

AGILE and multi-wavelength campaigns on blazars

S. Vercellone (INAF/IASF Palermo)
on behalf of the AGILE AGN WG

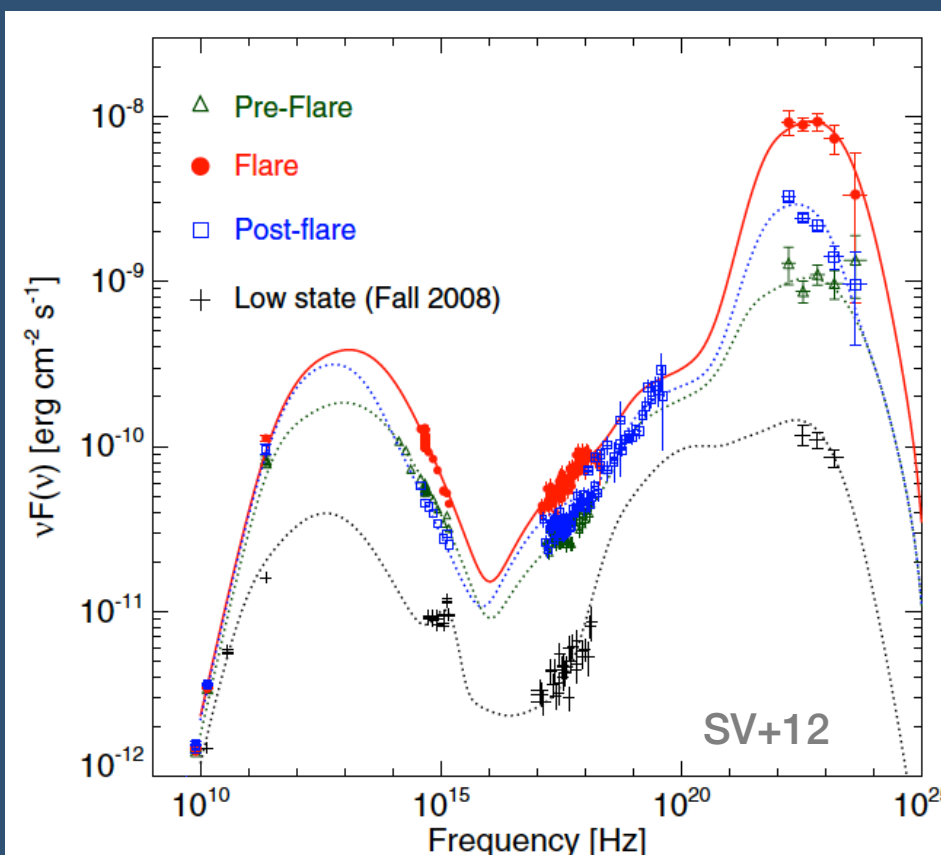
- AGN catcher
- Recent results

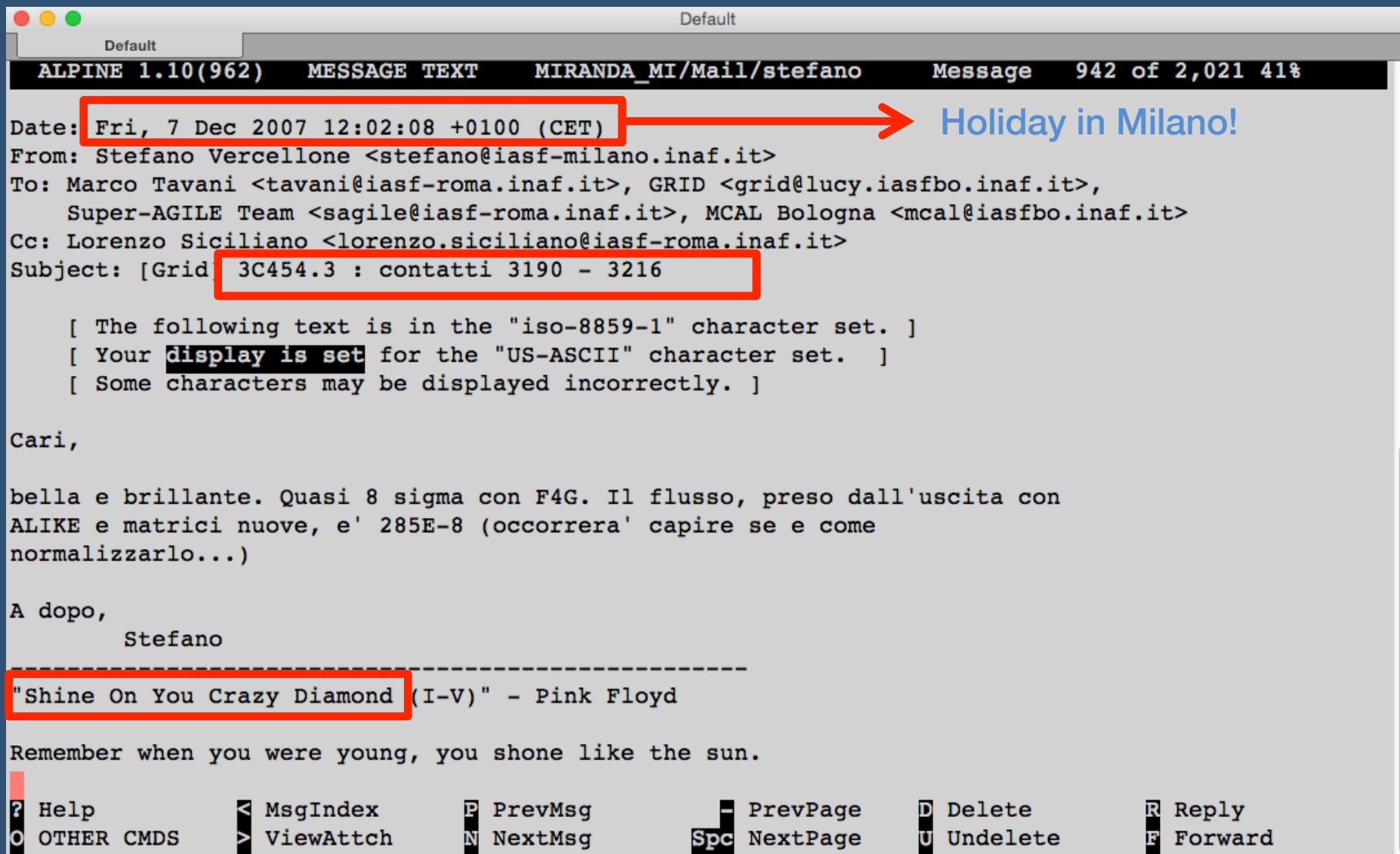
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MULTIWAVELENGTH OBSERVATIONS OF 3C 454.3. I. THE *AGILE* 2007 NOVEMBER CAMPAIGN ON THE “CRAZY DIAMOND”





Catching transient AGNs

8974 AGILE detection of enhanced gamma-ray activity from a new unidentified source at high Galactic latitude, AGLJ0917+1511

F. LUCARELLI, C. PITTORI, F. VERRECCHIA, A. BULGARELLI, V. FIORETTI, A. ZOLI, G. PIANO, P. MUNAR-ADROVER,...
20 APR 2016; 16:17 UT

8960 AGILE confirmation of enhanced gamma-ray emission from the FSRQ PKS 2023-07

F. VERRECCHIA, M. TAVANI, F. LUCARELLI, C. PITTORI,, A. BULGARELLI, V. FIORETTI, A. ZOLI, G. PIANO

8925 AGILE detection of gamma-ray activity from the FSRQ PKS 1000-04

A. BULGARELLI, F. LUCARELLI, F. VERRECCHIA, C. PITTORI,

8879 AGILE detection of a gamma-ray flare from the FSRQ PKS 2023-07

G. PIANO, A. BULGARELLI,

7589 Renewed gamma-ray activity of the FSRQ PKS 2032+107 detected by AGILE

F. LUCARELLI, C. PITTORI, AND F. VERRECCHIA, M. TAVANI, A. BULGARELLI, V. FIORETTI, G. PIANO, E. STRIANI,...
4 JUN 2015; 11:45 UT

8476 AGILE detection of gamma-ray activity from the FSRQ PKS 2023-07

8223 AGILE detection of enhanced gamma-ray activity from the S5 0836+71 (4C +71.07) region

F. LUCARELLI, F. VERRECCHIA, C. PITTORI, A. BULGARELLI, M. TAVANI, G. PIANO, C. M. RAITERI, F. VERRECCHIA, C. PITTORI, F. VERRECCHIA, A. BULGARELLI, V. FIORETTI, A. ZOLI, G. PIANO, P. MUNAR-ADROVER,...

