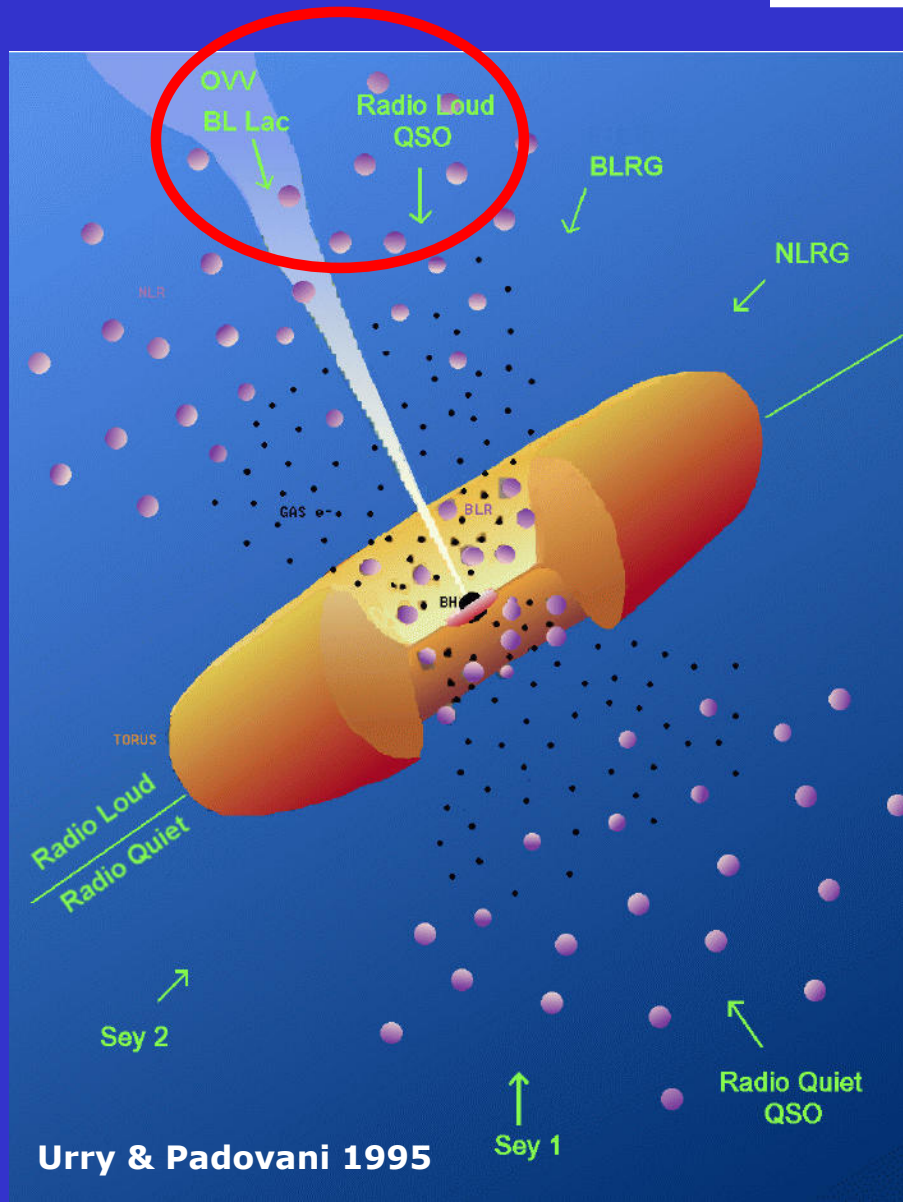


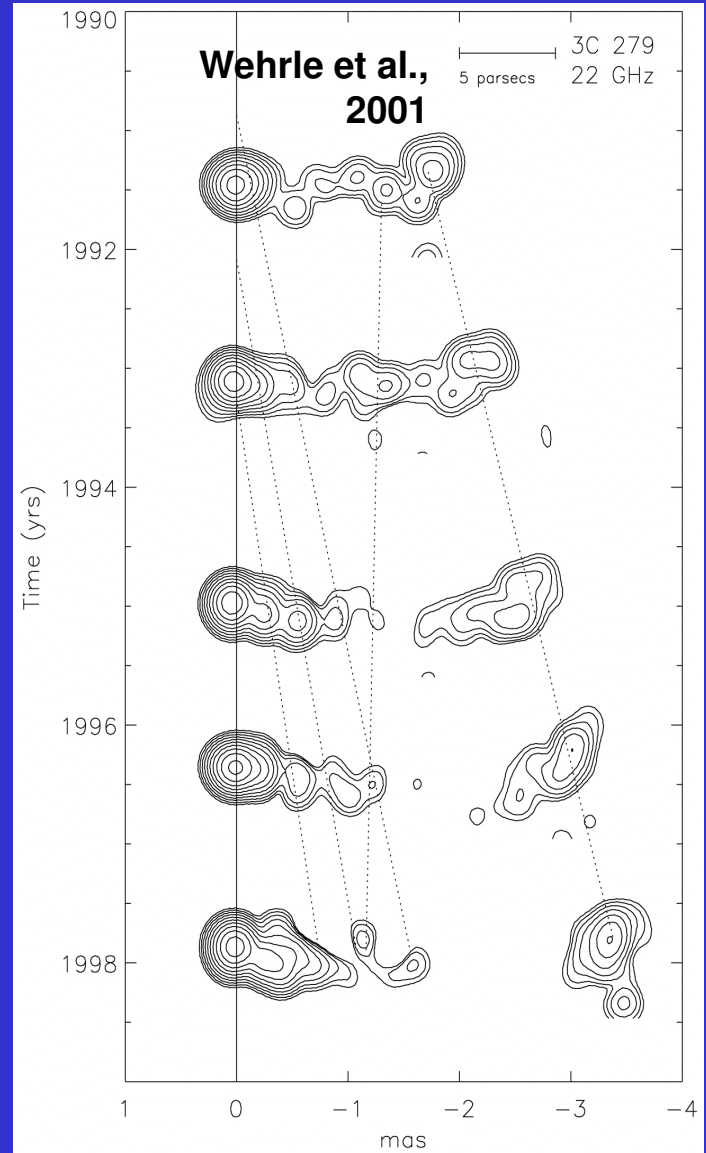
I primi *blazar* di AGILE

Stefano Vercellone, INAF - IASF Milano
on behalf of the AGILE AGN WG and of CaIMI

