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RECOVERY OF AS Psc AT MINIMUM LIGHT

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Kato & Uemura (2001) recently reviewed the outburst history and characteristics of this star and concluded that it is a likely dwarf nova, though its subtype remains indeterminate. At minimum it is below the sky survey limit (though a possible candidate is just visible on the POSS-II J image).

I obtained images in $UBVI(kc)$ on 2002 Jan 18 UT, using the MDM Observatory 2.4m Hiltner telescope on Kitt Peak, Arizona, and a SITe 2048² CCD. The image scale was 0".275 pixel⁻¹. Three exposures were obtained in each filter, totaling 720, 540, 360, and 360 s in $UBVI(kc)$ respectively. I measured instrumental magnitudes using the IRAF implementation of DAOPHOT.

Conditions were not photometric, but a few nights later T. Miller obtained shallower $UBVI(kc)$ images of the same field with the 1.3m McGraw-Hill telescope under photometric conditions. Several Landolt (1992) standard star fields were obtained the same night, and the calibration appears consistent to better than 0.03 mag in V . The 1.3m pictures provided local secondary photometric standards which are listed in Table 1, and these were used to calibrate the 2.4 m images. Astrometric solutions for all the images are from fits to numerous USNO A2.0 stars (Monet et al., 1996).

Fig. 1 shows the average 2.4m B-band image. The star marked at the center is at

$$\alpha_{\text{ICRS}} = 1^{\text{h}}28^{\text{m}}08^{\text{s}}.37, \quad \delta_{\text{ICRS}} = +31^{\circ}14'57''.3,$$

$\pm 0''.3$ (estimated uncertainty). This is consistent with the outburst position (Duerbeck 1987). It has

$$(U - B) = -1^{\text{m}}.15, \quad (B - V) = +0^{\text{m}}.11, \quad V = 22^{\text{m}}.11, \quad \text{and} \quad (V - I) = 0^{\text{m}}.07;$$

the total uncertainties (random plus systematic) should be < 0.1 mag, except for $U - B$, which is a little worse. (The colors could be affected by rapid variations between exposures, but we have no evidence of this).

Because of the close positional coincidence of this object with the outbursting object, and colors typical of a dwarf nova at minimum light, this is clearly the quiescent counterpart. Kato & Uemura (2001) report $B = 15^{\text{m}}.3$ at maximum, and we see it at $B = 22^{\text{m}}.2$. It could possibly get somewhat fainter, so we can conclude that $\Delta B \geq 6^{\text{m}}.9$. This is not unusual for dwarf novae, and supports Kato & Uemura's classification.

Table 1. AS Psc Field Star Photometry

α	δ	$U - B$	$B - V$	V	$V - I$
1:27:52.11	31:15:43.3	0.11(3)	0.68(2)	16.823(14)	0.78(2)
1:27:57.25	31:17:21.5	0.217(17)	0.727(15)	15.665(10)	0.825(13)
1:28:02.27	31:18:55.5	0.01(2)	0.594(16)	16.959(11)	0.731(16)
1:28:03.49	31:13:36.7	0.68(3)	0.916(15)	16.502(11)	1.024(16)
1:28:04.36	31:12:17.6	0.02(2)	0.566(18)	16.780(14)	0.69(2)
1:28:05.16	31:14:09.9	0.28(3)	0.710(17)	17.594(10)	0.810(15)
1:28:06.58	31:17:50.4	0.07(4)	0.582(17)	17.961(10)	0.733(17)
1:28:07.43	31:15:28.0	-0.088(19)	0.579(12)	17.367(8)	0.769(11)
1:28:08.88	31:12:35.8	0.04(3)	0.594(14)	17.378(9)	0.742(18)
1:28:09.71	31:13:26.4	0.17(5)	0.66(2)	18.142(12)	0.81(2)
1:28:10.20	31:13:48.2	0.90(4)	0.950(11)	16.815(7)	1.044(11)
1:28:10.89	31:11:32.0	0.50(7)	0.87(4)	17.93(2)	0.89(3)
1:28:13.71	31:17:04.4	0.014(5)	0.613(4)	15.153(2)	0.738(4)
1:28:14.07	31:16:30.9	1.28(2)	1.368(5)	15.145(3)	1.645(4)
1:28:16.00	31:16:56.0	0.12(2)	0.688(10)	17.151(5)	0.820(10)
1:28:16.33	31:11:51.1	0.36(6)	0.82(3)	18.067(16)	0.90(2)
1:28:19.81	31:16:26.9	-0.076(5)	0.558(3)	15.130(2)	0.765(4)
1:28:23.74	31:17:13.7	1.27(8)	1.358(13)	16.876(5)	1.637(7)
1:28:26.66	31:12:24.9	0.638(10)	0.953(11)	14.459(8)	1.012(12)
1:28:27.30	31:17:45.0	-0.12(3)	0.443(15)	17.904(9)	0.709(13)
1:28:27.86	31:15:45.9	0.454(6)	0.807(5)	13.997(2)	0.845(4)
1:28:28.05	31:18:09.4	0.139(10)	0.640(6)	16.063(4)	0.719(7)

