT Collaboration, has to be treated as strictly confidential. Data obtained by the two groups cannot be distributed outside the Collaboration;

- the AT and the other Group are free to publish independently their own data, if they decide to do so. In this case, the AT or Group communicates the decision to the partner with the commitment of not releasing any information that was in the meantime obtained by means of the ongoing Collaboration. Independent publishing of the results does not preclude the possibility of a joint publication with use of both data sets.
- the AT and the other Group establish a joint publication policy (authorship and task assignment) on a case by case basis;
- two “focal scientists” (one belonging to the AT and the other to the collaborating Group) are assigned to the investigation. The two scientists will have the duty of carrying out specific tasks within their groups and of coordinating the activity and the necessary data calibration.

- the science analysis of AGILE gamma-ray data is expected to be coordinated by AT scientists;
- the AGILE Team can share its data also with other Groups being part of different Collaborations. The AT encourages and foster collaboration among different Groups providing data for the same astrophysical sources. In case a joint collaboration of more than one Group and the AT cannot be established, the AT is free to make appropriate use of its data with the different Groups separately according to these Guidelines and following the commitment of data confidentiality.
- Any conflict or problematic issue within the Collaboration will be resolved by the joint resolution of the AGILE PI (on behalf of the AGILE Science Board) and PI/Coordinator of the other Group.

To do...

- **Bi-lateral Agreements following discussion of the Guidelines**
- **Set up of specific Working Groups (for the time being: AGN and PSR)**
- **Preparatory work, testing observing capabilities.**