AGN



Urry & Padovani 1995



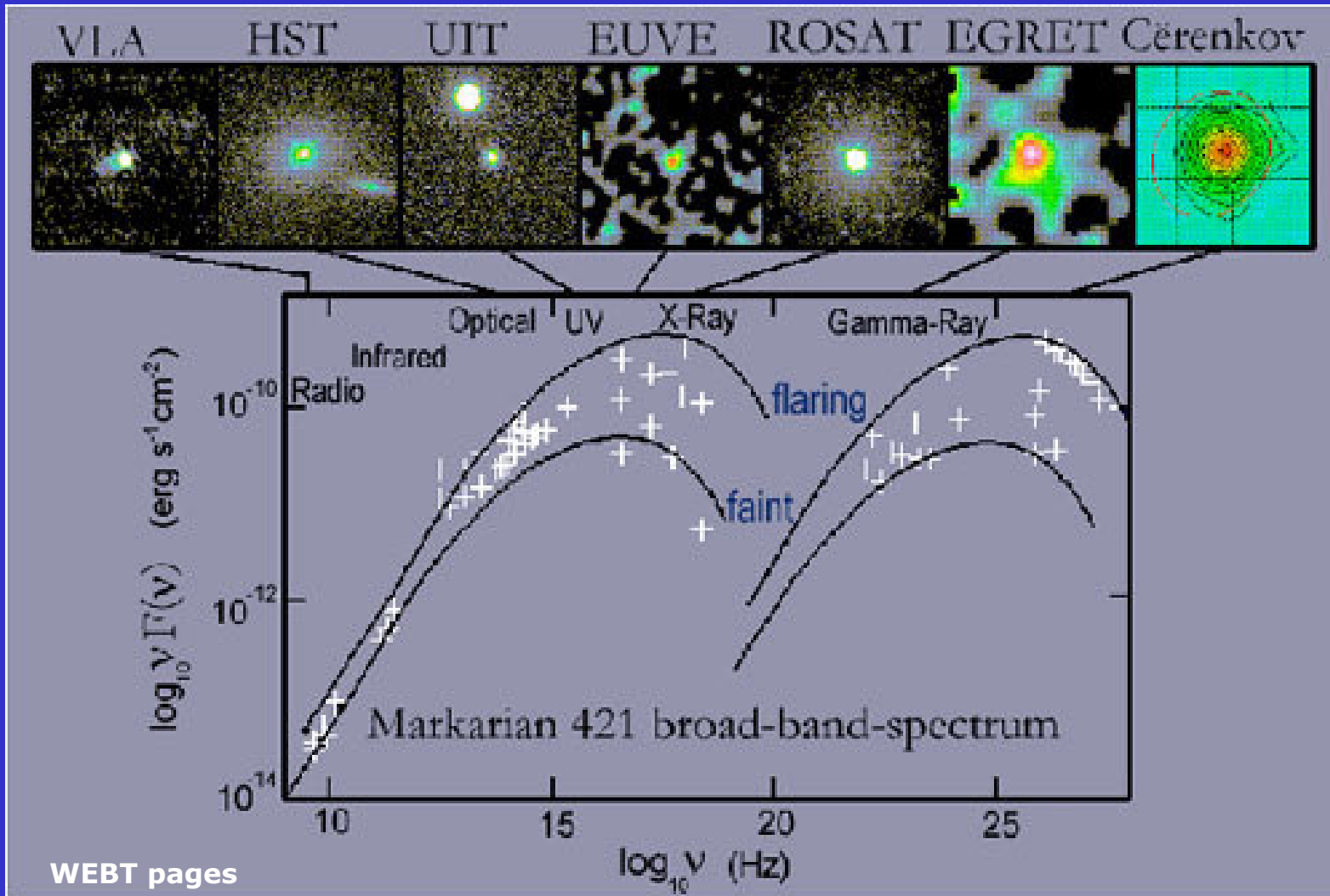
AGN alle alte energie

Ad energie comprese tra 15 keV e 10 MeV COMPTEL, INTEGRAL, e Swift-BAT rivelano solo una manciata di Blazar, mentre risultano più numerose le galassie di Seyfert

Tra 30 MeV e 50 GeV EGRET ha rivelato circa 70 AGN, per la maggior parte Blazar (FSRQ, LBL, HBL) e due radio-galassie (Cen A e NGC 6251)

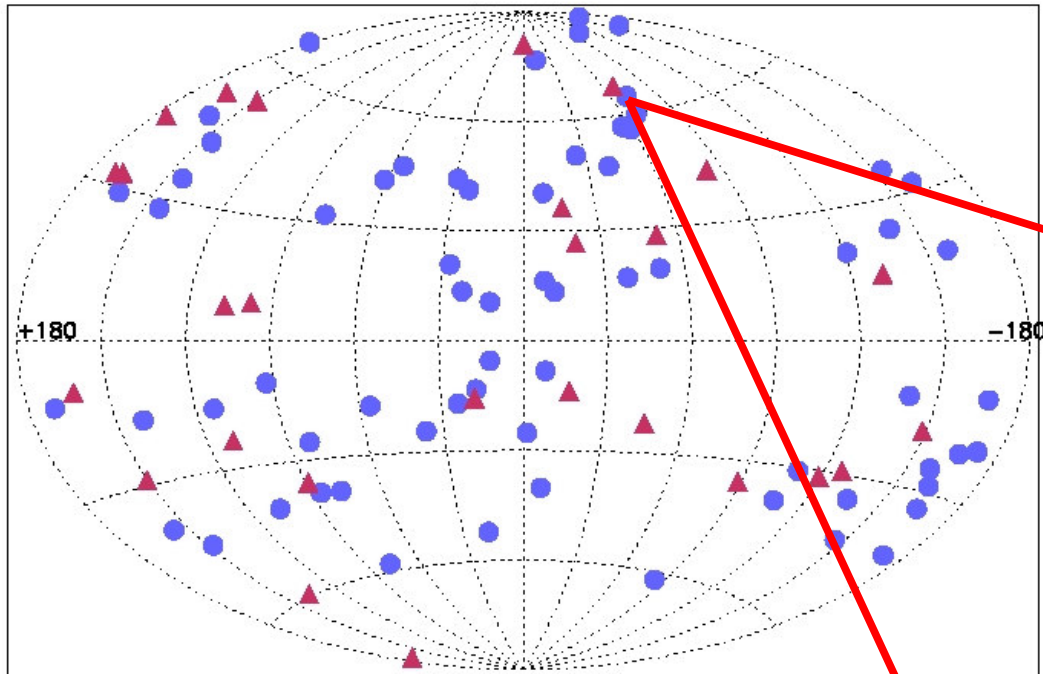
Sopra i 50-100 GeV, Blazar (soprattutto HBL) e radio-galassie (M87 !) continuano a dominare la scena, anche se con numeri esigui (circa una dozzina di oggetti)

Blazar

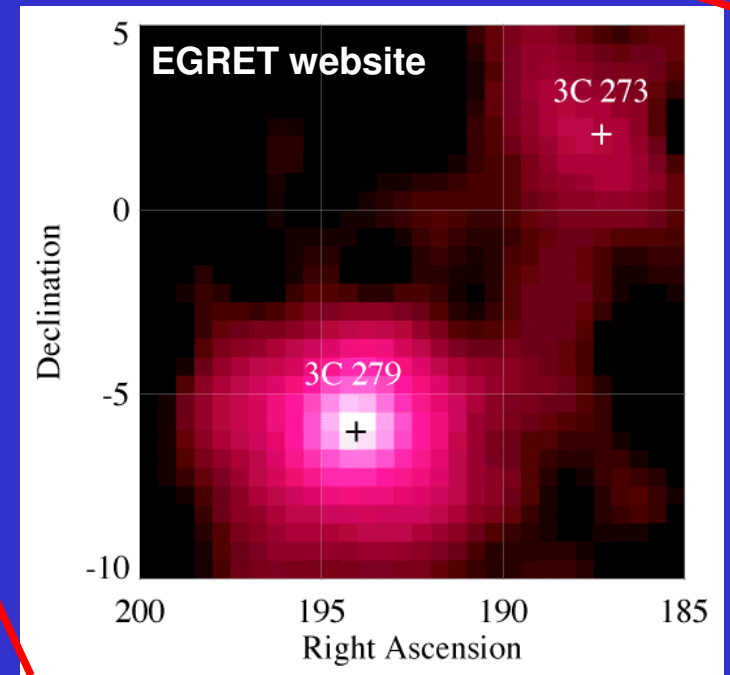


Blazar ed EGRET

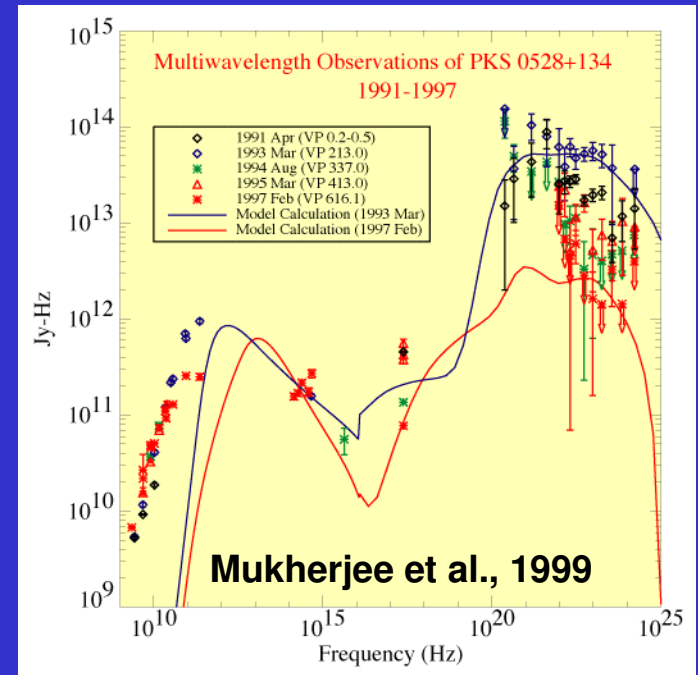
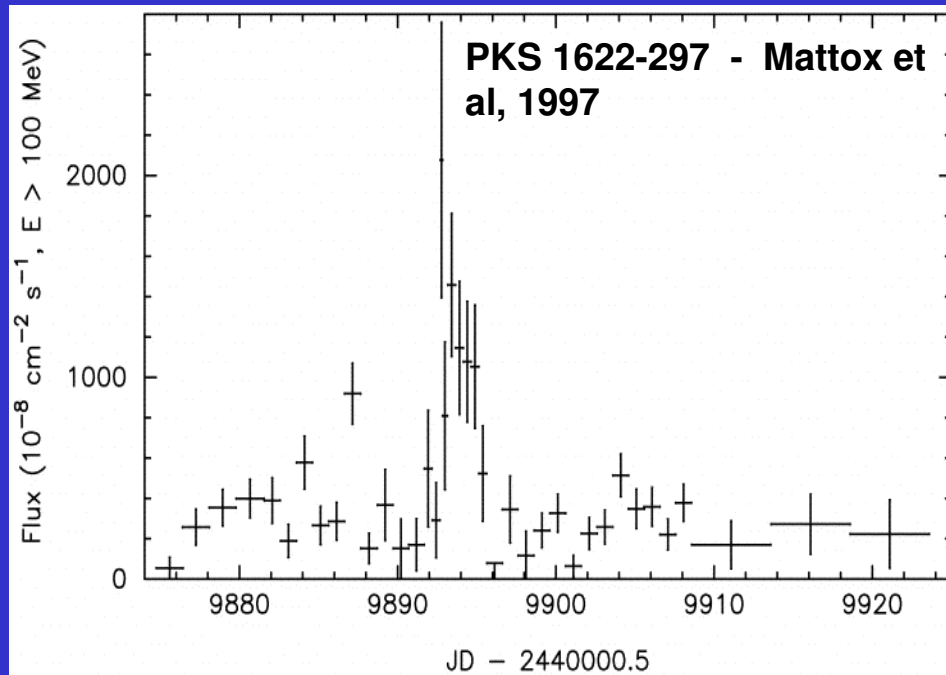
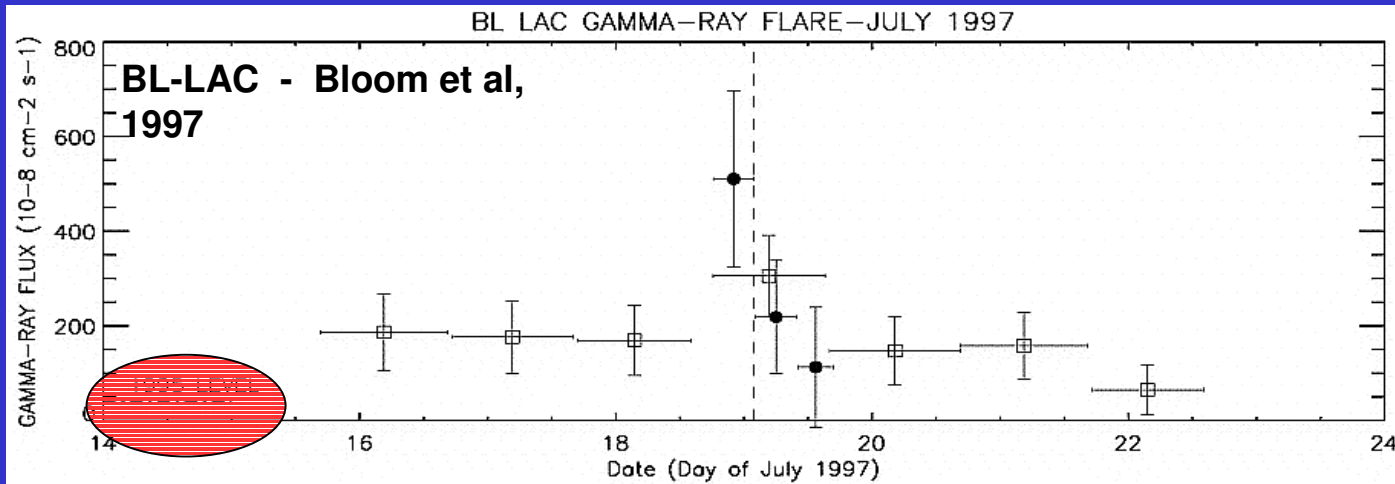
EGRET IDENTIFIED & CANDIDATE BLAZARS



