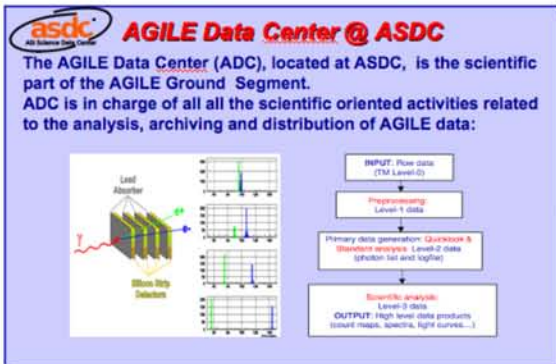


The major γ -ray flare of the blazar 4C+21.35 on Jun 17-19, 2010: AGILE and multi-wavelength follow up observations

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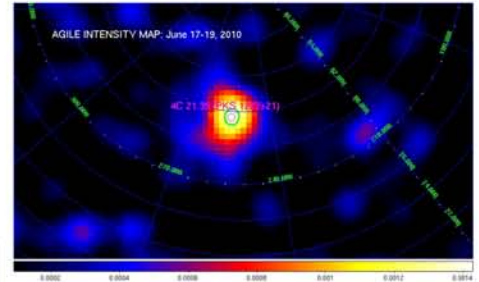
The Flat Spectrum Radio Quasar 4C 21.35, also known as PKS 1222+21, at redshift $z=0.432$, has shown extraordinary flaring activity above 100 MeV during 2009 and 2010. On June 19, 2010 a very intense gamma-ray emission has been reported by AGILE and Fermi. We present here the preliminary results of AGILE data analysis and multi-wavelength follow up observations of the 4C +21.35 intense flare on June 2010.

AGILE is an ASI mission with INFN, INAF-IASF e CIFS participation, devoted to γ -ray astrophysics in the 30 MeV - 50 GeV energy range, with simultaneous X-ray imaging capability in the 18-60 keV band. AGILE, launched on April 23, 2007, is currently operating in spinning observing mode since November, 2009, surveying a large fraction of the sky each day.



AGILE: the most compact instrument for high-energy astrophysics: Payload ~ 130 kg - Total ~ 300 kg

AGILE "very fast" Ground Segment (with contained costs) allows to have automatic alerts typically within just ~2-2,5 hours from the astrophysical event. Record for a gamma-ray mission!

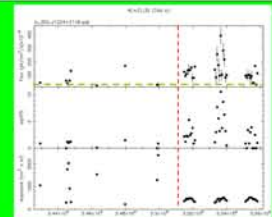


Intensity map of the γ -ray flare above 100 MeV from the blazar 4C21.35 from June 17 to 19 2010, as seen by AGILE (ATel #2686)

Scientific case of the blazar 4C 21.35

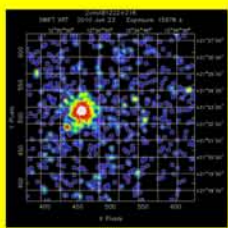
- On June 19, 2010 a very intense γ -ray emission from the blazar 4C21.35 has been reported by AGILE (ATel #2686) and Fermi (ATel #2687).
- Flaring activity from this source has been also detected in the previous few days by the MAGIC at energies above 100 GeV, together with a NIR (ATel #2626) flux increase.
- Six Swift Target of Opportunity observations were performed between June 20 and 23, 2010 (ATel #2698).
- Optical polarimetric observations during the gamma-ray flare (ATel #2693), and optical follow-up (ATel #2708) were also reported.

The June 17-19, 2010 γ -ray flare corresponds to an increase of about a factor of 2 with respect to the previous 48 hours of AGILE data and a factor of ~ 50 with respect to previous quiescent state observations of the peculiar 4C 21.35 !!



AGILE weekly γ -ray light curve of 4C 21.35 over the entire ~ 3.5 year dataset (July 2007 - Jan 2011). Upper panel: dots with no error bars are 90% c.l. upper limits. Dashed green line: EGRET average observed flux. Dashed red line: beginning of the AGILE spinning observing mode (Nov 4, 2009).

Swift follow up results:



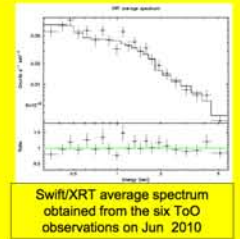
Swift XRT image obtained combining the six ToO observations performed on 20-23 Jun 2010

Following the AGILE alert, six Swift follow-up observations were performed between June 20 and 23, 2010. The Swift/XRT data were taken in Photon Counting mode for a total exposure time of about 16 ks. The X-ray flux does not show significant variability among the six ToO observations. The Swift/UVOT optical/UV bands photometry is compatible within 2 sigma with a constant flux.

The average Swift/XRT spectrum in the range 0.3-10 keV can be described with an absorbed power law model with a column density fixed to the galactic value ($N_H=2.1 \times 10^{20} \text{ cm}^{-2}$) and a photon index $\Gamma=1.63 \pm 0.06$. The unabsorbed 0.3-10 keV mean flux was $(5.6 \pm 0.2) \times 10^{-12} \text{ ergs/cm}^2/\text{s}$ (ATel #2698).

Comparison with previous Swift/XRT observations of 4C 21.35 during quiescent γ -ray state. April 10, 2009 (~2 ks): unabsorbed mean flux = $(6.0 \pm 1.0) \times 10^{-12} \text{ ergs/cm}^2/\text{s}$ (0.3-10 keV), $\Gamma=1.5 \pm 0.2$ May 8, 2009 (~2 ks): unabsorbed mean flux = $(4.9 \pm 0.7) \times 10^{-12} \text{ ergs/cm}^2/\text{s}$ (0.3-10 keV), $\Gamma=1.4 \pm 0.2$

In the days following the γ -ray flare of June 2010, the source didn't show a significant variation (at 90% c.l.) neither of the spectral characteristics nor of the X-ray flux levels with respect to previous observations during quiescent γ -ray state.



Swift/XRT average spectrum obtained from the six ToO observations on Jun 2010

Filter	Total Expos.	Mag
V	1184.1	15.25+/-0.05
B	1260.6	15.38+/-0.05
U	1265.7	14.40+/-0.04
UVW1	2460.8	14.12+/-0.02
UVW2	4465.7	13.33+/-0.03
UVW3	4745.0	13.93+/-0.05

Swift/UVOT average magnitudes obtained from the six ToO observations on Jun 2010

AGILE data analysis and preliminary MWL SED:

Preliminary multiwavelength Spectral Energy Distribution (SED) for the 4C 21.35 blazar, obtained by using the ASDC multi-mission archive and SED Builder Tool.

AGILE preliminary data analysis: hardening of the spectral index ($1.7+/-0.2$) during the 2-day flare.

SED modeling in progress including recent public MWL data (Pittori et al., 2011, in progress)

Further multi wavelength simultaneous observations needed to look for correlations with the gamma-ray activity over several timescales.



References

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- Kalberla et al. 2005, A&A, 440, 775
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