8129 AGILE detection of enhanced gamma-ray activity from the blazar 1ES 1959+650

A. BULGARELLI, M. TAVANI,

7631 AGILE detection of enhanced gamma-ray activity from the blazar 1ES 1959+650

9168 AGILE confirmation of enhanced gamma-ray activity from the Blazar 3C 454.3

F. LUCARELLI, C. PITTORI, F. VERRECCHIA, A. BULGARELLI, V. FIORETTI, A. ZOLI, G. PIANO, P. MUNAR-ADROVER,...
18 JUN 2016; 10:44 UT
E. STRIANI,...
20 MAY 2015; 13:30 UT

8593 AGILE detection of gamma-ray activity from the blazar 1ES 1959+650

7687 AGILE detection of gamma-ray activity from the blazar 1ES 1959+650

S. VERCELLONE, A.

9157 AGILE detection of increasing gamma-ray activity from the Blazar 3C 454.3

F. LUCARELLI, C. PITTORI, F. VERRECCHIA, A. BULGARELLI, V. FIORETTI, A. ZOLI, G. PIANO, P. MUNAR-ADROVER,...
15 JUN 2016; 12:53 UT

- 17 Astronomer's Telegrams since last AGILE Workshop (about 1.5/month)
- 4 new high-latitude sources (still to be characterized, work in progress)
- Fast reaction time (ATel typically issued within a few hours since the alert, excellent opportunity for MWL studies)

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AN EMERGING CLASS OF GAMMA-RAY FLARES FROM BLAZARS: BEYOND ONE-ZONE MODELS

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**Astronomy
&
Astrophysics**

Search of MeV–GeV counterparts of TeV sources with AGILE in pointing mode[★]

A. Rappoldi¹, F. Lucarelli^{2,3}, C. Pittori^{2,3}, F. Longo^{4,5}, P. W. Cattaneo¹, F. Verrecchia^{2,3}, M. Tavani^{6,7}, A. Bulgarelli⁸,
A. W. Chen⁹, S. Colafrancesco⁹, I. Donnarumma⁶, A. Giuliani¹⁰, A. Morselli¹¹, S. Sabatini⁶, and S. Vercellone¹²

Monthly Notices

of the

ROYAL ASTRONOMICAL SOCIETY

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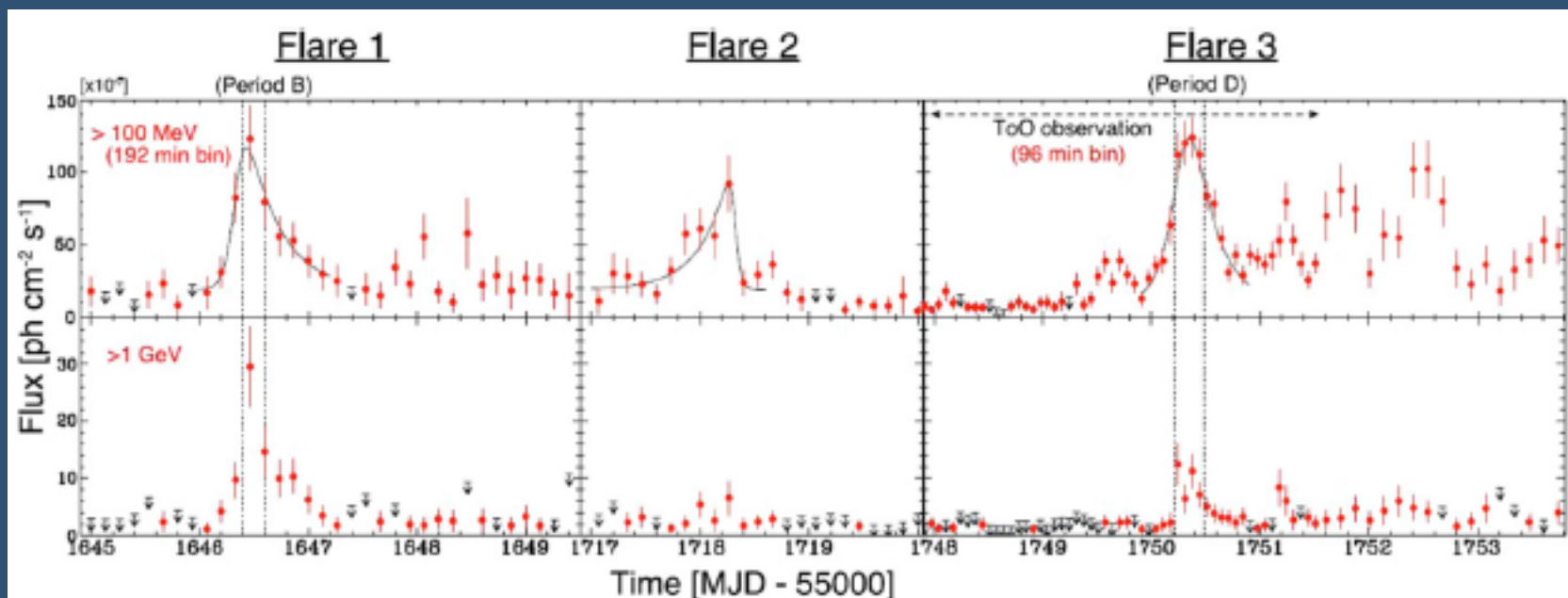


