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**PHOTOMETRIC SEQUENCES AND ASTROMETRIC POSITIONS  
OF NOVA Sco 2007 N.1 AND N.2**

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Nova Sco 2007 N.1 (= V1280 Sco) was discovered by Y. Nakamura and Y. Sakurai at  $\sim 9.6$  mag on CCD images exposed on Feb 4.85 UT (cf. Yamaoka 2007a). It was confirmed spectroscopically on Feb. 5.87 UT by Naito & Narusawa (2007a). Further optical spectra were described by Yamaoka (2007b) for Feb. 14.86 UT, by Buil (2007) for Feb. 20.20 UT, and infrared spectra for Feb. 14–16 by Rudy et al. (2007). Negative X-ray detection by RXTE and SWIFT on Feb. 21 and corresponding flux upper limits were given by Swank (2007) and Osborne et al. (2007), respectively. A detailed quantitative description of early post-maximum high resolution optical spectroscopy for Feb. 20.24 UT was presented by Munari et al. (2007). According to the AAVSO International Database, maximum brightness was reached on Feb. 16.7 at  $V \sim 4.0$ .

Nova Sco 2007 N.2 (= V1281 Sco) was discovered by Y. Nakamura at  $\sim 9.3$  mag on CCD images exposed on Feb. 19.86 UT (cf. Yamaoka 2007c), and confirmed spectroscopically by Naito & Narusawa (2007b) on Feb. 21.84 UT. A negative X-ray detection by SWIFT on Feb. 21 is reported by Osborne et al. (2007). It is not possible to accurately determine the date of maximum with the available data. Data reported in IAUC 8810 and 8812 indicate the latest negative detection was on Feb 18.85 and the first entries in the AAVSO database are for Feb. 22.7 UT at  $V \sim 9.1$  mag when the nova was already on the declining branch of the light-curve. An extrapolation of the available data supports a maximum around Feb 20.5 UT at  $V \sim 8.5$  mag.

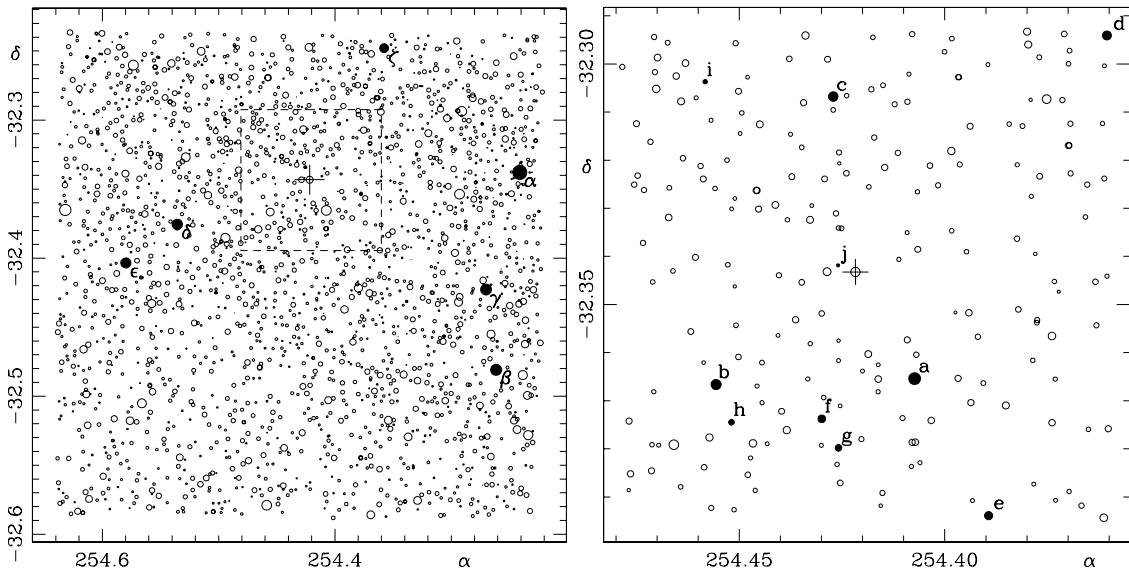
In this note we present a  $BVR_CI_C$  photometric sequence around both novae. To calibrate the sequences, we obtained CCD photometry with the Sonoita Research Observatory 0.35-m robotic telescope on several distinct photometric nights, using  $BVR_CI_C$  filters and an SBIG STL-1001E CCD camera. Pixel size is  $1.25''/\text{pix}$  and the field of view is  $20' \times 20'$ . Observations on each photometric night included following an extinction star from low to high airmass, along with  $BVR_CI_C$  exposures of Landolt standard fields (Landolt, 1983, 1992). The photometric sequences are presented in Figures 1 and 2.