67 AGN identificati
27 AGN candidati
45 FSRQs, 16 BL Lacs, 6 incerti
MKN 501 rivelato solo dopo il
completamento del Terzo catalogo
EGRET



Blazar in Gamma





Hit #1 : 3C 279

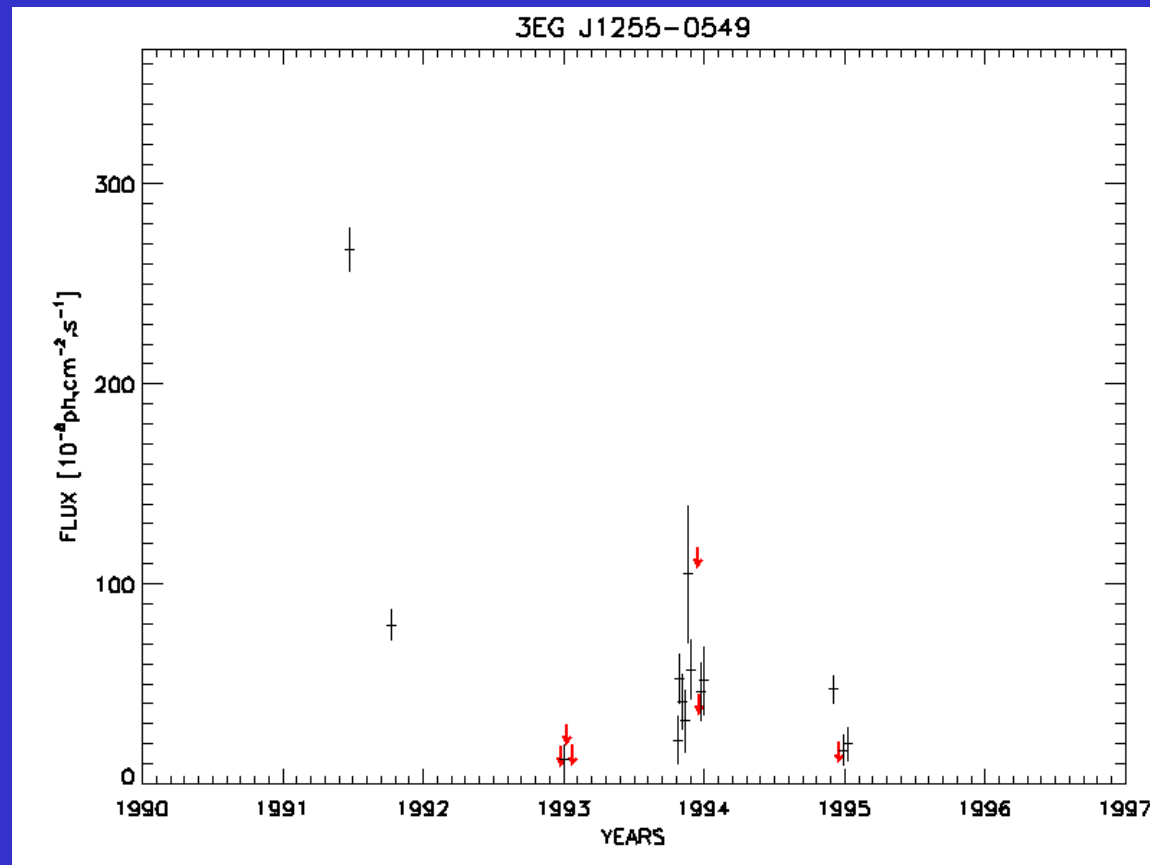
3C 279

Giuliani et al., in preparation

Hit #1 : EGRET

E' stato uno dei primi oggetti ad essere rivelato nella banda gamma.

Emissione intensa e variabile nell'era EGRET, quasi sempre rivelato quando puntato.



Hit #1 : AGILE

**AGILE lo ha osservato nel periodo 09 – 13 Luglio 2007
in risposta ad una campagna multifrequenza
organizzata da Ann Wehrle e Gino Tosti.**

**Nel periodo osservato la sorgente era in fase di flare
gamma.**

Observatory	PI, Observer or Contact	3C273	3C279	3C454.3
AGILE	AGILE Team- M. Tavoni / P. Giommi	July 9-12	July 9-12	No
Chandra	Ann Wehrle	July 10@21:23, 2ksec	July 11@17:41, 2ksec	July 11@20:38, 2ksec
RXTE	Public- Ann Wehrle	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 Wehrle	XRT, UVOT grism □2 ksec/day July 7-13	XRT, UVOT filters 4 ksec/day July 8-14	XRT, UVOT filters 2 ksec July 11 only
Spitzer	Ann Wehrle	July 10 @ 22:02 UT	July 11 @17:50 UT	July 11@20:55 UT
Pomona College, CA optical	Alma Zook 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 Wehrle (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 Gurwell (remote)	unknown	unknown	unknown
GTN amateurs (requested)	Gordon Spear and Ann Wehrle	unknown	unknown	unknown

