



cospar¹⁰

38th COSPAR Scientific Assembly
Bremen (Germany), 18-25 July 2010
Scientific Event E11

Time Variability at High Energies: A Probe of AGN Physics (including VLBI)

Flux, spectral and multiwavelength variability in Active Galactic Nuclei



Solicited speakers: L. Costamante; B. Czerny;
M. Giroletti; S. Kameno; A. Marscher; I.
Papadakis; L. Stawarz; F. Tavecchio

Oral Sessions:

July 18, 2010, 9:30 – 19:00

July 19, 2010, 9:30 – 13:00

July 20, 2010, 9:30 – 13:00

Room: Hall 2 Earth

Poster Session:

July 18, 2010, 16:00 – 17:30

Room: Hall 3 Poster Area

(image by L. Foschini)

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Online program:

[https://www.cospar-assembly.org/admin/
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38th COSPAR Scientific Assembly (Bremen, Germany, 18-25 July 2010)

E11 – Time Variability at High Energy: a Probe of AGN Physics

Oral Program

(Yellow: Solicited talks; Red: intervals; Blue: Session Titles and Chairs)

(*): slides available.

Hours	Sunday 18 July 2010
	L. Foschini: Event Opening (1')
	AGN with relativistic jets I – Chair: G. Giovannini
09:30 – 10:00	A. Marscher: Panchromatic emission maps of jets of blazars
10:00 – 10:15	G. Madejski: Fermi multi-band observations of blazars: structure of the jet in 3C 279
10:15 – 10:30	G. Tosti (on leave of S. Ciprini): Gamma-ray mono-band and multi-waveband temporal variability of AGN in the Fermi LAT era (*)
10:30 – 10:45	F. D’Ammando: Gamma-ray blazars: the view from AGILE (*)
10:45 – 11:00	J. Sitarek: Observations of AGNs with the MAGIC telescope (*)
11:00 – 11:30	Break
11:30 – 12:00	L. Costamante: HBL variability at high energies: clues on jet structure and driving engine (*)
12:00 – 12:15	N. Otte: Recent VERITAS results on extragalactic sources (*)
12:15 – 12:30	A. Tramacere: Fermi-LAT and multiwavelength observations of the flaring activity of PKS 1510-089 between September 2008 and June 2009
12:30 – 12:45	E. Bonning: The extraordinary flaring activity of the blazar 3C 454.3
12:45 – 13:00	M. Sasada: Multiwavelength photometric and polarimetric observations of the outburst of 3C 454.3 in December 2009
13:00 – 14:30	Lunch
	From loudness to quietness – Chair: L. Stawarz
14:30 – 14:45	M. Gliozzi: Long-term monitoring of PKS 0558-504, a highly accreting AGN with radio jet (*)
14:45 – 15:00	Y. Fukazawa: Suzaku X-ray measurements of time variability of broad-band X-ray spectrum of a radio galaxy Cen A
15:00 – 15:15	N. Kawai: X-ray monitoring of AGN with MAXI
15:15 – 15:45	B. Czerny: Time variability of radio-quiet AGN – Theory (*)
15:45 – 16:00	A. Goldwurm: The glorious past of the supermassive black hole at the Galactic Center unveiled by XMM-Newton and INTEGRAL
16:00 – 17:30	Break + Poster Session (Chair: M. Gliozzi, see below)
17:30 – 18:00	I. Papadakis: The X-ray variability properties of radio-quiet AGN (*)
18:00 – 18:15	S. Vaughan: What can we learn from multiple XMM-Newton observations of NGC 4051?
18:15 – 18:30	W. Ishibashi: Clumpy accretion flows in active galactic nuclei: X-ray variability properties
18:30 – 18:45	K. Hiragi: Wide-band X-ray spectral and timing analysis of AGNs
18:45 – 19:00	D. Grupe: UV and X-ray variability in the NLS1 WPVS007 and Mkn 335