Astrometry was performed using SLALIB (Wallace, 1994) linear plate transformation routines in conjunction with the UCAC2 reference catalog. Errors in coordinates were typically under 0.1 arcsec in both coordinates, referred to the mean coordinate zero point of the reference stars in each field. The coordinates we derived for Nova Sco 2007 N.1 are:

$$\alpha_{J2000} = 16\ 57\ 41.217(\pm 0''.052) \quad \delta_{J2000} = -32\ 20\ 35.63(\pm 0''.028)$$

Nova Sco 2007 N.1       $\alpha_{J2000} = 16\ 57\ 41.217$      $\delta_{J2000} = -32\ 20\ 35.63$

	$\alpha_{J2000}$ ( $\pm''$ )		$\delta_{J2000}$ ( $\pm''$ )		N	$V$ ( $\pm$ )		$B-V$ ( $\pm$ )		$V-R_C$ ( $\pm$ )		$R-I_C$ ( $\pm$ )	
a	254.407340	0.091	-32.365394	0.047	22	10.759	0.039	1.401	0.036	0.710	0.063	0.699	0.040
b	254.455661	0.054	-32.366616	0.051	22	12.098	0.038	0.531	0.043	0.303	0.035	0.319	0.029
c	254.427132	0.091	-32.306776	0.093	19	12.493	0.048	1.798	0.034	1.059	0.038	1.152	0.033
d	254.360533	0.062	-32.294085	0.108	22	12.923	0.045	1.211	0.038	0.676	0.046	0.639	0.040
e	254.389346	0.051	-32.393890	0.065	22	13.511	0.062	1.156	0.036	0.636	0.059	0.594	0.036
f	254.429934	0.090	-32.373744	0.050	20	13.936	0.064	0.937	0.053	0.506	0.046	0.487	0.042
g	254.425857	0.056	-32.379776	0.070	17	14.637	0.053	0.760	0.070	0.438	0.078	0.442	0.037
h	254.451915	0.095	-32.374468	0.146	16	15.395	0.052	0.828	0.050	0.408	0.060	0.432	0.058
i	254.458309	0.164	-32.303689	0.241	7	16.325	0.059	1.092	0.057	0.673	0.060	0.636	0.038
j	254.425956	0.511	-32.341853	0.116	2	17.319	0.071	0.988	0.073				
$\alpha$	254.240999	0.082	-32.337911	0.130	6	7.576	0.027	0.154	0.040	0.076	0.033	0.057	0.033
$\beta$	254.261365	0.099	-32.480897	0.066	20	9.791	0.067	0.194	0.054	0.110	0.054	0.137	0.042
$\gamma$	254.270053	0.123	-32.422711	0.057	22	9.935	0.069	0.016	0.049	0.057	0.058	0.031	0.039
$\delta$	254.535466	0.063	-32.375566	0.042	22	10.264	0.073	1.672	0.046	0.807	0.102	0.880	0.042
$\epsilon$	254.579693	0.058	-32.403422	0.047	22	10.475	0.041	0.428	0.036	0.233	0.037	0.262	0.038
$\zeta$	254.357711	0.075	-32.247917	0.088	22	11.461	0.040	0.673	0.040	0.379	0.039	0.363	0.027

