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Three years monitoring of 3C 273 with INTEGRAL and XMM-Newton

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Abstract. We present preliminary results of the analysis of 3C 273 observed with *INTEGRAL* and *XMM-Newton* during 2003 − 2005. The available data span from optical to hard X frequencies and show significant variability. Simulations with *SIMBOL-X* are also presented.

Key words. quasars: individual: 3C 273 – X-rays: galaxies – Galaxies: active

1. Introduction

We selected all the *INTEGRAL* publicly available pointings with the source in the FCFOV ($< 5°$ to the boresight) within the period 2003−2005, resulting in a total exposure of about 1 Ms. We analyzed the IBIS data using the standard software `OSA v. 5.1`. We retrieved the public *XMM-Newton* data collected over the same period, for a total exposure of 128 ks and analyzed them by means of the standard software `SAS v. 7.0`.

Lightcurves have been produced for 3C 273 from optical (*XMM*/OM) to hard X (*INTEGRAL*/ISGRI) bands, obtained with a binning time from 1.3 to 65 ks for OM data, 3 ks for PN and 90 ks for ISGRI (Fig.1). The lightcurves in the optical and ultraviolet bands are constant within errors, while strong flux variations show up in the X-ray bands. At the beginning of 2003 the source was increasing its flux level in both 0.2 − 1 and 3 − 10 keV bands, followed by a long decrease (2004) and a slow enhancement in 2005. The flux in both the 20 − 40 keV and 40 − 100 keV ranges suggests an anticorrelated trend to the soft X emission and a correlation to the radio flux, that suggests the presence of a jet.

Moreover the dominance of the soft X emission during the low jet contribution should reveal the Seyfert like component as suggested by Grandi & Palumbo (2004). A spectral analysis of all *XMM* observation is in progress and preliminary fits with a simple broken power-law confirm the trend found by Foschini et al. (2006).

In order to disentangle the Seyfert and jet component a spectral analysis of simultaneous data is needed. However *INTEGRAL* needs significantly longer exposure times than *XMM-Newton*. Indeed, as shown in Fig. 2, with 4 ks of exposures, it is possible to achieve only a low significance detection in two energy bands, despite 3C 273 is one of the brightest blazars in the sky.

The *SIMBOL-X* mission is expected to guarantee a high sensitivity in the hard X-rays

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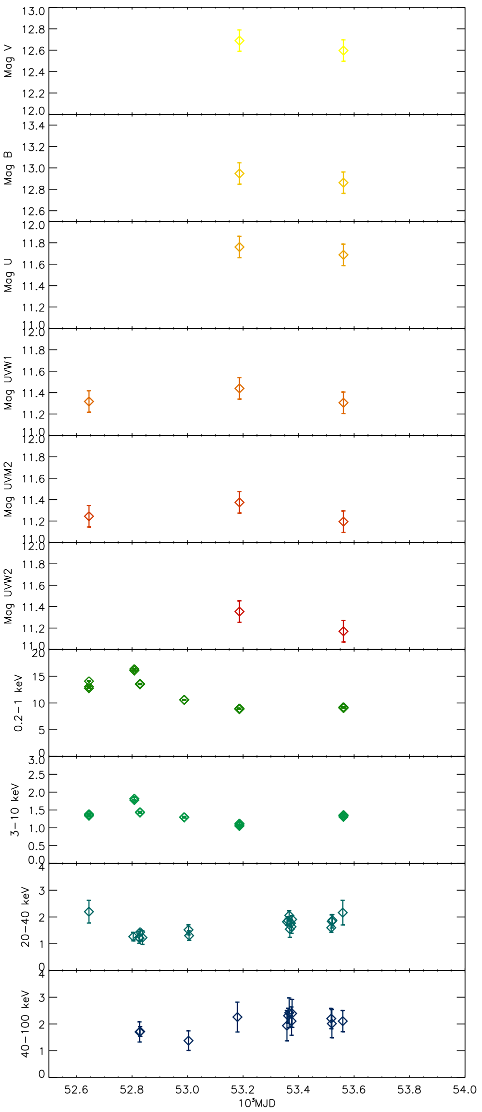

Fig. 1. From the top to bottom panel: *XMM*/OM lightcurves for filters V, B, U, UVW1, UVM2, UVW2; *XMM*/PN lightcurves in the 0.2 – 1 and 3 – 10 keV bands; *INTEGRAL*/ISGRI lightcurves in the 20 – 40 and 40 – 100 keV bands.

band. Simulations of observation of 3C 273 show that the different spectral components can be separated already with a 1 hour expo-

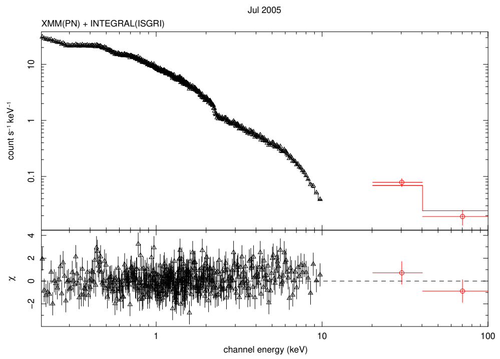

Fig. 2. Quasi-simultaneous spectral fit of *XMM-Newton* and *INTEGRAL* observation of 3C 273 performed on 2005 – 07 – 10. See text for more details.

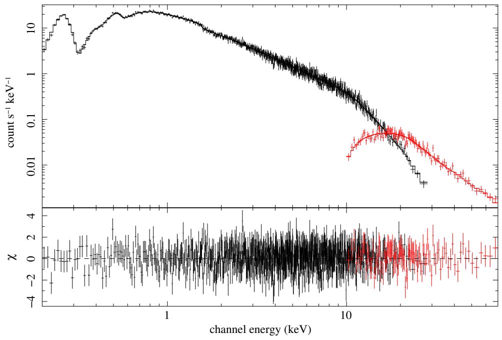

Fig. 3. Simulation of 1 hour observation of 3C 273 with *SIMBOL-X*, by adopting the same spectral parameters of the fit on the July 2005 observation.

sure (Fig. 3) and parameters can be very well constrained with a 100 ks observation.

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References

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