Hours	Monday 19 July 2010
	AGN with relativistic jets II – Chair: G. Tosti
09:30 – 10:00	L. Stawarz: AGN variability across the electromagnetic spectrum and spatial scales (*)
10:00 – 10:15	S. Wagner: Relations between optical synchrotron and gamma-ray variability
10:15 – 10:30	D. Paneque: Extensive multifrequency campaigns on the classical TeV blazars Mkn 421 and Mkn 501 in the Fermi era (*)
10:30 – 10:45	S. Chen: Long-term monitoring on Mkn 421 using ARGO-YBJ experiment (*)
10:45 – 11:00	U.B. De Almeida: Particle acceleration and magnetic field structure in PKS 2155-304: optical polarimetric observations (*)
11:00 – 11:30	Break
11:30 – 12:00	F. Tavecchio: GeV-TeV Blazars: How and Where (*)
12:00 – 12:15	M. Uemura: Bayesian approach to find a long-term trend in erratic polarization variations observed in blazars (*)
12:15 – 12:30	K. Nishikawa: Rapid variability generated at relativistic shocks simulated by Particle-In-Cell code (*)
12:30 – 12:45	S. Jorstad: Connection of gamma-ray emission to the mm-wave VLBI core in blazars (*)
12:45 – 13:00	F. Schinzel: Connection between radio and gamma-ray emission of 3C 345 (*)
13:00 – 13:15	J. Poutanen: GeV breaks in blazars as a result of gamma-ray absorption within the broad-line region (extra talk) (*)

Hours	Tuesday 20 July 2010
	Radio vs Gamma, Fundamental Physics – Chair: L. Foschini
09:30 – 10:00	M. Giroletti: Faint blazars and their impact on the radio/gamma ray connection (*)
10:00 – 10:15	M. Raue: Probing the VHE gamma-ray emission region in M87 using VHE and 43 GHz radio observations (*)
10:15 – 10:30	G. Giovannini: EVN observations of M87 as follow-up on a recent TeV flare (*)
10:30 – 10:45	T. Savolainen: The MOJAVE-Fermi program: studying the jets of gamma-ray blazars in parsec-scales
10:45 – 11:00	J. Bolmont: New limits on quantum gravity energy scale with PKS 2155-304 HESS data using a likelihood fit
11:00 – 11:30	Break
	A glance to future space missions – Chair: L. Foschini
11:30 – 12:00	S. Kamenov: VSOP-2: A space VLBI mission to image central engines and jet launchin regions (*)
12:00 – 12:15	A. Lobanov: Studies of ultracompact jets with Space VLBI
12:15 – 12:30	J. Grindlay: BATSS discovery of short timescale flaring from AGN?
12:30 – 12:45	M. Paolillo: X-ray variability of high-z AGNs: results from deep surveys and prospects for future X-ray missions (*)
12:45 – 13:00	S. Campana: NHXM: a new hard X-ray imaging and polarimetric mission (*)