doi:10.1093/mnras/stw710

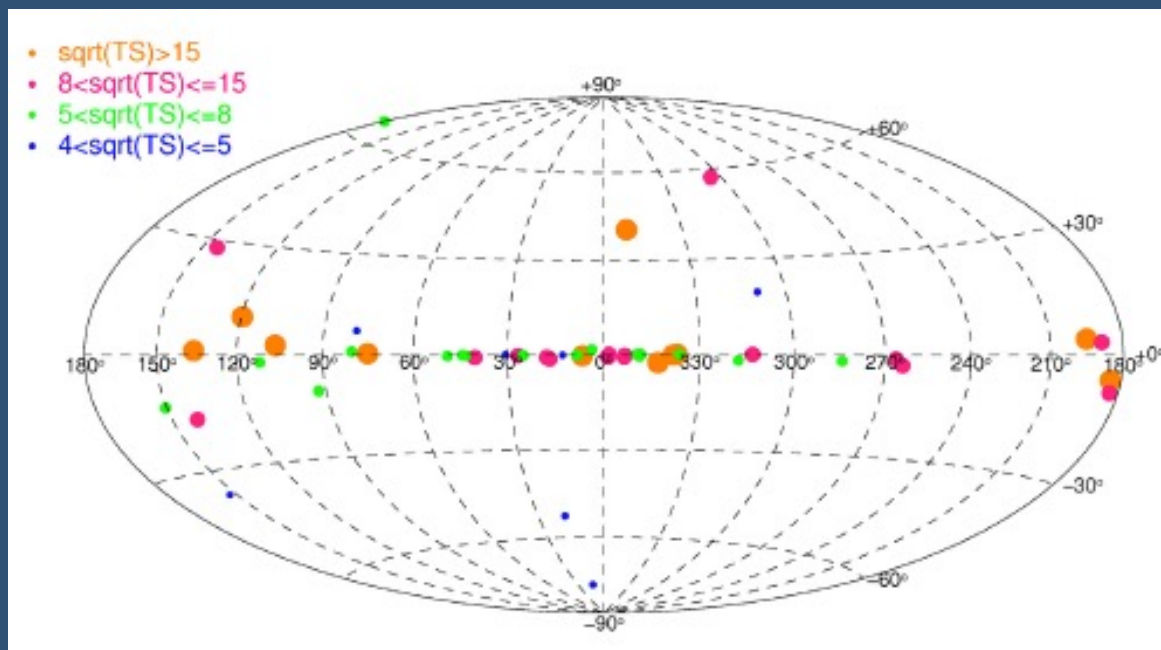
Multiwavelength observations of the blazar 1ES 1011+496 in Spring 2008

The MAGIC Collaboration: M. L. Ahnen,¹ S. Ansoldi,² L. A. Antonelli,³ P. Antoranz,⁴