Hit #2 : 3C 454.3

3C 454.3

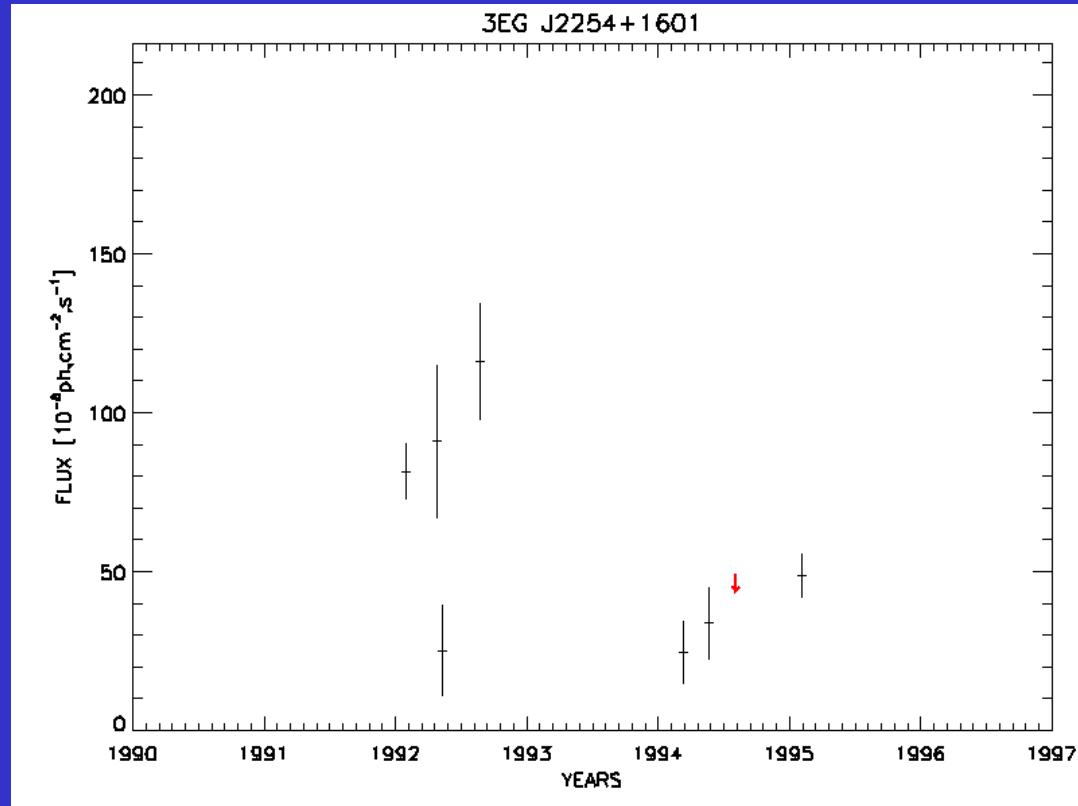
Vercellone et al., Draft submitted to the Team

Hit #2 : EGRET

Sorgente con forte variabilità a tutte le frequenze e con elevata attività nel gamma:

1992/01-02 $\rightarrow (40 - 140)E-8 \text{ ph cm}^{-2} \text{ s}^{-1}$

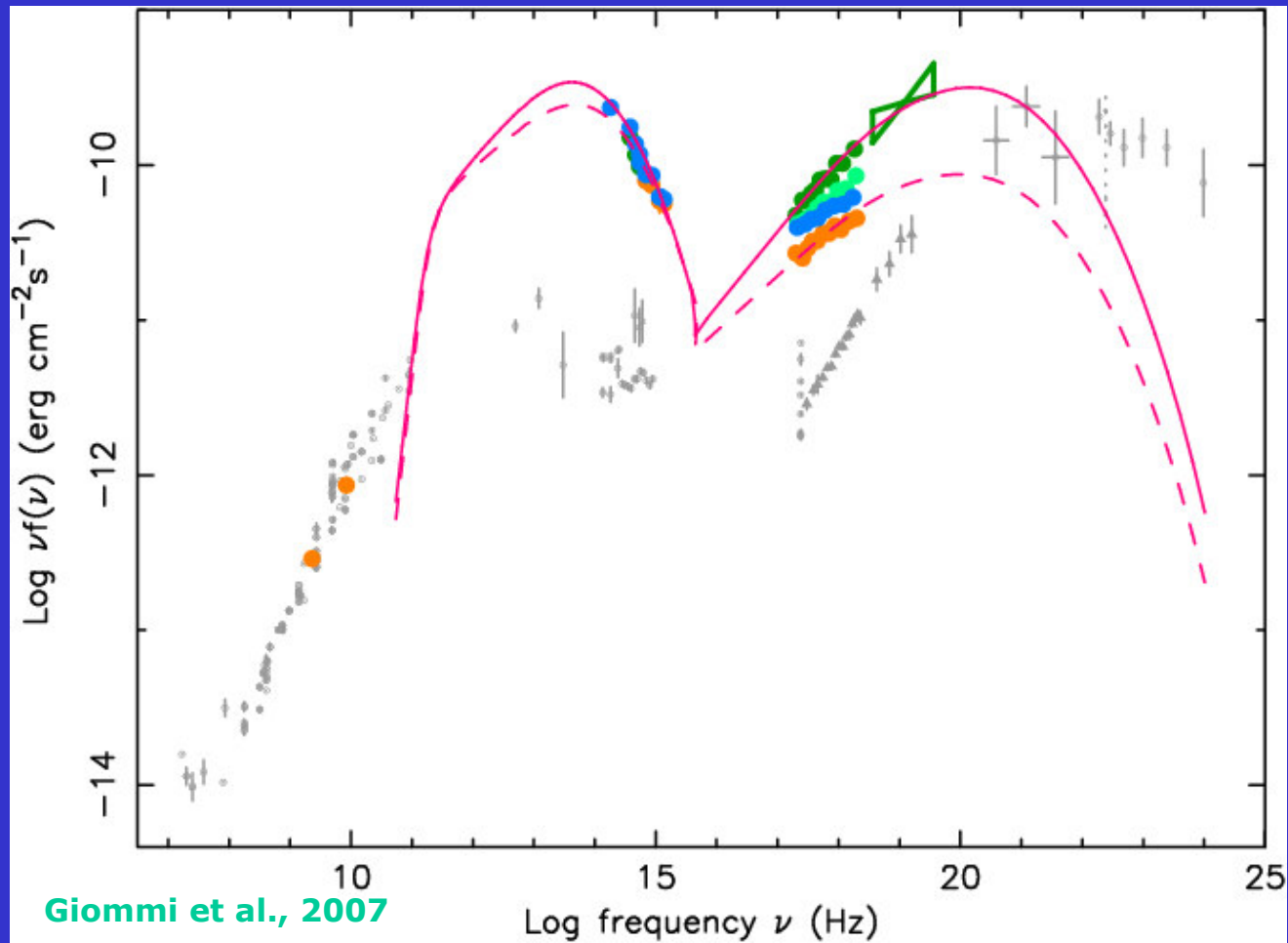
1995/11-12 $\rightarrow 40E-8 \text{ ph cm}^{-2} \text{ s}^{-1}$



Hit #2 : Post-EGRET

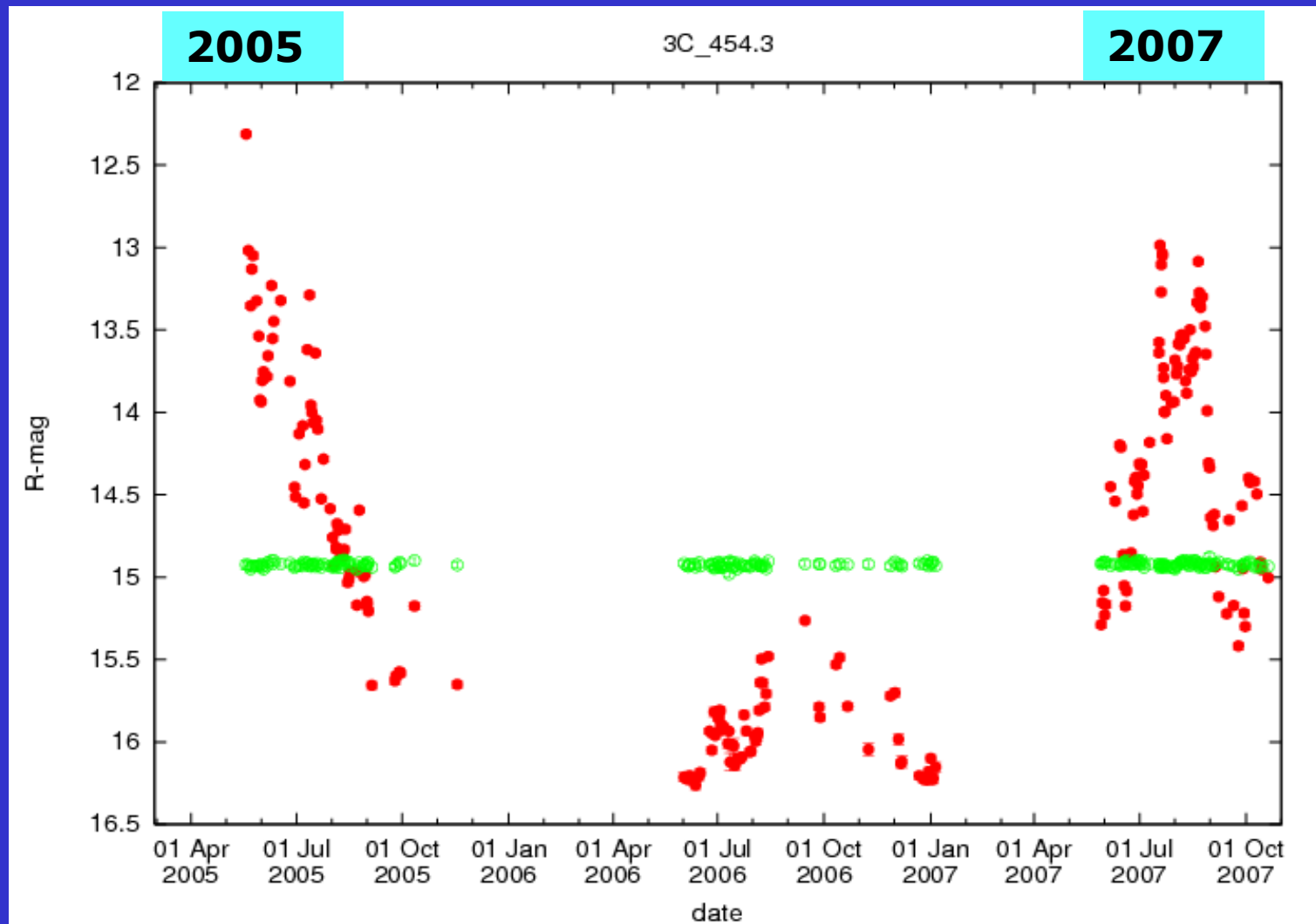
Nel 2005 flare molto intenso in ottico ed X

→ **NESSUN SATELLITE GAMMA IN ORBITA !!!!**



Hit #2 : AGILE

Nel 2007 altro intenso flare in ottico.



