

Surface Photometry of Barred AGN Arakelian 564

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The Seyfert 1.5 galaxy Akn564 [1] is a well known X-ray active galactic nucleus (AGN) included in our list of selected barred AGN. The galaxy was observed during the August 1996 season at the 2-m RCC telescope of the Astronomical Observatory "Rozhen" of the Bulgarian Academy of Sciences. ST-6 with standard Schott V, R, I filters were used. MIDAS'96 package was used for the data reduction with the Richter's expansion for the surface photometry [2]. Most of the basic data for the galaxy are shown in the Table 1 below.

Table 1. Observational data for Sy1.5 galaxy Arakelian 564

Coordinates (1950)	22h 40m 18s	+29d 27' 48"	Type: SBb		[1]
Dimensions	0.8 x 0.52 arcmin				[2]
Photometric data:	V = 13.67	U-B = -0.42	B-V 0.69	V-R = 0.76	[2]
Redshift	0.025				[3]
Other data	[5007]/H β = 1.0 F12 < 0.25 Jy	S6 = 49 mJy F25 = 0.72 Jy	F60 = 3.46 y	F100 = 5.53 Jy	[2]
Table of Observations	13.08.1996 V - 2x600 sec	2 m RCC tel. R - 2x300 sec	ST-6 CCD I - 2x300 sec	0.295 "/px	

References to the Table: [1] Arakelian, M.A., 1975, Publ.Bjurak.Obs, 47,3. [2] Lipovettsky, V.A. et al., 1987, Comm. of SAO (UdSSR), 55, 5. [3] Arakelian, M.A. et al., 1976, Astrophysics, 12, 456.

Following Richter, flat-fielded, dark-subtracted CCD frames were adaptive filtered, and a multiple masking technique was applied to have "galaxy on a pure background." The real objects were modeled with ellipses according to Bender & Moelenhoff [3] methods. Cumulative magnitudes and surface brightness for V,R and I frames and for the models have been evaluated, as well as the distribution of the position angles of the major axes and the colors. The parameters of the disk in 3 - 18 arcsec radius for the objects and models in the three colors are presented in Table 2.

Here $SB = Mc + (r/rc)\exp(1/n)$. On figure 1 (only R color is shown) the twisted bar, wider and stronger in the south part, is clearly seen and some bright star formation regions are traced. The extremely bright starlike nucleus with diameters 8 - 10 arcsec includes about 60 % of the luminosity of the galaxy. The disk is clearly visible to 50 arcsec on $SB = 26 \text{ mag/sqr.arcsec}$. The nucleus is bigger in R and I colors - see the sharp minimum in the distribution of V-R colors for the object and model. Figure 2 presents the surface brightness (SB), color index (V-R), axis ratio (b/a) and position angle (PA) as a function of the radius.

Table 2. Akn564 Fitting parameters

mod_obj	n	mc	err_mc	rc	err_rc
SB_v_mod	+0.40	21.36	0.782	+0.0029	+0.00026
SB_r_mod	+0.40	21.94	0.168	+0.0018	+0.00005
SB_i_mod	+0.40	+19.81	2.030	+0.0042	+0.00036
SB_v_obj	+0.40	+20.37	+0.780	+0.0039	+0.00029
SB_r_obj	+0.40	+20.31	+0.732	+0.0032	+0.00019
SB_i_obj	+0.90	+18.92	+0.391	+0.1298	+0.00718

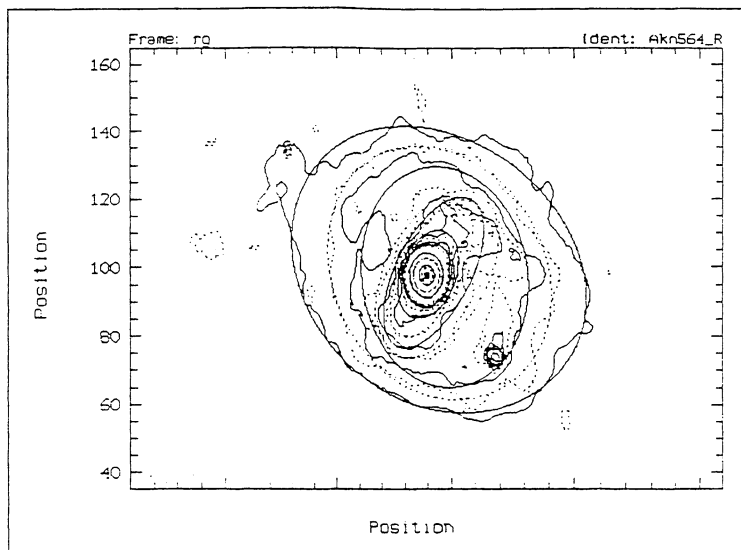


Figure 1. Fitting of the R-frame of Akn 564 with ellipses according to [4]

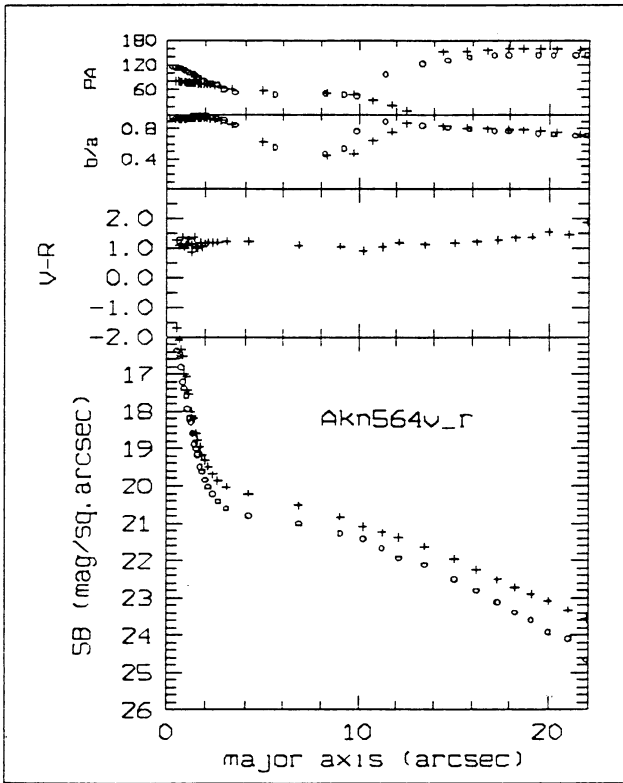


Figure 2. Surface brightness (SB), color index ($V-R$), axis ratio (b/a) and position angle (PA) as a function of the radius.

References

- Arakelian, M.A., 1975, *Publ.Bjurak.Obs.*, 47, 3
 Vennik, J., Hopp, U., Kovachev, B., Kuhn, B., Elsasser, H., 1996, *AApSuppl.*, 117, 261
 Lorenz, H., Richter, G., Cappaccioli, M., Longo, G., 1993, *A&A*, 277, 321
 Bender, R., Moelenhoff, C., 1987, *A&A*, 177, 71