

THE NGC 1275 GALAXY NUCLEUS EMISSION SPECTRUM VARIABILITY  
AT VARIOUS STAGES OF ACTIVITY

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Emission lines variability of Seyfert galaxy NGC 1275 nucleus in the scales of years and months has been observed since 1971 (I. Pronik, 1980). The photoelectric observations of I. Pronik and N. Merkulova (1987) show, that the variability in  $H\beta$  and 4959+5007 Å [OIII] lines occurs also in the time scale of several days. Hereinafter the analysis of  $H\beta$  and [OIII] variable emission lines within months is presented according to photographic observations carried out from 1971 till 1982 by I. Pronik (1980), V. Doroshenko and V. Terebizh (1983) and K. Chuvaev (1985).

Fig. 1 shows the results of 1970-1982 UV observations of the nucleus. The degree of its variability was the highest in 1970 - 1976, lowed in 1976 - 1978 and became too low after 1978. Spectral observations were scanty. Fig. 2 shows approximately 120 sets of spectral observations: curves I and II correspond to the observational data obtained prior to 1978, while curve III - to the period after 1978. The comparison of curves I and II shows, that at the same values of  $W_\beta$  the ratio  $I_{[OIII]}/I_\beta$  depends on the nucleus brightness in the continuum, being smaller in the case of bright nucleus.

The sequence III is markedly distinguished from I and II by its position in Fig. 2 as well as by a clear-cut dependence of  $I_{[OIII]}/I_\beta$  on  $W_\beta$ . As follows from Fig. 1 there was a sharp decrease of nucleus brightness in the continuum after 1978. The results in Fig. 2 allow a suggestion, that with the brightness variations

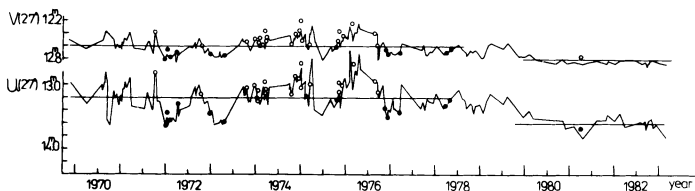
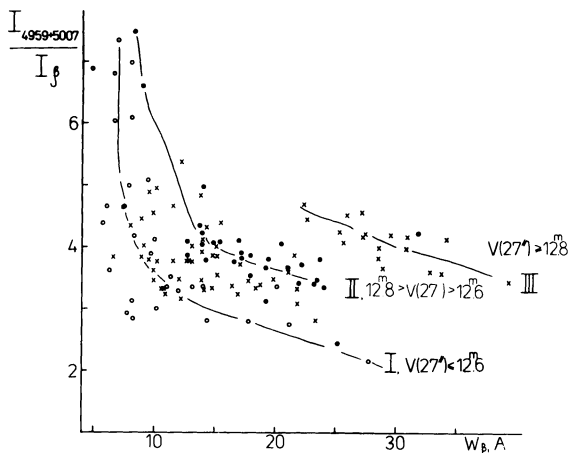
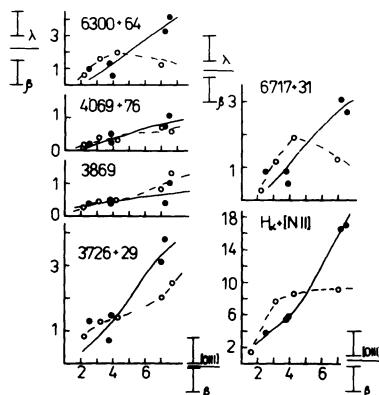


Figure 1. The U and V light curves of NGC 1275 nucleus obtained with the 27" diaphragm by Lyutyi (1980). The coincidences of spectral and UBV observations are indicated by circles and points for  $V \leq 12.6$  and  $V \geq 12.6$ , correspondingly. The horizontal lines indicate the levels of  $V = 12.6$  and  $V = 12.8$ .



**Figure 2.** The relation of  $I_{[OIII]}/I_{\beta}$  ratio versus  $W_{\beta}$  for the NGC 1275 nucleus. Circles and points indicate the same as in Fig. 1. Crosses stand for spectral observations not accompanied by UV ones.

**Figure 3.** The relation between relative intensities of emission lines in the spectrum of NGC 1275 nucleus. The labels are the same as in Fig. 1.



of the NGC 1275 nucleus in the continuum the physical parameters of the gaseous envelope must change, too. This suggestion is supported by the data in Fig. 3. It is evident here, that with the increase of  $I_{[OIII]}/I_{\beta}$ , the ratios  $I_{\lambda}/I_{\beta}$  for 3726+29 A [OII], 6300+64 A [OI], 6717+31 A [SII] lines increase faster in the case of a weak nucleus, than of a bright one. The lines 3869 A [NeIII] and 4069+76 A [SII] of higher degree of excitation show similar degree of variability in both cases.

#### References

- Chuvaev, K. 1985, Pisma v Astron.J., II, 803.  
 Doroshenko V., Terebizh V. 1983, Trudi GAISH, 55, 64.  
 Lyutyi V., 1980, Pisma v Astron.J., 6, 223.  
 Pronik I., 1980, Izv.Krimsk.Astrofiz. obs., 60, 131.  
 Pronik I., Merkulova N., 1987, "Observational Evidence of Activity in Galaxies", Proc. IAU Sym. No 121, p. 195.