

Rapid Profile Variations in the Broad $H\alpha$ Line of the Seyfert Galaxy Markarian 6

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1. Observations and data reduction

We report on rapid variations of the $H\alpha$ profile in Mark 6 over a period of about one hour and the implications for the velocity field of the BLR.

Two telescopes were used – the 6-m telescope of the SAO, equipped with a TV scanner, and the 2.6-m telescope of the BAO, using an image tube. A total of 6 $H\alpha$ spectra were recorded for Mark 6 during two nights at the two telescopes. The spectral resolution is typically $\sim 4 \text{ \AA}$ for scans and $\sim 6 \text{ \AA}$ for photographic spectra. The S/N ratio in the continuum for individual spectra is 10 – 15. No correction for spectral sensitivity has been applied. Individual spectra were continuum subtracted and calibrated scaling the total flux over two bands (λ_{obs} : 6500 – 6600 \AA and 6740 – 6800 \AA) in the $H\alpha$ wings.

2. Results

The $H\alpha$ difference profiles shown in Figures 1 and 2 display small but significant changes occurring on a time scale of ~ 1 hour. These changes take the form of narrow bumps (marked by arrows). The S/N ratios for the bumps are 3.6 – 9.0. (The high residuals at the positions of narrow $H\alpha$ and $[NII]$ lines in the difference spectra are consequences of guiding and centering errors.)

Interestingly, in the literature there are four $H\beta$ spectra of Mark 6 obtained at two different observatories in the same night 5 hours apart (Khachikian et al. 1982, Chuvaev 1991). These spectra show clear differences in the short wavelength shoulder of the broad profile during this time interval. This provides further evidence in favour of the reality of the variability in $H\alpha$ observed by us.

These rapid variations in the emission line profiles of Mark 6 are very similar to those observed in 3C 390.3 (see our other poster in this volume) and favour models of a relativistic inhomogeneous circular disk in the BLR.

References

- Chuvaev, K. K. 1991, *Izv. Krimsk. Astrofiz. Obs.*, 83, 194
Khachikian, E. Ye., Popov, V. N., & Egiazarian, A. A. 1982, *Astrofizika*, 18, 541

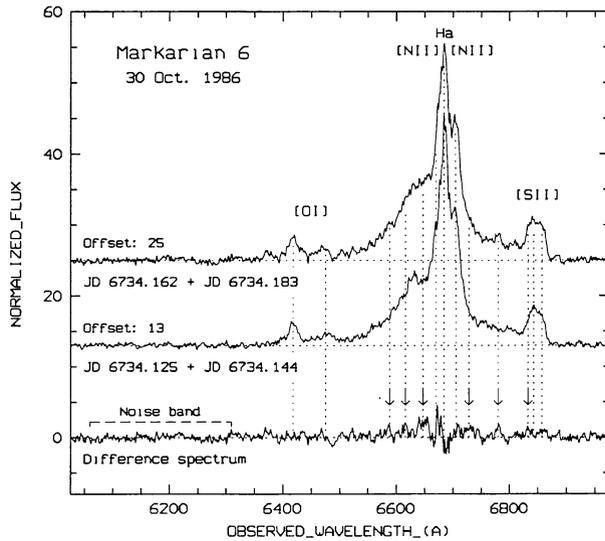


Figure 1. Image tube spectra of Mark 6 obtained 1986 October 30 and their difference.

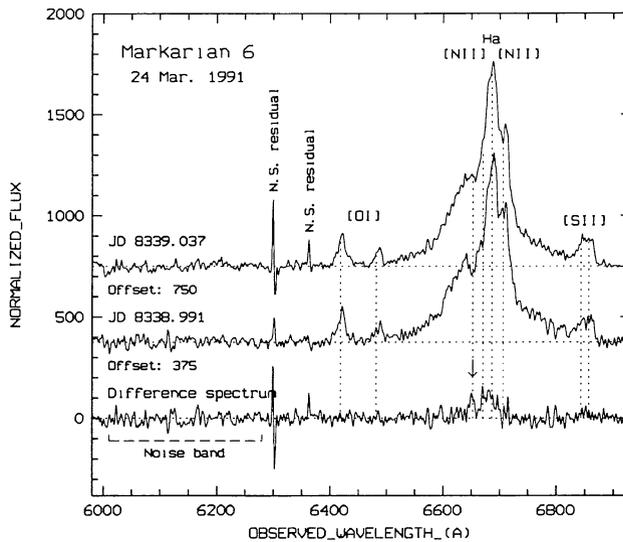


Figure 2. TV scanner spectra of Mark 6 obtained 1991 March 24 and their difference.