

COMMISSIONS 27 AND 42 OF THE IAU  
INFORMATION BULLETIN ON VARIABLE STARS

Number 4528

Konkoly Observatory  
Budapest  
27 October 1997

*HU* ISSN 0374 – 0676

**BY APODIS: A NEW MIRA VARIABLE<sup>†</sup>**

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BY Aps ( $\alpha = 16^{\text{h}}26^{\text{m}}58^{\text{s}}$ ,  $\delta = -75^{\circ}18'28''$ , epoch = 2000.0) was discovered as a variable star by Hoffmeister (1963) and designed as S5581. It is listed in the General Catalogue of Variable Stars (Kholopov et al. 1985) as an L-type variable, i.e., a star presenting slow irregular light changes. The quoted brightness variation is  $m_{\text{pg}} = 13.6 - (15.6)$ .

We have observed this star in the course of a photometric and spectroscopic program on southern and equatorial irregular variables (Cieslinski et al. 1997a, 1997b). The photometric observations (Table 1) were obtained with the FOTEX and FOTRAP (Jablonski et al. 1994) photometers at the 0.6-m Zeiss and 1.6-m Boller & Chivens telescopes of the CNPq/Laboratório Nacional de Astrofísica, Brazil. The spectroscopic observations were carried out in 1986 with the Boller & Chivens Spectrograph + 2D-Frutti on the 1.0-m Yale telescope at the Cerro Tololo Interamerican Observatory, Chile. The spectral coverage is 3900–6800 Å, with 7 Å resolution. Several spectra of BY Aps were collected and in all occasions the object showed a continuum compatible with M3–M7II spectral types.

In order to search for periodicities we analysed the photometric data of BY Aps using a DFT algorithm (Deeming 1975). A modulation with a period of 240<sup>d</sup>.40 is clearly evident in the V data (Fig. 1). The amplitude of this modulation is  $\sim 4$  mag and appears to be fairly coherent along the time interval in which our data were collected ( $\sim 12$  years). The behaviour of the  $U - B$ ,  $V - R$  and  $R - I$  indices is quite consistent with that of Mira-type objects (Celis 1977, de Laverny et al. 1997). The  $B - V$  index shows enhanced scatter around phase  $\sim 0.25$ , similar to what is seen for R Cha in phase  $\sim 0.8$  and for RU Oct in phase  $\sim 0.95$  (de Laverny et al. 1997). R Car and R Hya may have a similar effect on the descending branch of the light curve (Celis 1977). This colour index is also relatively constant in the range of phases 0.5 – 1.0, but this is not rare (see for example R Cha, RY Hyi, RU Oct and U Tuc in de Laverny et al. 1997)

The ephemeris for the times of maximum light of BY Aps is as follows:

$$T_{\text{max}}(\text{JD}) = 2447909.6(\pm 1.3) + 240.40(\pm 0.23) \times E$$

The presence of a periodic large amplitude variation and the M spectral type suggest BY Aps to be a Mira-type variable. A finding chart from the Digitized Sky Survey (SkyView)<sup>1</sup> is shown in Fig. 2.

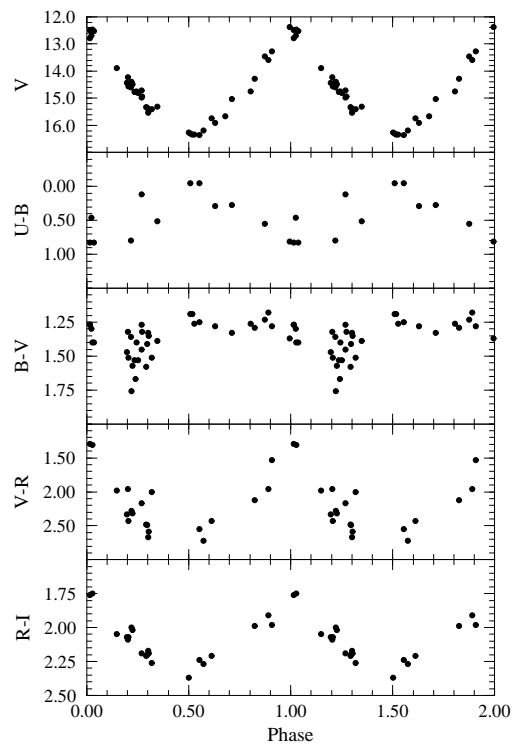
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<sup>†</sup>Based on observations made at CNPq/LNA, Brazil and CTIO, Chile

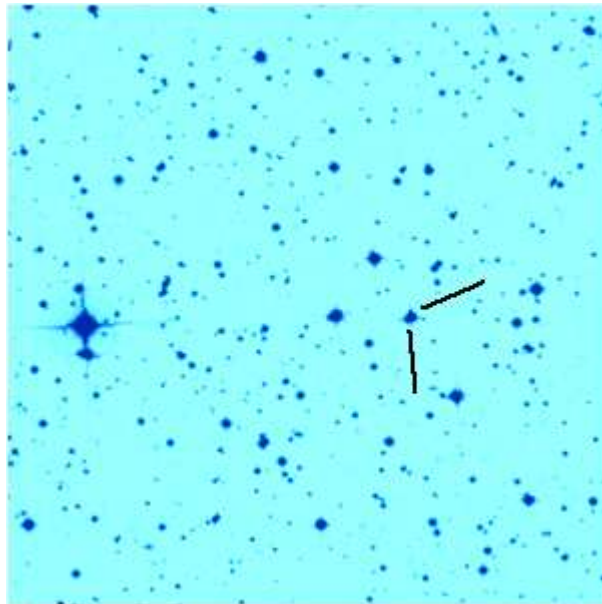
<sup>1</sup>SkyView was developed under NASA ADP Grant NASS-32068 and under the auspices of the High Energy Astrophysics Science Archive Research Center (HEASARC) at the GSFC Laboratory for High Energy Astrophysics.