Hit #2 : GLAST !!!!

Viene attivata da GLAST (!) una campagna multifreq.

Announcement of the Campaign (July 19, 2007)

The GLAST Large Area Telescope AGN science group is starting a multiwavelength campaign for blazar 3C454.3 (2251+158), effective immediately and continuing through the middle of August. This Ad-Hoc Intensive Campaign (AIC) is prompted by brightening in the radio, optical and X-ray. Swift Target of Opportunity observations are planned. A Spitzer observation is scheduled.

Campaign managers: Matthias Kadler, mkadler@milkyway.gsfc.nasa.gov, and Ann Wehrle, awehrle_ssi@earthlink.net

Please contact them if you have telescope time and are interested in joining this campaign. For this campaign, the policy on data sharing will be: if you observe and send data that can be used, you are a co-author of a resulting multiwavelength publication unless you just want an acknowledgment. Anyone who contributes data keeps the right to publish those data separately.

Although there will be no GLAST gamma-ray data (GLAST is still in testing in Arizona), the opportunity for good multiwavelength coverage of this source right now is excellent at other wavelengths. In addition to the intrinsic scientific interest, this campaign can be used to establish planning and coordination routines for the upcoming years of multiwavelength blazar observations with GLAST.

Hit #2 : AGILE

AGILE-GRID ha acquisito dati su 3C 454.3 nel seguente periodo di circa 5.8 giorni:

- **START** = 2007-07-24 14:30:17 UTC
- **STOP** = 2007-07-30 11:39:59 UTC
- La sorgente era posizionata a circa 38 gradi di fuori-asse.
- **Super-AGILE** ha accumulato dati, in quel periodo, per circa 250 ksec.
- La sorgente era codificata quasi in asse lungo la direzione X , mentre era al bordo del FoV in Z .

Hit #2 : Prime Pubblicazioni

AGILE gamma-ray detection of the Blazar 3C 454.3

ATel #1160; [S. Vercellone, A. Chen, A. Giuliani, A. Pellizzoni, S. Mereghetti, F. Fornari, P. Caraveo, F. Perotti, M. Fiorini \(INAF/IASF Milano\), A. Bulgarelli, G. Di Cocco, C. Labanti, M. Marisaldi, F. Fuschino, M. Galli, F. Gianotti, M. Trifoglio \(INAF/IASF Bologna\), M. Tavani, G. Pucella, F. D'Ammando, E. Costa, M. Feroci, I. Donnarumma, L. Pacciani, E. Del Monte, A. Arqan, A. Trois, \(INAF/IASF Roma\), M. Prest, E. Vallazza \(INFN-Como\), G. Picozza, P. Lipari \(INFN-Roma\), F. Longo, G. Barbiellini \(INFN-Trieste\) on behalf of the AGILE Team and P. Giommi, C. Pittori, L.A. Antonelli, D. Gasparrini, S. Cutini, G. Fanari, F. Verrecchia \(ASDC\) and L. Salotti \(ASI\)](#)

on 27 Jul 2007; 15:45 UT

Password Certification: Adamantia Paizis (ada@iasf-milano.inaf.it)

Subjects: Gamma Ray, AGN, Transients

Referred to by ATel #: [1167](#)

The AGILE satellite, currently in the science performance verification phase, started to observe the 3C454.3 field on July 24, 2007, following the significant flaring activity of this blazar recently detected in the optical and X-ray energy bands.

A gamma-ray source positionally consistent with 3C 454.3 is detected with a maximum likelihood analysis giving a significance of 4.9 sigma in the AGILE GRID (Gamma-Ray Imaging Detector) data acquired between 2007-07-24 14:30 UT and 2007-07-27 05:27 UT.

Due to satellite constraints, 3C 454.3 is about 36 degrees off-axis. Considering that the in-flight calibration of the GRID is still ongoing, we can only provide at this moment a preliminary estimate of the gamma-ray flux of $(3 \pm 1) \times 10^{-6}$ ph/cm²/s for $E > 100$ MeV.

AGILE will point at the 3C 454.3 field until July 30, 12:00 UT. Multifrequency observations of the source are encouraged.

AGILE pointing at 3C 454.3: end of the observations and preliminary results.

ATel #1167; [A. Bulgarelli \(INAF/IASF Bologna\), A. Chen, S. Vercellone, A. Giuliani, S. Mereghetti, A. Pellizzoni, F. Perotti, F. Fornari, F. Fiorini \(INAF/IASF Milano\), G. Pucella, F. D'Ammando \(INAF/IASF Roma\), F. Longo \(INFN Trieste\), M. Prest, E. Vallazza \(INFN Insubria\), M. Tavani \(INAF/IASF Roma\), G. Barbiellini \(INFN Trieste\), P. Caraveo \(INAF/IASF Milano\), E. Costa \(INAF/IASF Roma\), G. Di Cocco \(INAF/IASF Bologna\), P. Picozza \(INFN Roma\), M. Feroci, I. Donnarumma, L. Pacciani, E. Del Monte, F. Lazzarotto, P. Soffitta, Y. Evangelista, I. Lapshov, M. Rapisarda \(INAF/IASF Roma\), C. Labanti, F. Fuschino, M. Marisaldi, M. Galli, F. Gianotti, M. Trifoglio \(INAF/IASF Bologna\), A. Arqan, A. Trois \(INAF/IASF Roma\), A. Zambra \(INAF/IASF Milano\), Lipari \(INFN Roma\), on behalf of the AGILE Team and P. Giommi, C. Pittori, L. A. Antonelli, D. Gasparrini, S. Cutini, F. Verrecchia \(ASDC\) and L. Salotti \(ASI\)](#)

on 2 Aug 2007; 15:52 UT

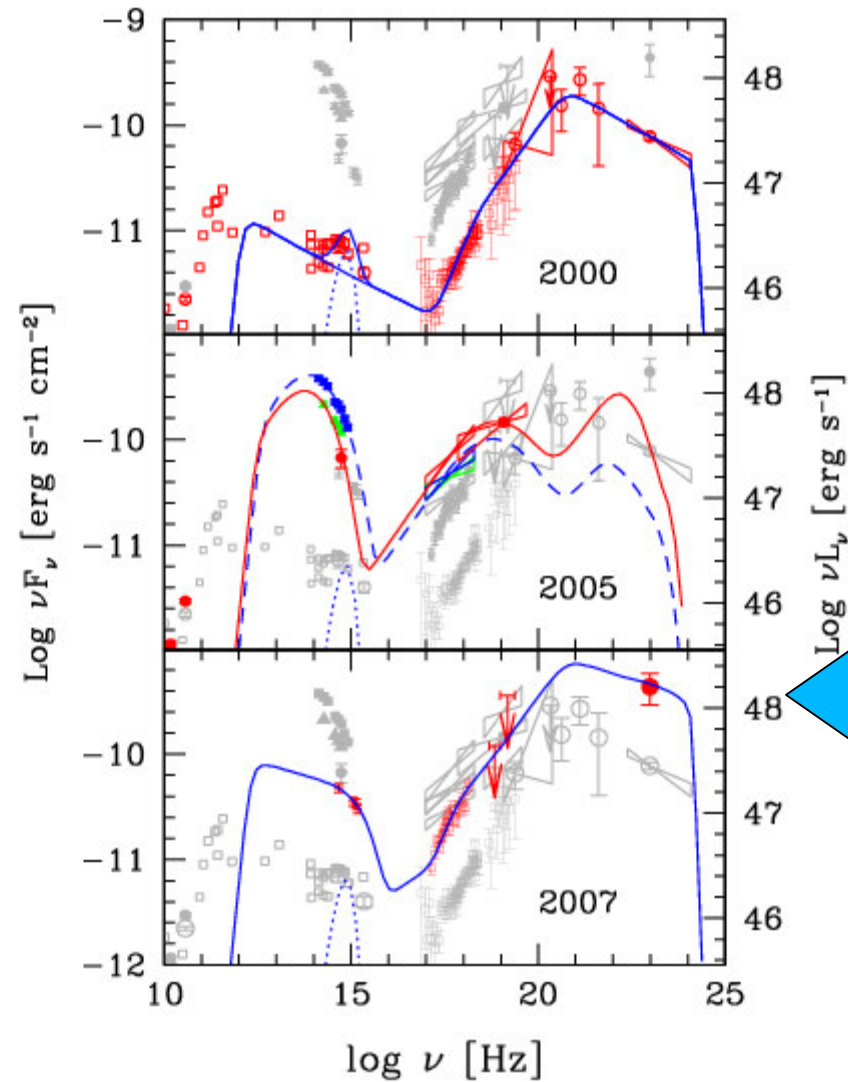
Password Certification: Stefano Vercellone (stefano@iasf-milano.inaf.it)

Subjects: Gamma Ray, AGN, Transients

The AGILE satellite, currently in the scientific performance verification phase, has observed the 3C 454.3 field starting on 2007-07-24 14:30 UT, and ending on 2007-07-30 11:40 UT. The AGILE repointing followed a significant flaring activity of this blazar, as detected in the optical and X-ray bands. AGILE subsequently detected the source in the gamma-ray energy band during the early phase of the observation (see ATel [#1160](#)).