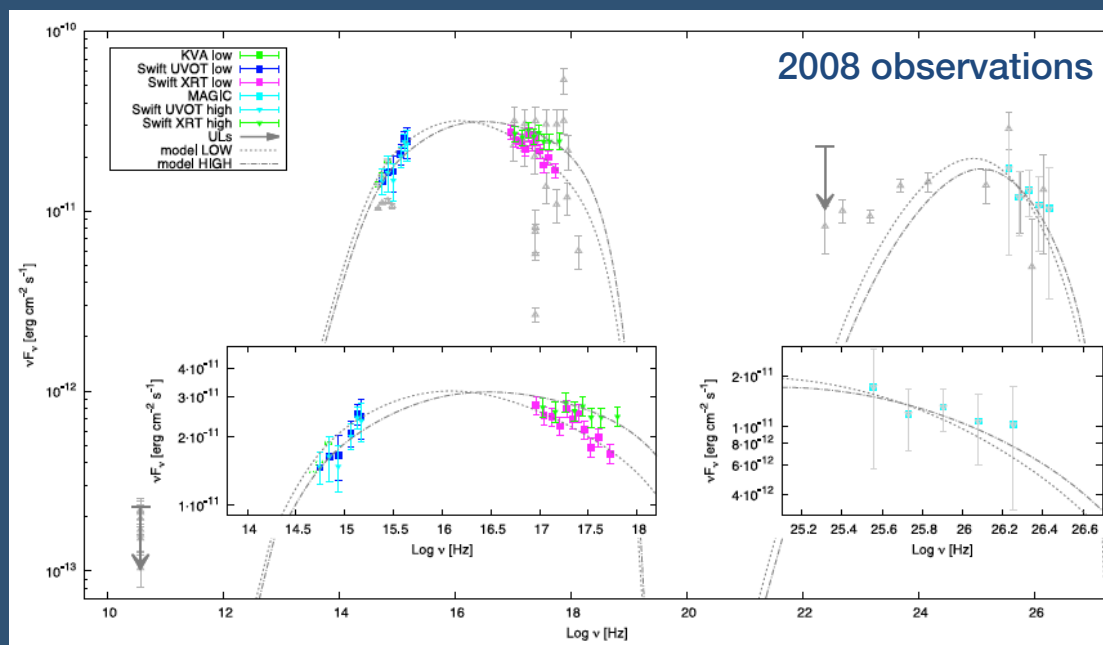
Tavani+15 – γ -ray flares



- Optical/soft X-ray orphan γ -ray flares observed in 3C 454.3 and 3C 279 challenge the current one-zone leptonic models of emissions from within the broad-line region
- New model based on primary synchrotron photons emitted in the BLR by a plasma blob moving out with the jet and scattered back toward the incoming plasmoid by an outer plasma clump acting as a mirror
- Mirroring phenomena can locally enhance the density and anisotropy with associated relativistic boosting of soft photons within the jet, so as to trigger bright inverse Compton γ -ray transients from nearly steady optical/X-ray synchrotron emissions.



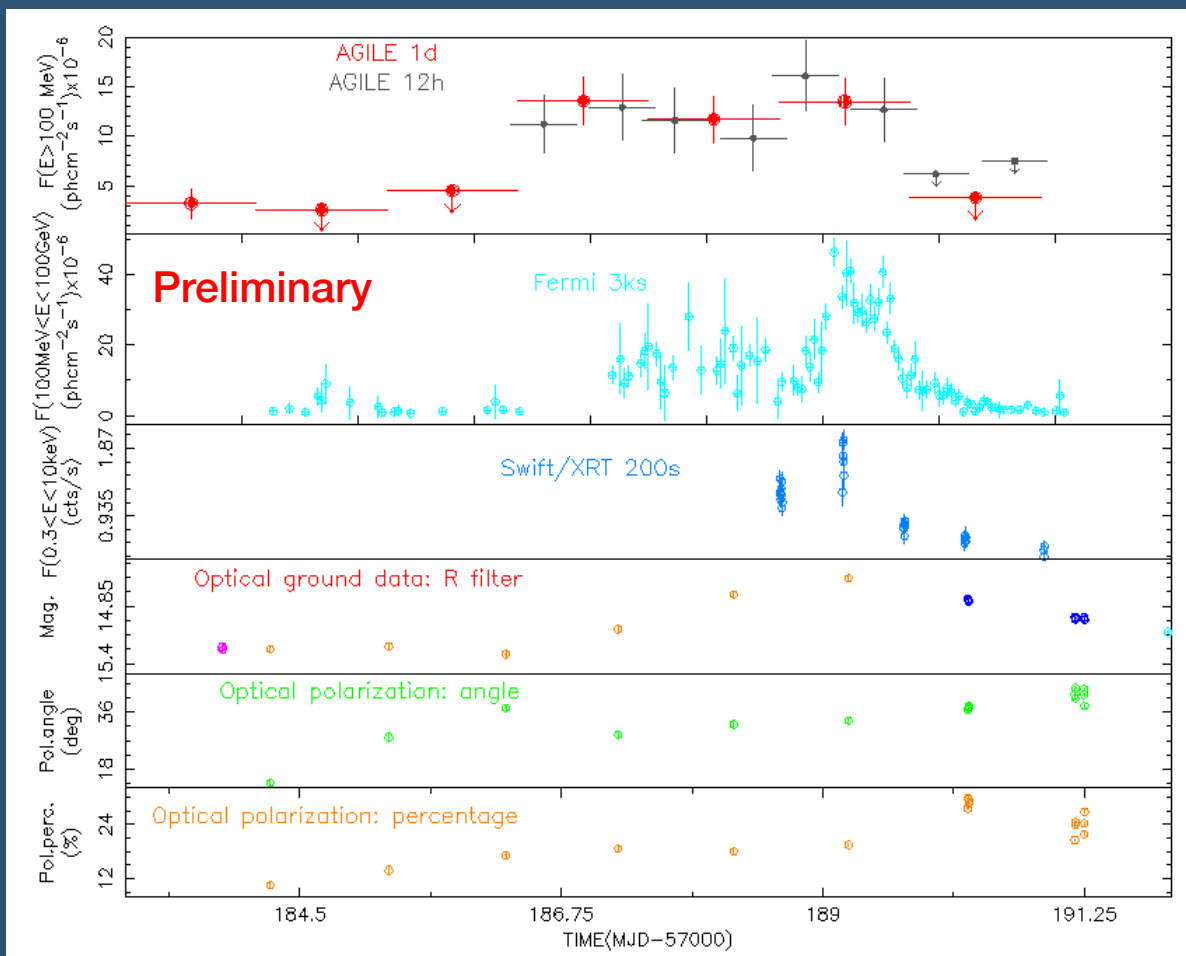
- 52/152 TeV sources have γ -ray counterparts in the AGILE data
- 26 γ -ray sources are new
 - 15 GALs
 - 7 EGALs
 - 4 UNIDs
- 8/26 γ -ray sources are not associated to any F/LAT sources



