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Optical and near infrared observations of the blazar 3C 279 with the REM telescope

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on behalf of the REM collaboration.

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Abstract. The Rapid Eye Mount (REM) telescope installed at La Silla (Cile) on June 2003, is a robotic telescope able the capability to observe in optical and infrared bands. Since the late commissioning phase a optical and infrared monitoring program of a sample of blazars, most emitting also in the gamma–ray band, was started. Such program is still on going and it make part of an observational activity aimed to the multiwavelength characterization possible blazars candidate to be observed also in gamma-ray by the instruments on board of AGILE satellites(launched on 23 April 2007) and Glast (that will be launched at the end of the 2007). In this poster we present the optical/near-IR data obtained during the January 2007, outburst of 3C279 (the prototype of the gamma–ray loud).

Key words. galaxies: active – galaxies: jets – quasars: general – quasars: individual (3C 279) – radio continuum: galaxies

1. Introduction

Blazars form a subclass of Active Galactic Nuclei (AGNs) including BL Lac objects and flat spectrum radio quasars (FSRQ). The recent progresses made in the astronomical instrumentation allowed to reveal the emitted radiation from the blazar over the entire electromagnetic spectrum, from radio to the more energetic gamma-rays (Hartman et al. 1992; Mattox et al. 1997; Wehrle et al. 1998). More than 70 blazars have been identified at $E > 100$ MeV by EGRET, and more then 15 blazars have also been observed at $E > 350$ GeV by Cherenkov telescope . The energy distribution of blazars is characterized by two continuous components, having the peaks of emission in the mm-IR-optical and gamma-ray range respectively. The low-energy component is probably due to synchrotron emission by relativistic electrons that move along a very collimated jet that form a small angle with line of sight (Ulrich et al. 1997). A characteristic feature of the observed blazar phenomenology is the strong temporal and spectral variability at all the frequencies. The study of variability requires observations in different regions of the spectrum and can provide useful indications to determine both the dimensions of the active regions and the physical particle acceleration/emission mechanisms. Observations in the optical/IR bands are of particular interest because it is in this spec-

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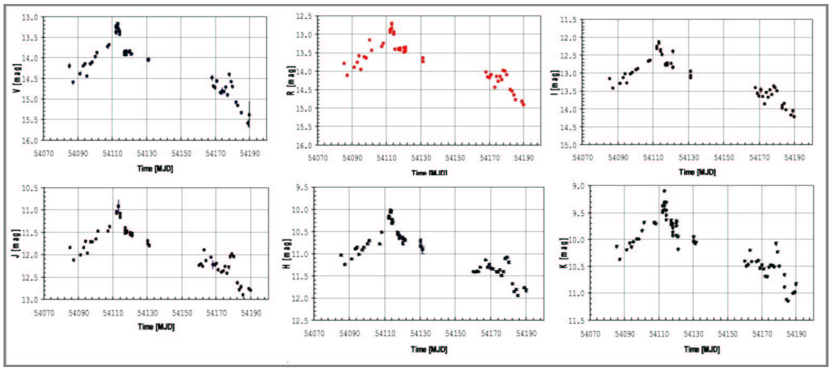

Fig. 1. Light curves of 3C 279 both in the optical bands (V,R,I) and in the infrared band(J,H,K)from REM telescope in the period august 2006 march 2007

tral region is very close to the synchrotron emission peak of FSRQs and Low–frequency peaked BL Lacs (LBL). The next missions AGILE and GLAST will allow to study in detail the EGRET blazars and to discover new one. It is only through the combination of the gamma-ray data with those of low energy that we could understand physical mechanisms and constraint models. In order to better characterize the temporal/spectral variability in the optical/IR range, a program to monitor a sample of southern EGRET blazar in VRIJHK bands was activated on the REM robotic telescope. Most of our sample sources have not been observed with regularity in the past, while others (visible also from the northern hemisphere) are well-known sources but with very few simultaneously near-IR-optical observations. Below we report first results from the observation of a big flare in 3C 279 in January 2007 observed with REM.

2. Optical-near infrared observations of 3C 279

The REM telescope allows to execute simultaneously optical and near-infrared photometry and low-resolution spectroscopy. It is equipped of two instruments: REM-IR for observations in the IR range using 4 filters (Z,J,H and K); ROSS for observations in the optical range (V,R,I filters). For this scientific program we used the two instruments to obtain nearly simultaneous data in order to study the spectral behaviour of the sources to different levels of flux (fig.1). Data reduction has been carried out through the GAIA program using images corrected by bias, dark and flat-field. The instrumental magnitudes have been calibrated using the comparison star sequences reported in the Landessternwarte Heidelberg-Königstuhl web pages (**www.lsw.uni-heidelberg.de/projects/extragalactic/charts/**) (optical bands) and the sequences of (González-Pérez et al. 2001) for the near-IR bands.

3. Conclusions

In the study of spectral distribution of 3C279 we have not found no variation of the spectral index $\alpha \equiv \frac{\partial(\log f_\nu)}{\partial(\log\nu)}$ in proximity of flare maintaining itself to value $\alpha \approx -1.42$

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References

Hartman, R.C., et al., 1992, ApJ, 385, L1
Mattox, J.R., Wagner, S.J., Malkan, M., et al., 1997, ApJ, 476, 692
Ulrich, M.-H., Maraschi, L., & Urry, C.M., 1997, ARA&A, 35, 445
Wehrle, A.E., et al. 1998, ApJ, 497, 178
González-Pérez, M. R. Kidger, & F. Martín-Luis, 2001, AJ, 122, 2084