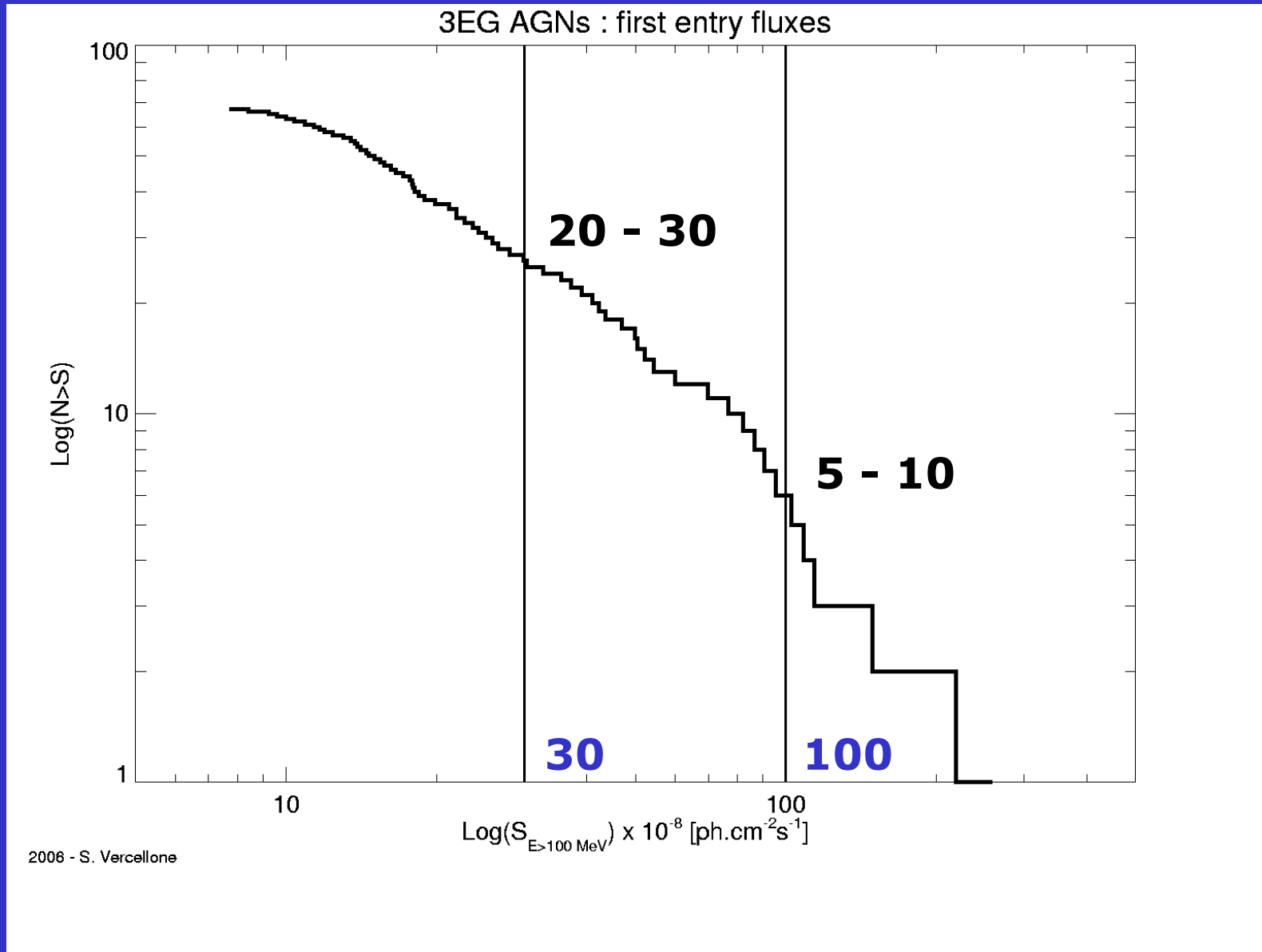
Based on all the data accumulated in 5.8 days by the AGILE GRID (Gamma-Ray Imaging Detector) on 3C 454.3, and considering that the in-flight calibration is still ongoing, the source detection significance turns out to be equal to 9.9 sigma as derived from a maximum likelihood analysis (note that this significance does not take systematic errors into account). The average flux is consistent, within the uncertainties, with the previously reported AGILE flux estimate (ATel. [#1160](#)). A time variability analysis is in progress.

Hit #2 : ... e primi falchi !



Ghisellini et al., 2007

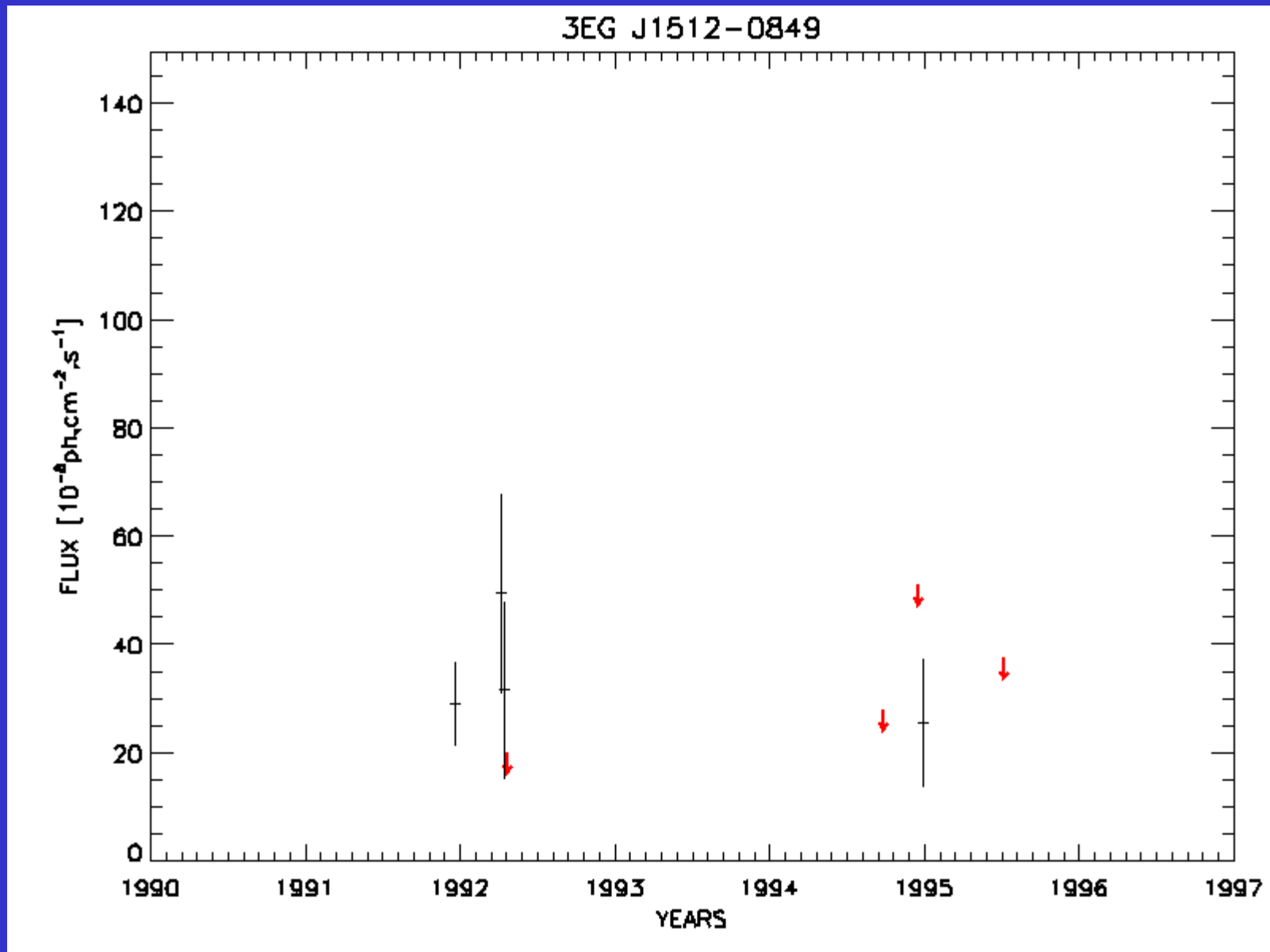
Studio di Variabilita'



