SPECTRAL VARIABILITY OF SIX BRIGHT BL LAC OBJECTS IN THE NEAR IR

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The results of several photometric campaigns (1986-1993) in the near IR of the six bright BL Lac objects 3C 66A, PKS 0422+004, PKS 0735+178, PKS 0754+100, PKS 0829+046 and OQ 530 are presented. The observations were carried out at the 1.5 m Italian IR Telescope at Gornergrat (TIRGO - 3150 m a.s.l.) equipped with a IR photometer using a InSb detector cooled at the solid nitrogen temperature and the standard J, H, K filters. The principal aims of our program are the search of rapid variability (typical time scales of 1 day or less) and of correlations between the flux level (typically in the J band, where the largest variation amplitude is found) and the spectral slope. In the following we summarize some relevant results.

Variations ranging from 0.4 to about 1.1 mag have been observed for all the sources in the three bands. Flux changes of $\sim$ 0.3 mag at distance of two or three days were found in several occasions but, on shorter time scales, variations greater than $\sim$ 0.2 mag are not frequent events. Remarkable episodes were the $\leq$ 1 day brightening by 0.25 mag in K and 0.16 mag in H, while J did not change, of PKS 0754+100 and the change by 0.4 mag in J, 0.14 mag in H, without a detectable variation in K, which occurred in PKS 0735+178 on a time scale of $\sim$ 1 hour.

Our data do indicate that the correlation between the J flux and the spectral slope of the NIR emission, reported in previous papers, cannot be considered a general property of the BL Lac objects. Two sources (PKS 0829+046 and OQ 530) show large changes of the slope without evidence of correlation with the J flux. A practically constant spectral index is observed in PKS 0754+100 (with the only exception of the event reported above), despite the J flux varies by a factor of 2. A possible correlation can be envisaged for PKS 0422+004 by considering the average spectral index and flux on a time scale of a few years. Finally, 3C 66A and PKS 0735+178 have a mild correlation: the weighted coefficients of linear correlation are 0.54 and 0.66 corresponding to probabilities to have a chance effect less than 0.03 and 0.01, respectively.

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