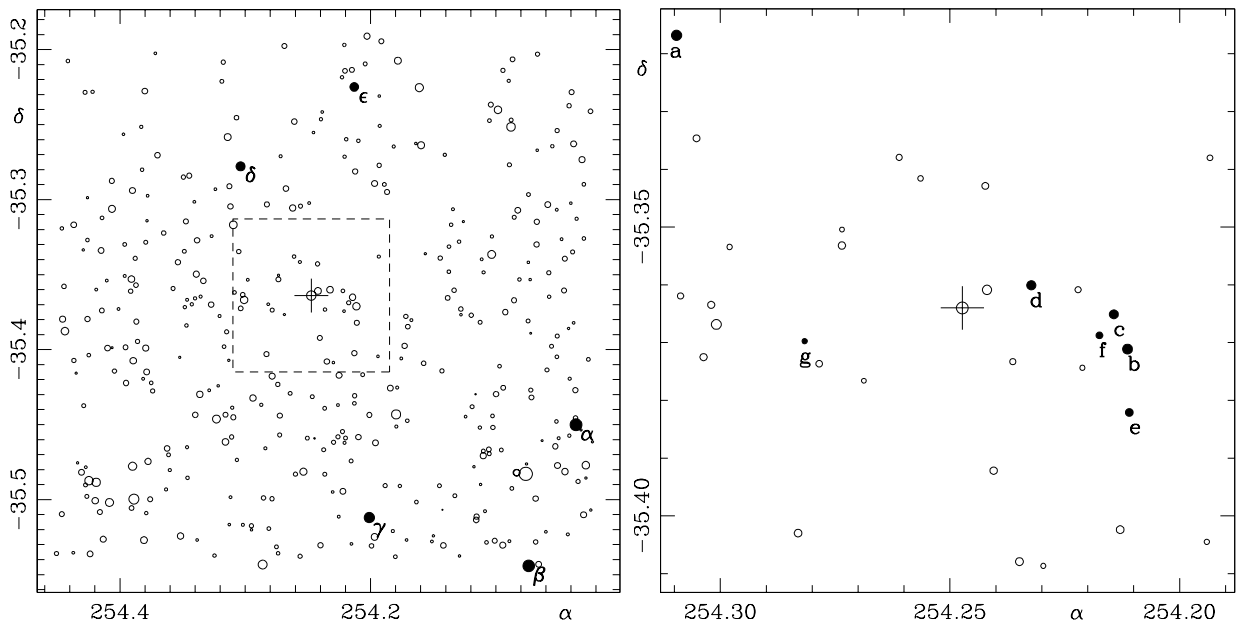


**Figure 1.**  $BVR_CI_C$  photometric comparison sequence around Nova Sco 2007 N.1. The cross indicates the nova.  $N$  is the number of nights in which the given star has been measured in the given band. The errors in  $\alpha$  and  $\delta$  are in arcsec. The panel on the left covers a  $20' \times 20'$  area centered on the nova and shows stars down to  $V = 18.0$ . The dashed  $6' \times 6'$  area is zoomed in on the right panel.

$a =$  TYC 7364-1316-1,  $\alpha =$  HD 152805 (A3V),  $\beta =$  HD 152806 (A0V),  $\gamma =$  HD 152819 (B4IV),  
 $\epsilon =$  TYC 7364-1321-1