Table 1: Photoelectric photometry of BY Aps

HJD	V	U-B	B-V	V-R	R-I	$\sigma_V$	$\sigma_{U-B}$	$\sigma_{B-V}$	$\sigma_{V-R}$	$\sigma_{R-I}$
2446179.6400	14.75	—	1.26	—	—	0.07	—	0.11	—	—
2446230.5844	12.78	—	1.27	—	—	0.04	—	0.05	—	—
2446232.5495	12.70	0.46	1.30	—	—	0.04	0.06	0.05	—	—
2446283.5500	14.76	—	1.53	—	—	0.06	—	0.12	—	—
2446284.5956	14.76	—	1.67	—	—	0.05	—	0.10	—	—
2446285.4846	14.74	—	1.40	—	—	0.04	—	0.06	—	—
2446287.4414	14.80	—	1.53	—	—	0.04	—	0.06	—	—
2446291.5198	14.98	—	1.45	—	—	0.06	—	0.07	—	—
2446292.5447	14.94	—	1.32	—	—	0.04	—	0.06	—	—
2446353.4322	16.33	—	1.26	—	—	0.20	—	0.18	—	—
2446550.7195	15.30	0.51	1.39	—	—	0.03	0.16	0.04	—	—
2446589.6323	16.30	-0.05	1.19	—	—	0.06	0.10	0.06	—	—
2446591.5990	16.33	—	1.19	—	—	0.07	—	0.06	—	—
2446618.5180	15.91	0.29	1.28	—	—	0.08	0.10	0.08	—	—
2446677.4199	13.45	0.55	1.23	—	—	0.04	0.12	0.05	—	—
2446706.4271	12.37	0.81	1.37	—	—	0.03	0.07	0.04	—	—
2446716.4279	12.53	0.83	1.40	—	—	0.04	0.12	0.05	—	—
2446878.6568	15.03	0.27	1.33	—	—	0.08	0.20	0.10	—	—
2447240.7907	14.59	0.80	1.36	—	—	0.06	0.20	0.06	—	—
2447335.5286	15.73	—	—	2.43	2.21	0.10	—	—	0.10	0.08
2447351.5930	15.66	—	—	—	—	0.10	—	—	—	—
2447626.8129	14.29	—	1.29	2.12	1.99	0.05	—	0.07	0.04	0.03
2447642.8299	13.59	—	1.18	1.96	1.91	0.05	—	0.10	0.05	0.02
2447716.5571	14.44	—	1.47	2.33	2.07	0.05	—	0.13	0.05	0.03
2447718.5376	14.57	—	1.51	2.43	2.07	0.06	—	0.12	0.05	0.02
2447739.4668	15.33	—	1.58	2.48	2.21	0.07	—	0.14	0.06	0.03
2447740.4637	15.35	—	1.41	2.49	2.20	0.08	—	0.12	0.09	0.05
2447741.5508	15.54	—	1.33	2.67	2.17	0.09	—	0.15	0.07	0.03
2447742.4297	15.46	—	1.35	2.59	2.19	0.07	—	0.15	0.07	0.03
2447802.4273	16.35	-0.05	1.25	2.55	2.24	0.10	0.18	0.10	0.07	0.05
2448443.5614	14.40	—	1.76	2.28	2.00	0.04	—	0.10	0.03	0.02
2448444.5251	14.48	—	1.57	2.32	2.02	0.04	—	0.08	0.03	0.02
2449249.4309	16.19	—	—	2.72	2.27	0.15	—	—	0.10	0.08
2449897.4309	14.72	0.12	1.27	2.17	2.19	0.04	0.12	0.05	0.03	0.03
2450291.4298	13.27	—	1.28	1.53	1.98	0.05	—	0.15	0.06	0.03
2450317.4880	12.48	0.83	1.27	1.29	1.76	0.03	0.15	0.06	0.04	0.03
2450320.4658	12.47	—	1.40	1.31	1.75	0.06	—	0.13	0.06	0.03
2450349.4283	13.89	—	—	1.98	2.05	0.10	—	—	0.10	0.07
2450362.4669	14.22	—	1.32	1.96	2.09	0.06	—	0.15	0.05	0.04
2450630.6798	15.40	—	1.51	2.00	2.26	0.10	—	0.20	0.08	0.07
2450674.4840	16.27	—	—	—	2.37	0.20	—	—	—	0.13



**Figure 1.** The photometric data of BY Aps folded on the  $240^{\text{d}}.40$  pulsational period.



**Figure 2.** A  $8^{\text{h}}.5 \times 8^{\text{m}}.5$  finding chart for BY Aps. North is up and East to the left.

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