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PHOTOMETRY OF STARS IN THE FIELD OF THE DWARF NOVA KU CASSIOPEIAE

KU Cassiopeiae is a relatively faint dwarf nova that reaches mag. 13 during outbursts, which occur about every two months. A precise position and large-scale identification chart are provided by Bruch et al. (1987). The position for KU Cas is: $1^h31^m02^s.6$ +57°54' 14" (J2000), which differs significantly from the (precessed) position in the GCVS4.

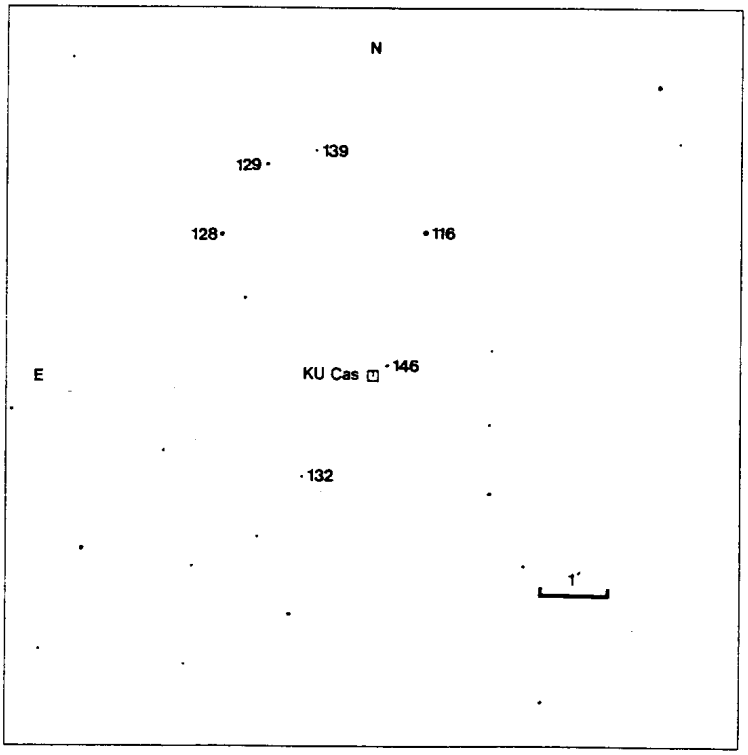

Figure 1. The field of KU Cas showing stars from the GSC. V magnitudes are indicated to the nearest tenth of a magnitude with the decimal point omitted.

At the request of Charles Scovil of the American Association of Variable Star Observers, I made photoelectric measurements of several stars in the field to improve the magnitudes for an existing sequence of comparison stars on an AAVSO chart. Since the quiescent brightness is quite faint (about mag. 18), the sequence stars concentrate on those likely to be useful during eruptions; the six stars span the range $11.6 < V < 14.6$.

The observations were made on 4 and 7 September 1992 UT using the Lowell Observatory 53cm photometric telescope. The stars were observed through a 19-arcsec diaphragm with Strömgren y and b filters. Each observation consisted of a minimum of four 10s integrations of 'star' and two 10s integrations on 'sky', with greater numbers of integrations for the fainter stars. All the standard stars are from the lists of Landolt (1983a, 1983b, 1992). The V magnitudes were adopted directly, sometimes supplemented with values from Menzies et al. (1991). The $b-y$ colors were determined using the same telescope against primary Strömgren standards. The redder Landolt stars were necessary in order to properly calibrate the red and reddened stars commonly found in low-latitude fields such as this one. The data for each night was reduced separately using linear transformations. Atmospheric extinction was estimated on these nights from measurements taken on other nights near this time. Average per star residuals (standard deviation) were ± 0.003 in V and ± 0.003 in $b-y$ on 4 September, and ± 0.006 and ± 0.005 on the 7th.

The standards observed are listed in Table 1 along with the adopted and mean observed V and $b-y$ colors, and the numbers of observations 'n'. The mean deviations of the observed averages from the assumed values listed in the table are: $V = 0.001 \pm 0.004$; $b-y = 0.000 \pm 0.004$.

Table 1. Standard Star Observations

Name	V (std)	b−y (std)	V (obs)	b−y (obs)	n
HD 315	6.440	−0.078	6.439	−0.080	1
HD 5319	8.046	0.601	8.046	0.596	1
HD 7615	6.693	0.023	6.688	0.027	2
BD−00°0288	8.831	0.711	8.831	0.710	3
HD 11983	8.192	0.959	8.191	0.963	1
HD 16581	8.195	−0.033	8.203	−0.038	1
HD 218155	6.783	−0.005	6.784	−0.002	1
HD 222732	8.857	0.735	8.860	0.737	1

The results for the KU Cas field are given in Table 2, listed in order of decreasing brightness. Identifications and J2000 positions are provided for all except the very faintest star from the Guide Star Catalog. Each star, again except the faintest, was observed on two nights. The uncertainties listed in the second line of each entry are the standard deviations of the means of the two observations; for the faint star it is the standard deviation on the batch of integrations taken. The two measures of GSC 3678-0321 differed by 0.1 magnitudes, indicating a possible variable. The $b-y$ color suggests the star could be a δ Scuti-type variable.

Table 2. Photometry of Stars Near KU Cas

Star	RA (2000)	Dec (2000)	V	$b-y$	n	Remarks
GSC 3678-0321	$1^h30^m57\overset{s}{.}0$	+57°56' 18"	$11\overset{m}{.}648$	$0\overset{m}{.}236$	2	suspect var
			.073	.001		
GSC 3678-0036	1 31 19.0	+57 56 16	12.830	0.914	2	
			.013	.000		
GSC 3678-0187	1 31 14.1	+57 57 16	12.931	0.381	2	
			.011	.016		
GSC 3678-1147	1 31 11.5	+57 50 50	13.150	0.539	2	
			.006	.001		
GSC 3678-0002	1 31 08.8	+57 57 28	13.867	0.608	2	
			.021	.028		
anon	1 31 01	+57 54.3	14.645	0.964	1	not in GSC: lies
			.042	.078		15" NW of KU Cas

For the convenience of observers, a chart based on the GSC is shown in Figure 1, centered on the Bruch et al. position of the variable. The comparison stars are indicated by their V magnitudes rounded to the nearest tenth of a magnitude (decimal point omitted) in the style of visual variable-star charts.

Brian A. SKIFF
Lowell Observatory
1400 West Mars Hill Road
Flagstaff AZ 86001-4499
USA
e-mail (Internet): bas@lowell.edu

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