- Little studied at different wavelengths. 1ES 1011+496 is a borderline case between intermediate and high synchrotron peak frequency BL Lac objects
- Simultaneous SED:
 - synchrotron-dominated source, unlike concluded in previous work based on non-simultaneous data
 - well described by a standard one-zone synchrotron self-Compton model

- 3C 279
- 4C +71.07

Pittori+16 – 3C 279



Strong activity in June 2015

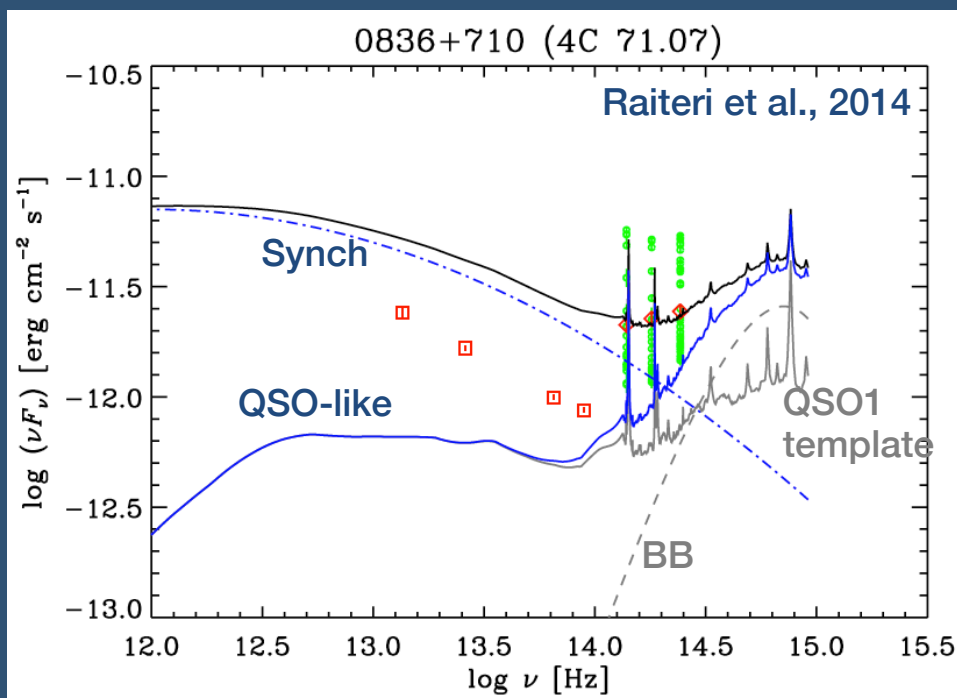
Palyia, 2015 $\rightarrow$ 52 GeV photon $\rightarrow \delta_{\min} \sim 14$