Hit #3 : 1510

TXS 1510-089

Hit #3 : 1510



Hit #3 : 1510

→ Prima campagna multifrequenza attivata da AGILE

AGILE detection of a gamma-ray source off the Galactic Plane

ATel #1199; A. Bulgarelli (INAF/IASF Bologna), S. Vercellone, A. Giuliani, A. Chen, S. Mereghetti, A. Pellizzoni, F. Perotti, F. Fornari, M. Fiorini, P. Caraveo, A. Zambra (INAF/IASF Milano), M. Tavani, G. Pucella, F. D'Ammando, V. Vittorini, E. Costa, M. Feroci, I. Donnarumma, L. Pacciani, E. Del Monte, F. Lazzarotto, P. Soffitta, Y. Evangelista, I. Lapshov, M. Rapisarda, A. Arqan, A. Trois (INAF/IASF Roma), G. Barbiellini, F. Longo (INFN Trieste), G. Di Cocco, C. Labanti, F. Fuschino, M. Marisaldi, M. Galli, F. Gianotti, M. Trifoglio (INAF/IASF Bologna), P. Picozza, A. Morselli (INFN Roma-2), M. Prest, E. Vallazza (Universita' dell'Insubria), P. Lipari (INFN Roma-1) and P. Giommi, C. Pittori, L. A. Antonelli, D. Gasparrini, S. Cutini, F. Verrecchia (ASDC) and L. Salotti (ASI)

on 31 Aug 2007; 16:53 UT

Password Certification: Stefano Vercellone
(stefano@iasf-milano.inaf.it)

Subjects: Gamma Ray, AGN, Quasars, Transients
Referred to by ATel #: 1204

The AGILE satellite, currently in its science performance verification phase, during an observation centered near the Galactic plane ($l=334.44$, $b=10.06$) that started on 2007-08-27 12:00 UT, detected significant gamma-ray emission from a source at approximately 33 degrees off the AGILE pointing direction. A preliminary maximum likelihood analysis of the AGILE-GRID (Gamma-Ray Imaging Detector) data obtained between 2007-08-27 14:48 UT and 2007-08-30 10:50 UT for photon energies above 100 MeV results in a detection significance of about 4 sigma. The positional error box derived from our preliminary maximum likelihood analysis (that does not, as yet, take into account possible systematic effects) results in a 95% contour level centered at the position $l = 351.1$, $b = 39.7$ with a radius of about 0.5 degrees. We note that this position is marginally consistent with the radio position of the blazar TXS 1510-089 that has been associated with the gamma-ray source 3EG J1512-0849. Considering that the in-flight calibration of the GRID is still ongoing, and despite the preliminary GRID positioning capability at substantial off-axis angles, we strongly encourage multi-frequency observations of the field of the gamma-ray source detected by AGILE. The AGILE pointing of the Galactic plane region that includes this gamma-ray source will continue until 2007-09-01 12:00 UT.

GASP detection of a high optical state of the blazar PKS 1510-08

ATel #1204; D. Carosati (Armenzano Astronomical Observatory, Assisi, Italy), V.M. Larionov and L. Larionova (Astronomical Institute, St.-Petersburg State University and Pulkovo Observatory, St. Petersburg, Russia), M. Villata and C.M. Raiteri (INAF, Osservatorio Astronomico di Torino, Italy)

on 4 Sep 2007; 9:24 UT

Password Certification: Stefano Vercellone
(stefano@iasf-milano.inaf.it)

Subjects: Optical, AGN, Quasars

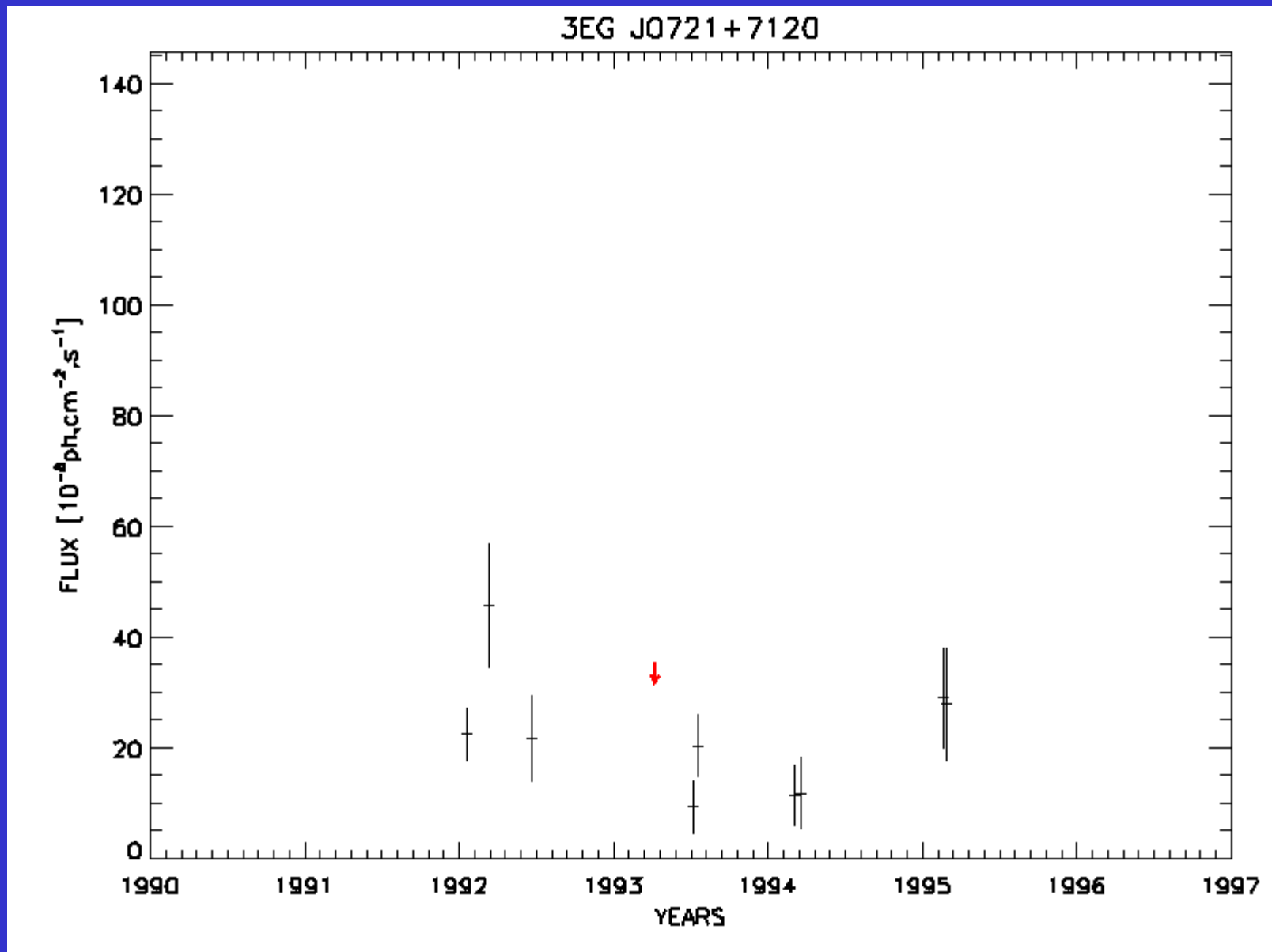
With reference to ATEL #1199 reporting on the possible detection at gamma-ray energies of the blazar PKS 1510-08, the GLAST-AGILE Support Program (GASP) of the Whole Earth Blazar Telescope (WEBT) reports on the recent observation of a very bright optical state of this blazar. The source brightened in the first half of August, reaching a level comparable to the outburst of 1996 (see Raiteri et al. 1998, A&AS, 127, 445), and it appears now in a dimming phase. Some preliminary data are:

R = 16.37 +/- 0.02 on August 3, 2007 (Crimean Observatory);
R = 15.04 +/- 0.02 on August 15, 2007 (Crimean Observatory);
R = 15.52 +/- 0.05 on August 31, 2007 (Armenzano Observatory);
R = 15.85 +/- 0.05 on September 1, 2007 (Armenzano Observatory);
R = 15.87 +/- 0.05 on September 2, 2007 (Armenzano Observatory).

