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Spectral Variability of Some Seyfert Galaxies

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Abstract. The very first spectrograms of 40 Seyfert galaxies are discussed. All these objects were taken from Markarian's lists of galaxies. They were first investigated and classified at Fesenkov Astrophysi- cal Institute during 1973-1988. Spectral study was carried out with a slit spectrograph, attached to the 70-cm telescope and equipped with a three cascades image-tube. Repeated observations of 22 galaxies were obtained in 1985-2000. An analysis of possible spectral variability of the studied galaxies over 10-26 years was made. A list of objects which are the most interesting for further observations is presented.

Spectral Observations and Results

The very first spectrograms of 40 Seyfert galaxies from Markarian's lists of galaxies were studied and classified at Fesenkov Astrophysical Institute during 1973-1988. Spectral observations were carried out with a slit spectrograph, attached to the 70-cm telescope and equipped with a three cascades image-tube. Spectrograms cover the wavelength region 6200-6800ÅÅ.

The list of galaxies: numbers from Markarian's lists, dates of the first observations, values of V magnitudes and Z are given in the Table together with the main characteristics of the spectra, such as availability of emission lines and widths of the broad emission profiles.

During the last ten years, spectra of more than half of this group were obtained repeatedly, using the same instrument and optical systems. A comparison of the early and recent observational data reveals any variations in the spectra during 20-30 years. Thus we can identify the objects that are rather promising for follow-up detailed investigations on the basis of their variability.

For example, changes in the FWHM of broad Hα, as high as 30 or more percent were registered in the spectra of Mrk 595, 705, 841 and 1040. These objects are considered to be candidates for further detailed investigations.

One more object –the galaxy Mrk 926– looks very promising for the searching of variations. It is rather bright and has a very broad emission Hα.

References

Lipovetsky, V.A. et al. 1987, Communications of SAO, No55

Table 1. Seyfert Galaxies Studied in the Fesenkov Astroph.Inst.

Mrk Number	V (mag)	$Z(FAI)/Z^a$	Date of the First Observ.	FWHM Hα $km\,s^{-1}$	b	c	d
463	13.81	0.0506/0.0506	08.02.73	2650	-	B	+
464	16.12	0.0510/0.0510	03.02.73	6000	-	B	
474	15.25	0.0360/0.0396	01.03.73	4500	+	B	
486	14.78	0.0397/0.0397	18.10.73	2500	+	B	+?
504	15.78	0.0373/0.0373	20.10.73	4380	+	B	
595	14.42	0.0275/0.0275	08.02.73	4360	+	M	
609	14.4	0.0345/0.0345	18.01.74	4300	+	M	+?
618	13.56	0.0357/0.0357	26.01.73	2900	+	B	
620	11.92	0.0068/0.0069	24.01.73	2500	+	M	+
646	15.28	0.0537/0.0537	21.01.74	1100	-	M	+?
668	14.98	0.0797/0.0797	15.02.74	2100	-	M	
699	15.11	0.0348/0.0348	21.02.74	4000	+	B	
704	13.51	0.0290/0.0294	23.02.76	5500	+	B	+?
705	14.52	0.0282/0.0288	23.02.76	3200	+	M	+
707	14.88	0.0492/0.0505	26.11.76	2200	-	M	
715	15.45	0.0841/0.0841	27.02.76	2900	-	F	+?
716	16.5	0.0580/0.0574	27.02.76	3700	+	F	
720	15.1	0.0450/0.0451	27.02.76	2000	+	F	
734	14.81	0.0492/0.0497	23.02.76	2900	+	F	+
739	13.81	0.0300/0.0296	23.02.76	1800	-	M	+?
744	13.85	0.0097/0.0092	02.03.76	3300	+	F	+?
745	14.56	0.0101/0.0101	27.11.76	1500	-	F	+
766	12.64	0.0128/0.0128	23.02.76	3000	+	M	+?
771	14.93	0.0630/0.0632	02.03.76	2300	-	M	
817	13.62	0.0321/0.0321	23.02.76	3000	+	M	
841	14.48	0.0365/0.0365	23.01.76	4300	+	M	
871	14.22	0.0337/0.0337	25.02.76	2700	+	F	
896	14.61	0.0268/0.0262	20.11.76	2300	-	M	+?
926	13.82	0.0478/0.0475	21.11.76	10400	+	M	
928	14.14	0.0249/0.0249	26.11.76	2400	-	B	+
937	13.8	0.0301/0.0301	23.11.76	1750	-	M	+
955	14.01	0.0352/0.0351	24.11.76	3300	+	F	+?
957	15.14	0.0740/0.0711	20.11.76	1900	-	F	+?
975	14.19	0.0498/0.0498	20.11.76	5300	+	F	+?
993	13.39	0.0169/0.0169	24.11.76	2700	+	F	+?
1040	13.26	0.0173/0.0164	20.11.76	3800	+	M	+
1044	13.67	0.0164/0.0164	19.11.76	2400	+	B	+?
1048	13.38	0.0424/0.0424	23.11.76	2000	+	M	+?
1058	14.35	0.0174/0.0174	21.11.76	1400	-	M	+?
1095	12.87	0.0330/0.0327	21.11.76	4500	+	B	

[a] Lipovetsky et al. (1987).

[b] Column b shows presence of our repeated observations.

[c] Column c determines contrast of maximal intensity of Hα relatively to continuum: B-"bright", M-"middle", F-"faint".

[d] Column d shows a presence of other emission lines besidesHα.

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