Good correlation among different energy bands

Doubling of both the Pol. Angle and the Pol. Percentage

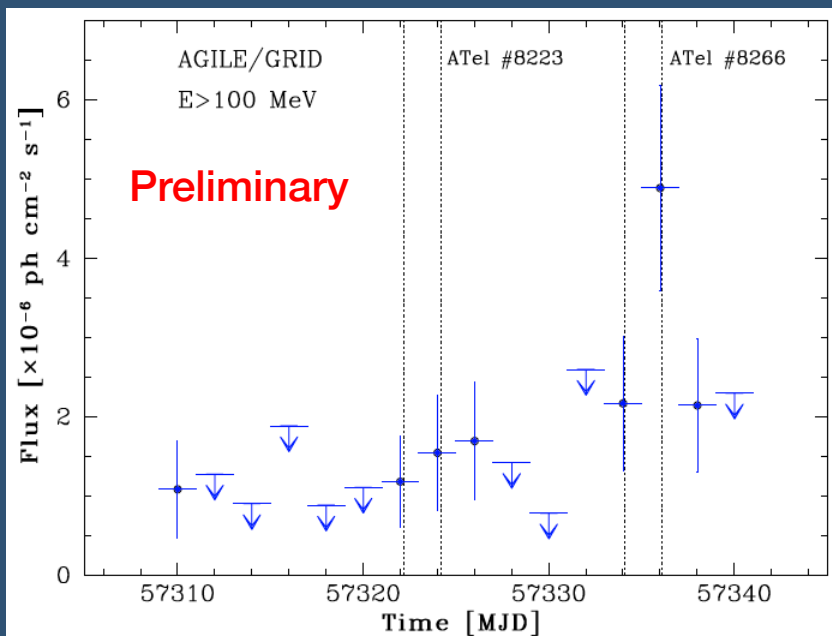
Short time-scale variability

- Distant FSRQ ($z=2.172$, most distant FSRQ in the GASP–WEBT sample)
- Intervening system ($z=0.914$) along the line of sight
- Strong blue bump peaking at about $10^{14.9}$ Hz, which is the signature of an accretion disc whose luminosity is comparable to the highest values observed in type 1 QSO



- Near-infrared data suggest that the accretion disc may be brighter than predicted by the QSO1 template.
- $L_{\text{disk}} \sim 1.7 \times 10^{47} \text{ erg/s}$

