



Astrophysics > Cosmology and Extragalactic Astrophysics

# Multiwavelength campaign on Mrk 509. I. Variability and spectral energy distribution

J. S. Kaastra, P.-O. Petrucci, M. Cappi, N. Arav, E. Behar, S. Bianchi, J. Bloom, A. J. Blustin, G. Branduardi-Raymont, E. Costantini, M. Dadina, R. G. Detmers, J. Ebrero, P. G. Jonker, C. Klein, G. A. Kriss, P. Lubinski, J. Malzac, M. Mehdipour, S. Paltani, C. Pinto, G. Ponti, E. M. Ratti, R. A. N. Smith, K. C. Steenbrugge, C. P. de Vries

(Submitted on 4 Jul 2011)

(Abridged) Active galactic nuclei show a wealth of interesting physical processes, some of which are poorly understood. We want to address a number of open questions, including the location and physics of the outflow from AGN, the nature of the continuum emission, the geometry and physical state of the X-ray broad emission line region, the Fe-K line complex, the metal abundances of the nucleus and finally the interstellar medium of our own Galaxy. We study one of the best targets for these aims, the Seyfert 1 galaxy Mrk 509 with a multiwavelength campaign using five satellites (XMM-Newton, INTEGRAL, Chandra, HST and Swift) and two ground-based facilities (WHT and PAIRITEL). Our observations cover more than five decades in frequency, from 2  $\mu\text{m}$  to 200 keV. The combination of high-resolution spectroscopy and time variability allows us to disentangle and study the different components. Our campaign covers 100 days from September to December 2009, and is centred on a simultaneous set of deep XMM-Newton and INTEGRAL observations with regular time intervals, spanning seven weeks. We obtain a continuous light curve in the X-ray and UV band, showing a strong, up to 60% flux increase in the soft X-ray band during the three weeks in the middle of our deepest monitoring campaign, and which is correlated with an enhancement of the UV flux. This allows us to study the time evolution of the continuum and the outflow. By stacking the observations, we have also obtained one of the best X-ray and UV spectra of a Seyfert galaxy ever obtained. In this paper we also study the effects of the spectral energy distribution (SED) that we obtained on the photo-ionisation equilibrium. Thanks to our broad-band coverage, uncertainties on the SED do not strongly affect the determination of this equilibrium.

Comments: 10 pages, 5 figures, 2 tables. Accepted for publication in Astronomy & Astrophysics

Subjects: **Cosmology and Extragalactic Astrophysics (astro-ph.CO)**; High Energy Astrophysical Phenomena (astro-ph.HE)

Cite as: **arXiv:1107.0656v1 [astro-ph.CO]**

## Download:

- [PDF](#)
- [PostScript](#)
- [Other formats](#)

Current browse context:

**astro-ph.CO**

[< prev](#) | [next >](#)

[new](#) | [recent](#) | [1107](#)

Change to browse by:

[astro-ph](#)

[astro-ph.HE](#)

## References & Citations

- [INSPIRE HEP](#)  
([refers to](#) | [cited by](#))
- [NASA ADS](#)

## Bookmark([what is this?](#))



## Submission history

From: Jacobo Ebrero [[view email](#)]

[v1] Mon, 4 Jul 2011 15:32:07 GMT (55kb)

*[Which authors of this paper are endorsers?](#)*

Link back to: [arXiv](#), [form interface](#), [contact](#).