Nova Sco 2007 N.2	$\alpha_{J2000} = 16\ 56\ 59.353$	$\delta_{J2000} = -35\ 21\ 50.40$
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	$\alpha_{J2000}$ ( $\pm''$ )		$\delta_{J2000}$ ( $\pm''$ )		N	V ( $\pm$ )		B-V ( $\pm$ )		V-R <sub>C</sub> ( $\pm$ )		R-I <sub>C</sub> ( $\pm$ )	
a	254.309520	0.050	-35.316804	0.067	10	12.601	0.039	1.092	0.048	0.656	0.047	0.657	0.051
b	254.211325	0.063	-35.371121	0.117	10	12.877	0.043	1.688	0.044	0.903	0.042	0.833	0.052
c	254.214301	0.092	-35.365098	0.070	10	13.503	0.071	0.977	0.052	0.573	0.066	0.568	0.055
d	254.232278	0.065	-35.360077	0.124	10	13.353	0.053	1.341	0.041	0.783	0.046	0.765	0.051
e	254.210946	0.144	-35.382090	0.144	9	14.362	0.036	0.859	0.044	0.530	0.038	0.554	0.046
f	254.217448	0.104	-35.368745	0.155	7	15.030	0.074	1.049	0.050	0.599	0.112	0.666	0.068
g	254.281649	0.311	-35.369735	0.117	3	15.993	0.016	1.270	0.059	0.644	0.140	0.762	0.081
$\alpha$	254.036042	0.113	-35.450088	0.059	10	9.931	0.037	0.669	0.052	0.357	0.046	0.376	0.052
$\beta$	254.073794	0.195	-35.544186	0.352	3	10.086	0.039	1.409	0.036	0.692	0.018		
$\gamma$	254.200979	0.120	-35.511953	0.170	10	10.958	0.073	1.760	0.064	0.879	0.062	0.844	0.053
$\delta$	254.303689	0.105	-35.277839	0.094	10	11.818	0.047	0.704	0.045	0.379	0.039	0.434	0.039
$\epsilon$	254.212949	0.096	-35.224904	0.042	10	12.057	0.038	0.553	0.039	0.320	0.045	0.361	0.048



**Figure 2.**  $BVR_C I_C$  photometric comparison sequence around Nova Sco 2007 N.2. The cross indicates the nova.  $N$  is the number of nights in which the given star has been measured in the given band. The errors in  $\alpha$  and  $\delta$  are in arcsec. The panel on the left covers a  $20' \times 20'$  area centered on the nova and shows stars down to  $V = 16.8$ . The dashed  $6' \times 6'$  area is zoomed in on the right panel.

$\alpha = \text{HD 152663 (A4III/III)}$ ,  $\beta = \text{CD-35.11195}$

close to the coordinates measured by Kadota (2007) at position end figures 41<sup>s</sup>20 and 35<sup>''</sup>8. Nearest cataloged field stars are GSC2.2 S222213212743 at position end figures 40<sup>s</sup>908, 43<sup>''</sup>59 and  $V = 15.9$ ,  $R = 15.1$ , and GSC2.2 S222213213017 at position end figures 41<sup>s</sup>101, 30<sup>''</sup>82 and  $V = 17.4$ ,  $R = 16.5$ .

Our coordinates for Nova Sco 2007 N.2 are:

$$\alpha_{J2000} = 16\ 56\ 59.353(\pm 0''.183) \quad \delta_{J2000} = -35\ 21\ 50.40(\pm 0''.093)$$

close to the coordinates measured by Itakagi (2007) at position end figures 59<sup>s</sup>35 and 50<sup>''</sup>2. Nearest cataloged field star is USNO-A2.0 0525-24996449 at position end figures 58<sup>s</sup>656, 44<sup>''</sup>41 and  $B = 17.7$ ,  $R = 15.9$ .

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#### References:

- Buil, C., 2007, *IAUC*, No. 8812  
 Itakagi, K., 2007, *IAUC*, No. 8810  
 Kadota, K., 2007, *IAUC*, No. 8803  
 Landolt, A.U., 1983, *AJ*, **88**, 439  
 Landolt, A.U., 1992, *AJ*, **104**, 340  
 Munari, U., et al., 2007, *CBET*, No. 852  
 Naito, H., Narusawa, S., 2007a, *IAUC*, No. 8803  
 Naito, H., Narusawa, S., 2007b, *IAUC*, No. 8812  
 Osborne, J.P., et al., 2007, *ATel*, No. 1011  
 Rudy, R.J., et al., 2007, *IAUC*, No. 8809  
 Swank, J.H., 2007, *ATel*, No. 1010  
 Wallace, P., 1994, *ASP Conf. Ser.*, **61**, 481, in: *Astronomical Data Analysis Software and Systems III*  
 Yamaoka, H., 2007a, *IAUC*, No. 8803  
 Yamaoka, H., 2007b, *IAUC*, No. 8807  
 Yamaoka, H., 2007c, *IAUC*, No. 8810