Poster Session, Sunday 18 July 2010 – Chair: M. Gliozzi

- M. Bozkurt:** Nature of Point Sources from Aquarius Supercluster (*)
- G. Calderone:** Gamma-ray emission of Narrow-Line Seyfert 1 galaxies (*)
- S. Ciprini:** Two years of variable gamma-ray sky explored by Fermi LAT Flare Advocates (*)
- S. Ciprini:** The first Fermi LAT multifrequency campaign on BL Lac: unveiling the low state of the eponymous blazar
- S. Covino:** Long-term Optical and NIR photometry of the BL Lac Object PKS 2155-304 (*)
- H. Duorah:** Radiation studies from NGC 5548
- L. Fallon:** Searching for Pair Halos (*)
- V. Fish:** Imaging the Very High Energy Emitting Region in M87
- L. Foschini:** Patterns of variability in gamma-ray active galactic nuclei (*)
- K. E. Gabanyi:** Intraday Variability and the local interstellar medium (*)
- H. Gaur:** Rapid optical intra-day variability in blazars
- M. Georganopoulos:** A method for setting upper limits to the extragalactic background light with simultaneous Fermi-LAT and TeV observations of blazars
- K. Gereb:** WMAP point sources as potential Space VLBI calibrators (*)
- A. Gupta:** Quasi periodic oscillations (QPOs) in blazars on diverse timescales
- M. Hudaverdi:** A Long Term X-ray Variable Source at Groth-Westphal Field (*)
- A. Hutter:** Photon Beaming in External Compton models (*)
- R. Itoh:** Long-term spectral variation of 3C 66A with Fermi and Kanata Telescope
- M. Kadler:** TANAMI: Dual-Frequency VLBI and Multiwavelength Monitoring of Southern-Hemisphere AGN Jets (*)
- H. S. Kuchibhotla:** Intraday Variability: Intrinsic or Extrinsic?
- T. Larchenkova:** The image jets modeling of gravitationally lensed sources
- C. Müller:** Subparsec scale imaging of Centaurus A (*)
- K. Nishikawa:** The CD Kink Instability in Magnetically Dominated Relativistic Jets (*)
- L. Pacciani:** The strongest ever gamma-ray source in the sky: the December 2009 flare of 3C 454.3
- E. Prandini:** Five years of Observations of PG 1553+113 with the MAGIC Telescope (*)
- A. Pravac:** The blazar sequence: Effect of pair creation and annihilation
- S. Rainò:** Blazar variability affecting the gamma-ray opacity calculation of the universe (*)
- E. Rastorgueva:** Jet kinematics of the blazar 0716+714 on different spatial scales from the multi-frequency VLBI observations (*)
- T. Sbarrato:** Study of the variability of blazars gamma-ray emission (*)
- P. Seal Braun:** Unification of BL Lac objects and FR I radio galaxies (*)
- V. Sochora:** Energy shifts of spectral lines from black hole accretion discs
- K. Sokolovsky:** Estimating the magnetic field strength in AGN jets with multi-frequency VLBI: first results from a pixel-based approach
- H. Takahashi:** Neutral Iron K Lines in Type 1 Seyfert Galaxies observed with Suzaku (*)
- J. Tammi:** Non-jet flares in AGNs: Signatures from loading of the jet?
- S. Trushkin:** Studies of the bright at millimetre wavelength radio sources with the RATAN-600 telescope
- I. Vavilova:** Search for the Multiwavelength AGN Properties in Dependence on Environment
- M. Weidinger:** Analysis of Blazar-flares - A Selfconsistent SSC Model (*)
- A. Zoghbi:** Mapping the inner gravitational radii of AGN using X-ray reverberation and spectroscopy

Time Variability at High Energies: A Probe of AGN Physics (including VLBI) (E11)
[Report by L. Foschini & G. Tosti]

The E11 event focused on variability as a key to understanding the physics of Active Galactic Nuclei (AGN). The session covered the research performed to date at all the wavelengths of the electromagnetic spectrum, from high energy gamma rays to radio frequencies. The session was sponsored by the Italian National Institute of Astrophysics (INAF), the IAU and the Japanese Aerospace and Exploration Agency (JAXA), whose generous contributions provided financial support to three young scientists and to two researchers coming from emerging countries.

The event was well attended, with peaks of up to 70-80 persons per session. The discussions after the presentations were well balanced and lively, suggesting a high degree of participation. The final programme comprised 40 oral presentations (eight having been solicited) and 37 posters (globally, 87 abstracts were received, but 10 were later withdrawn). An extra talk was fitted in on Monday 19 July by accommodating Juri Poutanen who, after having heard some talks, asked about the possibility of giving a talk himself.

Some of the presentations were dedicated to overviews of the latest results of the main satellites and ground-based facilities, such as *Fermi* (Tosti), *AGILE* (D'Ammando), *MAGIC* (Sitarek), *VERITAS* (Otte), *MAXI* (Kawai), *ARGO-YBJ* (Chen), *MOJAVE* (Savolainen). Another group of oral presentations outlined the current status and ongoing work in designing some of the future space missions, such as *VSOP-2* (Kameno, solicited), *RADIOASTRON* (Lobanov), *WFXT* (Paolillo) and *NHXM* (Campana). Grindlay presented some interesting results on very short hard X-rays flares obtained with the *Swift*/BAT Slew Survey (BATSS) that could be the primary science for the EXIST telescope mission.