NOTES to Table 1: Coordinates are ICRS, from a fit to 38 USNO A2.0 stars in a 1.3m CCD image obtained 2002 January. They should be accurate to $\sim 0^{\text{s}}.3$, with somewhat better relative accuracy. The magnitude uncertainties given in parentheses are *formal* 1σ errors; the systematic uncertainties are expected to be ~ 0.03 mag except for $U - B$, which is worse. Two sets of $UBVI$ images were used. Only those stars measured successfully in all filters on both sets of images with consistent magnitudes are tabulated.

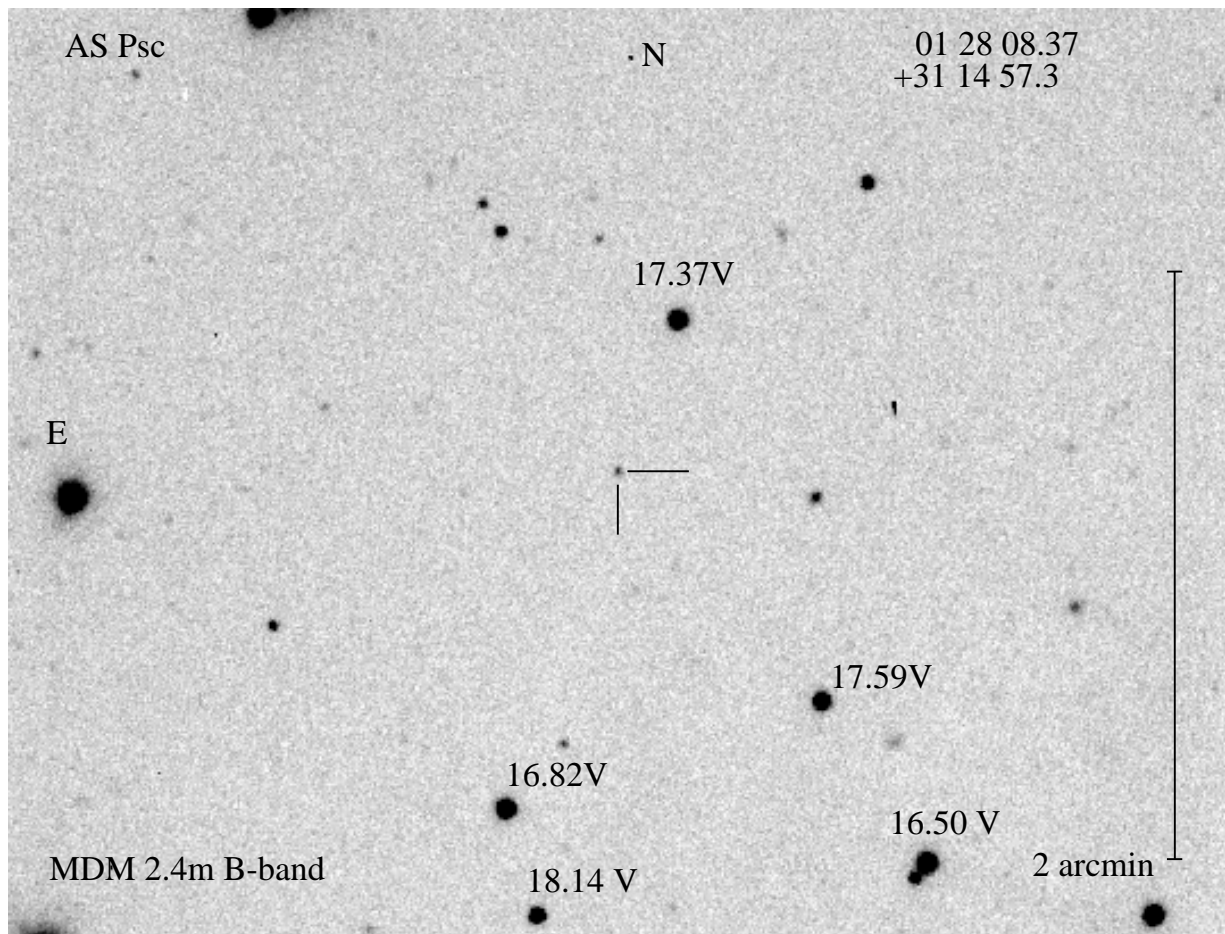


Figure 1. Finding chart, from the average of three 2.4m B-band images. North is at the top, east is at the left, and a 2-arcmin scale bar is at right. Field stars are labeled with their V magnitudes. The B image is shown to maximize the visibility of the counterpart.

References:

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