Hit #4 : 0716

S5 0716+71

Hit #4 : 0716



Hit #4 : 0716

→ Seconda campagna multifrequenza attivata da AGILE

AGILE detection of a gamma-ray source possibly associated with Blazar TXS 0716+714

ATel #1221; [A. Giuliani, S. Vercellone, A. Chen, S. Mereghetti, A. Pellizzoni, F. Perotti, F. Fornari, M. Fiorini, P. Caraveo, A. Zambra \(INAF/IASF Milano\), A. Bulgarelli, F. Gianotti, M. Trifoglio, G. Di Cocco, C. Labanti, F. Fuschino, M. Marisaldi, M. Galli, \(INAF/IASF Bologna\), M. Tavani, G. Pucella, F. D'Ammando, V. Vittorini, E. Costa, M. Feroci, I. Donnarumma, L. Pacciani, E. Del Monte, F. Lazzarotto, P. Soffitta, Y. Evangelista, I. Lapshov, M. Rapisarda, A. Argan, A. Trois, G. De Paris \(INAF/IASF Roma\), G. Barbiellini, F. Longo \(INFN Trieste\), P. Picozza, A. Morselli \(INFN Roma-2\), M. Prest, E. Vallazza \(Universita' dell'Insubria\), P. Lipari, D. Zanello \(INFN Roma-1\), F. Mauri \(INFN Pavia\) and P. Giommi, C. Pittori, L. A. Antonelli, D. Gasparri, S. Cutini, F. Verrecchia \(ASDC\) and L. Salotti \(ASI\)](#)
on 21 Sep 2007; 15:53 UT

Password Certification: Stefano Vercellone (stefano@iasf-milano.inaf.it)

Subjects: Gamma Ray, AGN, Quasars
Referred to by ATel #: [1223](#)

The AGILE satellite, currently in its science performance verification phase, during the Observing Block that started on 2007-09-04 12:00 UT, detected significant gamma-ray emission from a source possibly associated with blazar TXS 0716+714.

A preliminary maximum likelihood analysis of the AGILE-GRID (Gamma-Ray Imaging Detector) data obtained between 2007-09-10 13:50 UT and 2007-09-20 10:13 UT for photon energies above 100 MeV results in a detection significance of about 8 sigma. The positional error box, that does not yet take into account possible systematic effects, is centered at Galactic coordinates $l = 143.8$ deg, $b = 27.6$ deg. The 95% confidence level contour has a radius of about 0.4 degrees. The blazar TXS 0716+714, that has been associated with the gamma-ray source 3EG J0721+7120, lies at a distance of 0.44 degrees from the best fit position of the gamma-ray source. We therefore tentatively associate the AGILE source with this blazar.

Considering that the in-flight calibration of the GRID is still ongoing, and despite the preliminary GRID positioning capability at off-axis angles (20 to 40 deg for this observation), we strongly encourage multi-frequency observations of the field of the gamma-ray source detected by AGILE. The AGILE pointing of the Galactic plane region that includes this gamma-ray source will continue until 2007-09-23 12:00 UT.

GASP detection of an optical flare of the blazar S5 0716+71

ATel #1223; [D. Carosati \(Armenzano Astronomical Observatory, Assisi, Italy\), V.M. Larionov and L. Larionova \(Astronomical Institute, St.-Petersburg State University and Pulkovo Observatory, St. Petersburg, Russia\), J.A. Ros \(Agrupació Astronòmica de Sabadell, Spain\), M. Villata and C.M. Raiteri \(INAF, Osservatorio Astronomico di Torino, Italy\)](#)
on 24 Sep 2007; 9:33 UT

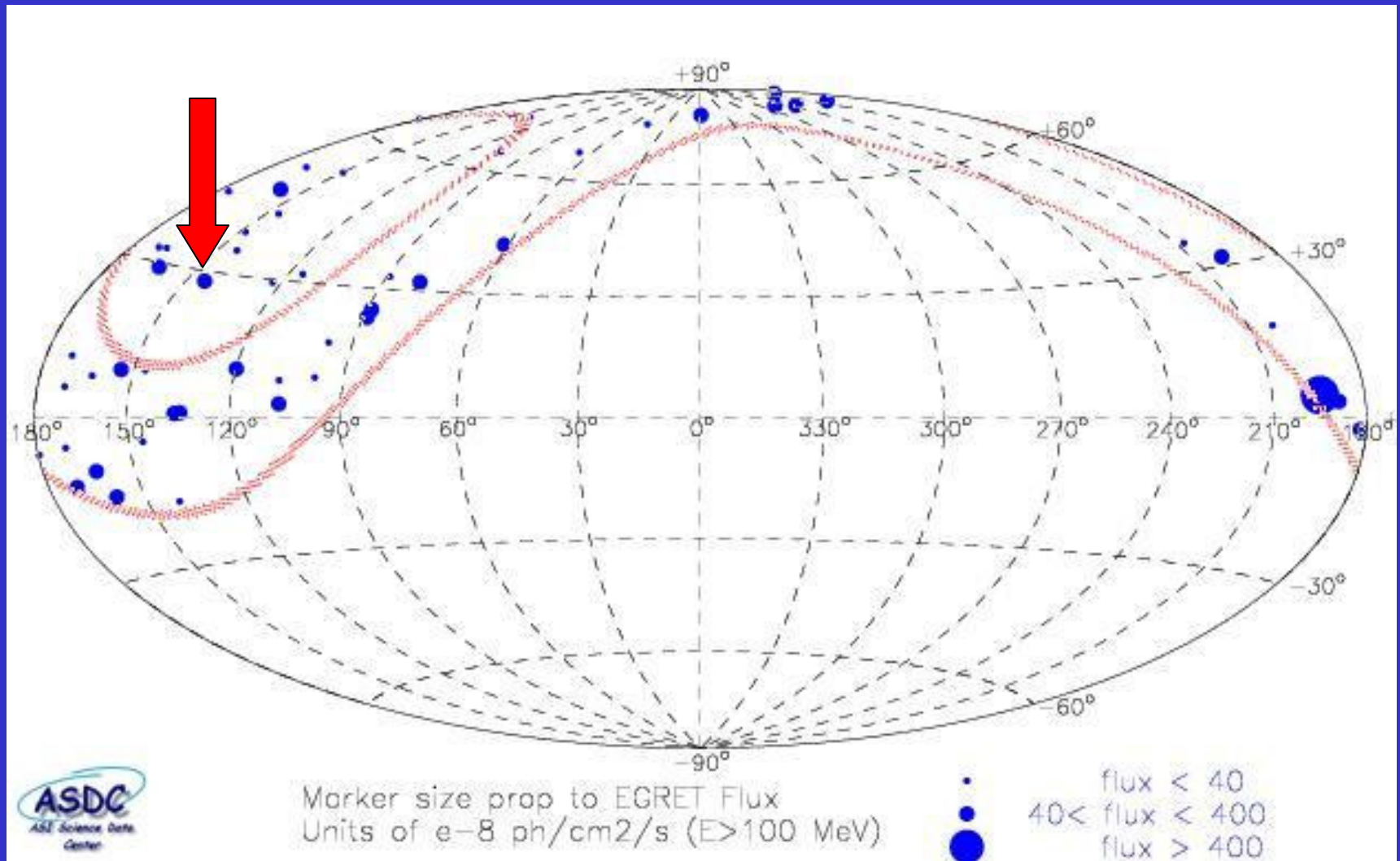
Password Certification: Claudia M. Raiteri (raiteri@oato.inaf.it)

Subjects: Optical, AGN

With reference to ATel #[1221](#) announcing the possible detection at gamma-ray energies of the blazar S5 0716+71, the GLAST-AGILE Support Program (GASP) of the Whole Earth Blazar Telescope (WEBT) reports on the observation of an optical flare of this blazar in the same period. The source brightened from $R = 12.92 \pm 0.01$ on September 8 to $R = 12.58 \pm 0.04$ on September 12, it was $R = 12.60-12.65$ the day after, and faded to $R = 13.01-13.03$ on September 15, 2007.

Hit #4 : Breaking news !

ToO : 2007-10-24 08:00 → 2007-10-29 12:00



AGILE AO-1

Lista AGN di Team

AGILE Team AGNs LIST – 2007.09.28

NAME	GLON	GLAT
1ES 1426+428	77.49	64.90
1ES 1959+650	98.00	17.67
3C 111	161.66	8.82
3C 120	190.37	-27.40
3C 273	289.95	64.36
3C 279	305.10	57.06
3C 454.3	86.11	-38.18
BLLac	92.59	-10.44
Cen A	309.52	19.42
HB89 0537-441	250.08	-31.09
HB89 0716+714	143.98	28.02
HB89 1730-130	12.03	10.81
M 87	283.78	74.49
PKS 0528+134	191.37	-11.01
PKS 1622-29	348.82	13.32
PKS 1830-211	12.17	-5.71
TXS 1510-089	351.29	40.14
1ES 1921-293	9.34	-19.61
1ES 2344+514	112.89	-9.91
HB89 0836+710	143.54	34.43
NGC 6251	115.76	31.20
PKS 2209+236	82.24	-26.09
HB89 2230+114	77.44	-38.58
HB89 0736+017	216.99	11.38
HB89 1739+522	79.56	31.75
HB89 2005-489	350.37	-32.60
NRAO 0190	196.62	-28.16
PKS 1622-253	352.14	16.32
HB89 1127-145	275.28	43.64
HB89 1406-076	333.88	50.28

Dati proprietari del Team per 12 mesi (01/12/2007 sino a 30/11/2008)

Collaborazioni per progetti multifrequenza con IASF-Bo (radio), WEBT (ottico/radio), Perugia (ottico), MAGIC, HESS (TeV)

Proposal già accettati per ToO con Swift, INTEGRAL, REM, RXTE

Proposal sottomessi per VLBI e XMM

AGN e puntamenti AO-1

AGILE Team AGN Sources - R = 45 deg

