

## Variability of the broad emission $H_{\beta}$ profile in 3C390.3

A.N. Burenkov, A.I. Shapovalova, V.V. Vlasyuk

*Special Astrophysical Observatory of Rus.Ac.Sci., Nizhnij Arkhыз,  
Russia*

and N.G. Bochkarev

*Sternberg Astronomical Institute, Moscow, Russia, 119899*

### 1. Introduction

The object 3C390.3 is a well known broad-line radio galaxy ( $z=0.056$ ), whose very broad emission lines are variable in time (see Veilleux and Zheng 1991, and Dietrich et al. 1998 for references). It is known as the prototypical source of broad double-peaked  $H_{\beta}$  and  $H_{\alpha}$  emission lines. In this paper we present the preliminary results of spectral observations of 3C390.3 in 1995 – 1998 on 6-m and 1-m telescopes of the Special Astrophysical Observatory of RAS.

### 2. Observation and data reduction

The spectra were obtained with the long-slit spectrograph + CCD of the 6-m telescope ( $\approx 80\%$ ) and with the long-slit spectrograph + CCD of 1-m telescope ( $\approx 20\%$ ). The processing of the spectra was made using software developed in SAO RAS by Vlasyuk (1993). The spectra were scaled to constant flux of [OIII] emission lines. The linear approximation of continuum in a spectrum was made via two areas ( $\lambda 4930 \pm 5\text{\AA}$  and  $\lambda 5313 \pm 5\text{\AA}$ ). The profile of the emission  $H_{\beta}$  was fitted by compilation of 3 Gaussians (broad blue, broad red and narrow components). Fig.1 presents results of measurement of the spectra.

### 3. Results

We studied the variability of the broad  $H_{\beta}$  profile during the last 3 years: from April 1995 to April 1998.

1. The variations of the  $H_{\beta}$  and broad red component fluxes followed the continuum ( $I_{\text{cont}}$ ) during the period of observations, excluding dates dJD before 10000 and dJD after 10800. The possible delay  $\approx 200$  days of the emission lines variability to continuum was present (Fig.1, top).

2. The local continuum varied quasi-periodically with possible period  $\approx 800$ -1000 days (Fig.1, top).

3. The relation of broad blue component flux to red was almost constant  $\approx 0.25$  until dJD 10500, increased rapidly up to 2.5 at dJD 10600 and later turned back. For testing this result we averaged spectra inside dJD 10599 – 10701,

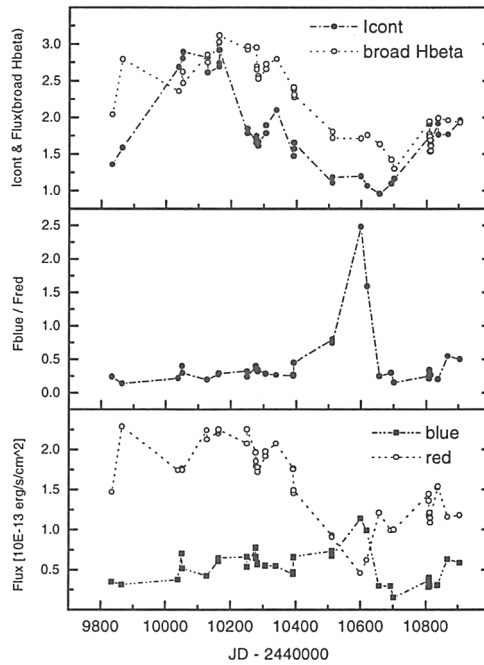


Figure 1. Top: Flux density in continuum (Icont) is measured within the wavelength range  $\lambda\lambda 5100 - 5150\text{\AA}$  and the full broad  $H\beta$  flux. Middle: Relation of blue/red components of broad  $H\beta$ . Bottom: Fluxes of blue and red components of broad  $H\beta$ . Icont is shown in  $10^{-15} \text{erg s}^{-1} \text{cm}^{-2} \text{\AA}^{-1}$  and fluxes are present in  $10^{-13} \text{erg s}^{-1} \text{cm}^{-2}$  (for the [OIII]  $4959+5007\text{\AA}\text{\AA}$  flux =  $1.7 \cdot 10^{-13} \text{erg s}^{-1} \text{cm}^{-2}$ )

repeated the same analyses as for individual spectra and confirmed the strong decrease of the broad red component at this time.

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**References**

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