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PROPERTIES OF THE OPTICAL RADIATION OF NOVAE
AND SUPERNOVAE STARS

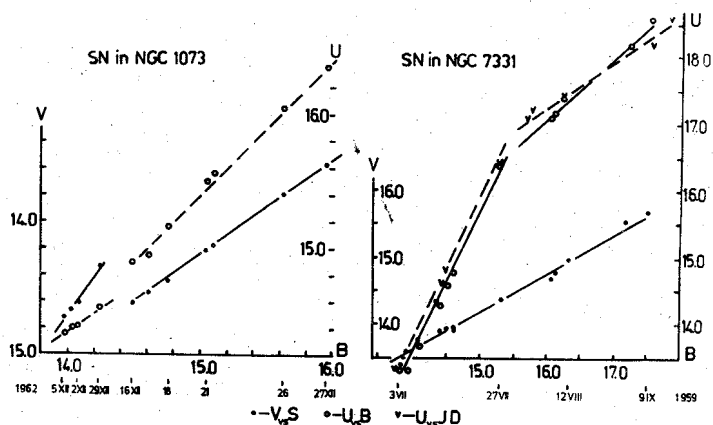
It was noticed that the relations between V,B or U,B photoelectric magnitudes can be described by linear regressive correlations for intrinsic variables of different types. The gradients $\Delta V/\Delta B$ and $\Delta U/\Delta B$ can be considered as quantitative characteristics of optical radiation properties when ΔV is not very small (>0.5). They reveal the process of variability in its development.

The changes of UBV magnitudes are plotted for four novae and four supernovae stars according to series of photoelectric observations with $\Delta V > 0.5$. The errors of gradients are smaller than 0,03 in all the cases. The N Her 1963 observations in (3,4,5) comprise the same time interval, while the differences in $\Delta U/\Delta B$ according to (4) and (5) reach 0,11, apparently being a sequence of peculiarities of individual ubv systems. Therefore one cannot conclude that gradient differences of such an order indicate different optical radiation properties of variable stars. The slopes of V,B and U,B relations change near minima for some novae. The above relations have a discontinuity near maximum for SN in NGC1073. Values of the both gradients before maximum differ from those after maximum. The gradient $\Delta U/\Delta B$ is different before and after the moment of the abrupt change of the light curve slope for SN in NGC 7331 (Fig.1)

Therefore on the basis of Table 1 there are reasons to conclude that the optical radiation properties before maximum differ from those after maximum for novae and supernovae stars. For novae the differences manifest mainly in U and for supernovae beside that in B and possibly in V regions. The optical radiation properties before maximum may be similar for novae and supernovae. After the maximum $\Delta V/\Delta B$ and $\Delta U/\Delta B$ both are close for different novae, while for supernovae $\Delta V/\Delta B$ are close and $\Delta U/\Delta B$ can be essentially different. From the linear regressive dependences for V,B and U,B it follows that the relations between changes in UBV pe magnitudes are of a statistical nature and ΔV , ΔB and ΔU are proportional one to another in the same sense.

Table 1

	Before maximum		After maximum		Literat. source
	$\Delta V/\Delta B$	$\Delta U/\Delta B$	$\Delta V/\Delta B$	$\Delta U/\Delta B$	
N Her 1960			1,09	0,96	1
N Her 1960			1,10	1,05	2
N Her 1963			1,20	1,06	3
N Her 1963			1,14	1,03	4
N Her 1963			1,16	1,14	5
N Del 1967	1,00	0,69			6
N Del 1967	1,07	0,88			7
N Del 1967	1,10				8
N Del 1967			1,05	0,98	9
N Vul 1968			1,00	1,03	10
N Vul 1968			0,98	1,05	9
SN in Virgo			0,58	1,00	11
SN in NGC 1073	1,00	0,77	0,66	1,06	12
SN in NGC 3389			0,59	1,38	13
SN in NGC 3389 B < 14 ^m 9			0,54	1,35	14
SN in NGC 7331 V < 16 ^m 7			0,64	2,00	15
SN in NGC 7331 V > 16 ^m 7			0,64	1,00	15
mean	1,04 $\pm 0,03$	0,78 $\pm 0,06$	N 1,09 $\pm 0,02$	N 1,04 $\pm 0,02$	
			SN 0,61 $\pm 0,02$	SN 1,0-2,0	



Literature:

1. L. Ross, PASP 72, 413, 1960
2. P. F. Chugainov, *Izv. Kr. AO* 26, 217, 1961
3. M. Huruata, *Tokyo Astr. Bul.* 11, N164, 1964
4. K. Sdanavichus, *R. Calitis Bul. Viln. Observ.* 10, 137, 1964
5. G. Chincarini, PASP 76, 289, 1964
6. D. I. K. O'Connell, *Inform. Bul. Com. 27 IAU* 313, 1968
7. B. Onderlicka, *M. Vetesnik, BAC* 19, 99, 1968
8. I. Grygar, L. Kohoutek, P. Harmanec, *BAC* 19, 101, 1968
9. O. P. Abuladse, *AC* 500, 1969
10. O. P. Abuladse, *Inform. Bul. Com. 27 IAU* 324, 1969
11. M. Mihalas, PASP 74, 116, 1962
12. F. Bertola, *A Ap* 27, 319, 1964
13. O. Gingerich *Circ. Centr. Bur. for Tel. IAU N2004*, 1967
14. G. de Vaucouleurs, *J. E. Solheim, R. Brown, Astrophysica* 3, 565, 1967
15. H. Arp, *Ap J* 133, 833, 1961.

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