

SIMULTANEOUS LONG TERM MILLIMETRE AND SUB-MILLIMETRE MONITORING OF BLAZARS*

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We have monitored a sample of 17 blazars at 375, 270, 230 and 150 GHz with the James Clerk Maxwell Telescope (JCMT). We also have 230, 150, 90 GHz data from IRAM and SEST, and 37, 22 GHz from Metsähovi Radio Research Station, Finland. The data shows a range of flaring time-scales, from months for e.g. 0851+202 to years in the case of e.g. 1641+399. Superimposed shorter time-scale variability ('flickering' behaviour) is seen in many sources from our sample. We make no conclusive statements on whether BL Lacs as a class are preferentially variable on shorter time-scales. All sources show variability on many time-scales regardless of classification.

For sources showing well defined flares of longer duration, there is a clear (Spearman rank-order) correlation between increasing 270 GHz flux and a flatter 375–150 GHz spectral slope (calculated by a weighted least squares fit). This can be interpreted as injection of a flatter electron distribution (which subsequently steepens), or may be related to the passage of the synchrotron self-absorption turnover past the viewing window. There is a clear separation of populations between the BL Lacs and the OVV's: the BL Lacs have a flatter mean spectral index (a 1-d K-S test gives a 98.8% confidence result). This agrees with the results of Gear et al. 1993; see also Stevens et al. in these proceedings.

The shock model of Marscher & Gear (1985) predicts three phases of flare evolution, with direct observational consequences in terms of flare amplitudes and delays in attainment of maximum flux. Specifically, in the initial growth phase the flare amplitude should increase as frequency decreases, and there should be no lag between frequencies. In subsequent evolutionary phases the amplitude of the flares should remain roughly constant or fall with decreasing frequency and there should be lags between frequencies. We compare this with our sources calculating lags using the DCF of Edelson & Krolik (1988), and find reasonable agreement between the model and observations.

References

- Edelson, R. A., & Krolik, J. H., 1988, *Astrophysical Journal*, 333, 646
Gear, W. K. et al. 1993, *Monthly Notices of the RAS*, in press
Marscher, A. P, & Gear, W.K., 1985, *Astrophysical Journal*, 298, 114

* Stevens et al. 1993, in preparation

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