AGILE and multi-wavelength campaigns on blazars

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on behalf of the AGILE AGN WG
Outline

- AGN catcher
- Recent results
Our archetypal source
Our archetypal source

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Subject: [Grid] 3C454.3 : contatti 3190 - 3216

Cari,

bella e brillante. Quasi 8 sigma con F4G. Il flusso, preso dall'uscita con ALIKE e matrici nuove, e' 285E-8 (occorrera' capire se e come normalizzarlo...)

A dopo,

Stefano

"Shine On You Crazy Diamond" (I-V) - Pink Floyd

Remember when you were young, you shone like the sun.
Catching transient AGNs

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

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

AGILE detection of gamma-ray activity from the FSRQ S5 4036-81 region

Renewed gamma-ray flare from the FSRQ PKS 2032+107 detected by AGILE

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

AGILE detection from the blaz

AGILE confirmation of enhanced gamma-ray activity from the Blazar 1ES 1959+650

AGILE detection from the blaza

AGILE detection of increasing gamma-ray activity from the Blazar 3C 454.3
Catching transient AGNs

- 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)
Recent results
Optical/soft X-ray orphan $\gamma$-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 $\gamma$-ray transients from nearly steady optical/X-ray synchrotron emissions.
52/152 TeV sources have $\gamma$-ray counterparts in the AGILE data

26 $\gamma$-ray sources are new
- 15 GALs
- 7 EGALs
- 4 UNIDs

8/26 $\gamma$-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
New papers

- 3C 279
- 4C +71.07
Pittori+16 – 3C 279

Strong activity in June 2015

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

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.

- $L_{\text{disk}} \sim 1.7 \times 10^{47}$ erg/s
MWL campaign in November 2015 involving:

- AGILE (\(\gamma\)-ray)
- Swift (Opt, UV, X-ray)
- GASP/WEBT (Radio, IR, Opt)
Vercellone+16 – 4C +71.07

Flare 1
Flare 2
Archival data (ASDC)

Preliminary
Conclusions

- 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!