Vercellone+16 – 4C +71.07

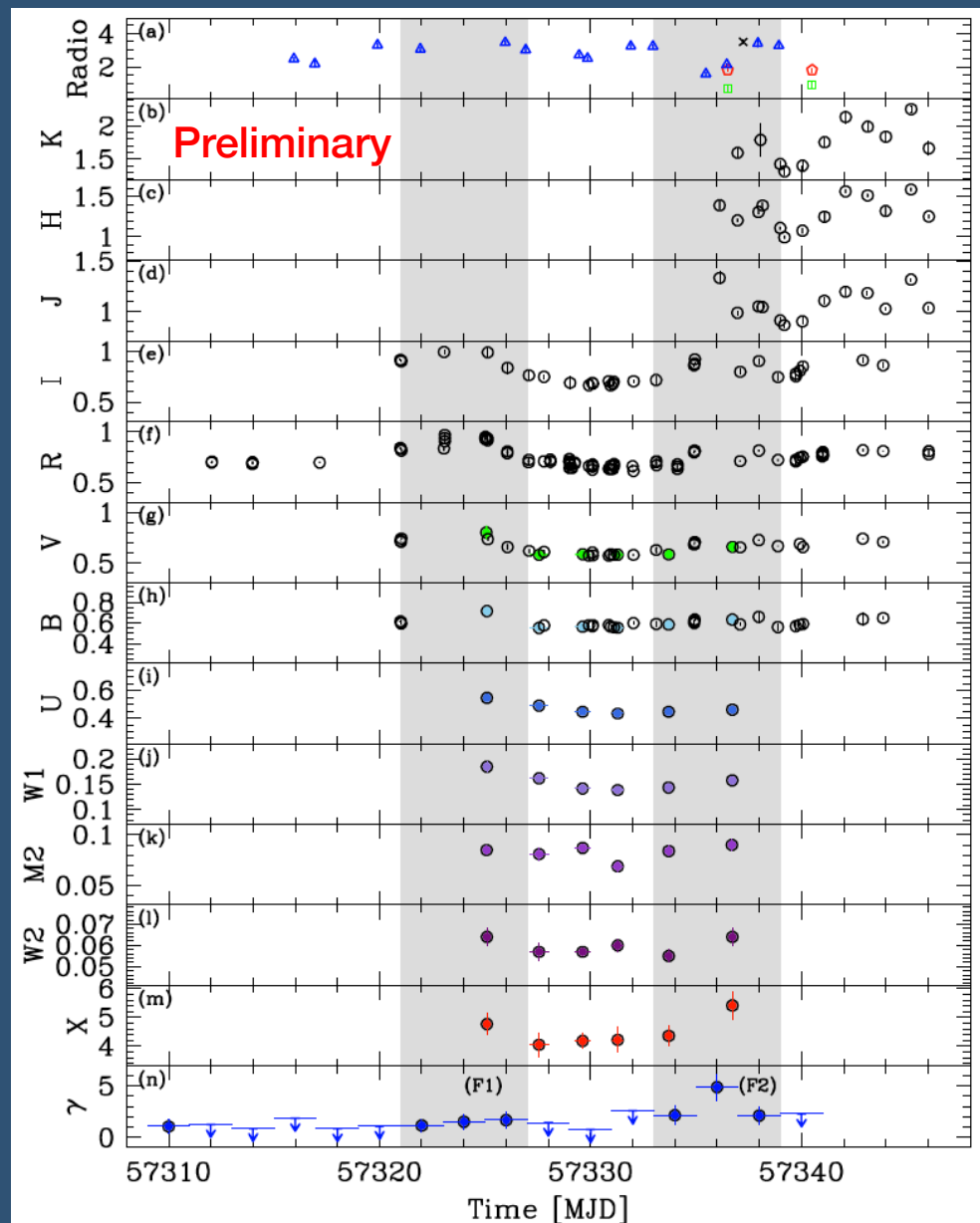


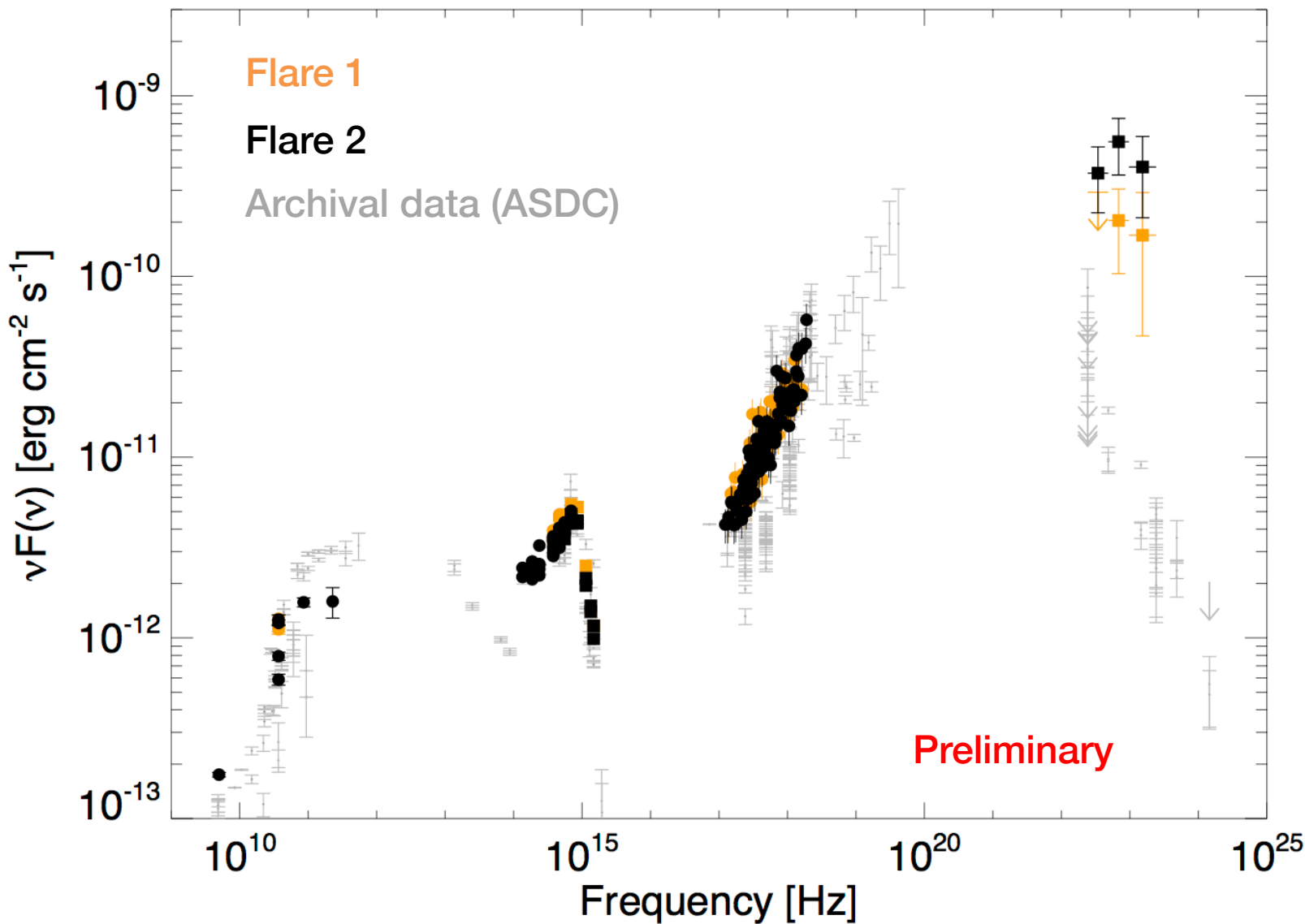
MWL campaign in November 2015
involving:

AGILE (γ -ray)

Swift (Opt, UV, X-ray)

GASP/WEBT (Radio, IR, Opt)





- AGILE demonstrated to be an excellent AGN transient catcher
- Multi-wavelength studies are facilitated by the fast analysis tools and procedures
- New results are on the way!