A large part of the event was dedicated to studies of particular sources, scheduled on the backbone of the reviews offered by the invited

speakers (Marscher, Costamante, Czerny, Papadakis, Stawarz, Tavecchio, Giroletti). One of the hot topics was the location where most of the dissipation occurs in blazars. Basically, there are two options: parsec/super-parsec vs sub-parsec scale. The first option has been defended by Marscher, Jorstad and Schinzel, on the basis of comparative studies of radio and gamma-ray emissions, and by Madejski, who studied gamma rays and the polarized optical emission in the case of 3C 279. On the opposing side, supporting the sub-parsec scale hypothesis, were Tavecchio and Poutanen, who based their conclusions on the variability at gamma rays (former) and the change in the slope at GeV energies of the gamma-ray spectrum (latter).

Another interesting topic emerging in more recent years is the polarization of the optical emission from blazars (Sasada, Barres de Almeida, Uemura). Particular attention has been dedicated to the recent exceptional outburst of 3C 454.3, which reached flux at energies greater than 100 MeV in excess of 10^{-5} ph cm⁻² s⁻¹ (Tavecchio, Bonning, Sasada, Wagner). Other studies on recent outbursts were also presented, namely of M87 (Raue, Giovannini) and of PKS 1510-089 (Tramacere).

Gliozzi presented an interesting multiwavelength study on the radio-loud narrow-line Seyfert 1 PKS 0558-504, where radio maps have shown the presence of a kpc-scale jet. This source could represent the prototype of the less-beamed parent population of the compact strongly-beamed narrow-line Seyfert 1, which was detected recently at gamma rays by *Fermi*. Grupe presented a multiwavelength study with *Swift* of two extreme narrow-line Seyfert 1: Mkn 335 (displaying X-ray variability by a factor of 35) and WPVS 007 (variability factor of 400!). Goldwurm reported on a *XMM-Newton* and *Integral* study of the supermassive black hole, Sgr A*, in our neighbourhood. He showed that, about 300 years ago, there was an outburst (up to about 10^{39} erg s⁻¹) that ended about 100 years ago; today, we are observing the echoes of this turbulent past.



Session E11 in progress.

Other interesting reports completed the presentations on the ‘two Markarians’ (Mkn 421 and Mkn 501) by Paneque, Centaurus A (Fukazawa), NGC 4051 (Vaughn), a theoretical model for the clumpy accretion in AGN (Ishibashi), a sample of Seyferts as observed with *Suzaku* (Hiragi), particle-in-cell simulation of relativistic shocks (Nishikawa). Last, but not least, Bolmont showed how the variability in AGN could be used to study the properties of the space-time between the Earth and the source, giving some useful constraints on quantum gravity theories.

In the 37 posters, many peculiar sources, such as 3C 454.3, PKS 2155-304, PG 1553+113 (and many more), were analysed. The observations dealt with some physical characteristics inferred by variability studies at all the wavelengths.

The slides of the talks and posters, plus some photos of the event, are available at: <http://www.brera.inaf.it/utenti/foschini/COSPAR2010E11/>

The Transient X-Gamma-ray Sky: Recent Results and Future Directions (E16)
[Report by A. Bazzano & N. Gehrels]

The meeting entitled ‘The Transient X-Gamma-Ray Sky: Recent Results and Future Directions’ took place in Bremen within the

framework of the theme ‘Research in Astrophysics from Space’. The meeting, which spanned 23 July (p.m.) and 25 July (a.m.), was organized by Dr Angela Bazzano (MSO) and Dr Neil Gehrels (DO). The rationale for organizing this high-energy event was the increasing interest of the whole scientific community in the new scenario depicted by the recent appearance of a crowded transient sky as results arrive from *Integral*, *Swift*, *Suzaku*, *MAXI*, *AGILE*, *Fermi*, *VERITAS*, *MAGIC* and *HESS* as well as the community’s plans to look for the next steps with regard to future possible missions.

The interest of the international community in studying and modelling the physical processes at work in these transient phenomena, from the most energetic ones (GRBs) to the weakest ones (Very Faint X-ray Transients), was represented by the level of response to the call for abstracts and by the audience discussion. Reviews of the status of the art from both observational and theoretical view points were addressed.

The meeting was a first attempt to gather together a wide-band community of observers and theoreticians with the aim of disentangling the new sky scenario of relativistic astrophysics while looking for next steps. The world-wide interest in the different fields of interest was also represented by the Scientific Organizing Committee, as well as a substantial participation at the meeting, with