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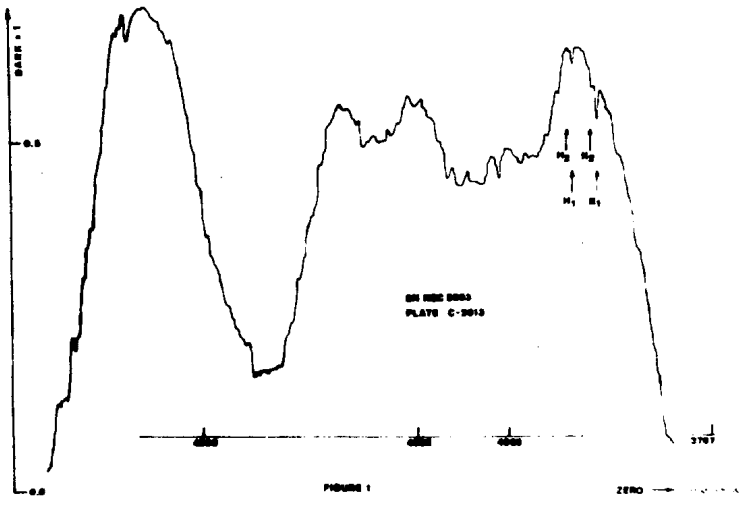
EXTRAGALACTIC CaII ABSORPTION LINES IN THE SPECTRA OF THE SUPERNOVA IN NGC 5253

The Supernova in NGC 5253 discovered by Kowal has been observed at Cerro Tololo Interamerican Observatory in Chile. We secured several spectroscopic plates with the 60 inch reflecting telescope. The grating spectrograph combination we used gives a reciprocal dispersion of 39 A/mm. Figure 1 displays a densitometric tracing of the plate C-2613 showing the continuum energy distribution (on linear intensity scale) of the supernova. It shows features of H and K CaII absorption lines of galactic origin; also a red-shifted system of H and K lines are suspected in Fig.1. Figure 2 shows a densitometric tracing of the H and K lines where the red-shifted system is clearly seen. Micrometric measurements with a Gärtner machine of these lines give the results listed in Table 1. The radial velocities obtained for the stronger pair (K_1 and H_1) of interstellar galactic origin give a radial velocity of -5 ± 3 km/s, while the red shifted pair gives $+427 \pm 6$ km/s.



The equivalent widths of the lines were measured on the plates C-2595,, C-2613, and C-2621. Calibration plates were taken with a spot sensitometer at λ4950 A ($\Delta\lambda/2$=130). The mean values obtained are: WK_1=0.445, WK_2=0.105, WH_1=0.361, WH_2=0.078, in Angstrom units. From these values the doublet ratios (DR) are: $(DR)_1$ = 1.23 and $(DR)_2$ = 1.35. From the theoretical curves of growth of Strömgren (1948) and Münch (1957) as given by Münch (1968) we obtain:

$(NL)_1=1.8\times10^{13}cm^{-2}$ $(NL)_2=2.8\times10^{12}cm^{-2}$
$(LogW/b)_1=0.42$ $(LogW/b)_2=0.30$
$(Log\tau_o)_1=0.52$ $(Log\tau_o)_2=0.26$,

from Strömgren's curve, and

$(NL)_1=2.6\times10^{13}cm^{-2}$ $(NL)_2=3.1\times10^{12}cm^{-2}$
$(LogW/n)_1=0.75$ $(LogW/n)_2=0.60$
$(Log\tau_o)_1=+1.0$ $(Log\tau_o)_2=+0.61$,

from the Münch's curve of growth.

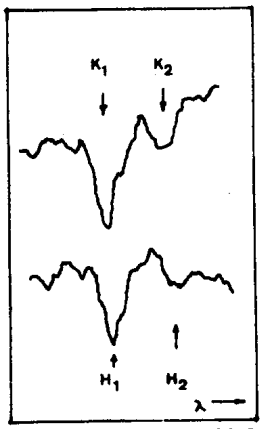


FIG.2 PLATE C-2613

The above values indicate that the red-shifted absorption lines are formed in the interstellar gas of NGC 5253, being the amount of matter involved smaller by a factor ~10 as compared with that which forms the galactic absorption. The turbulence parameters are also smaller for NCC 5253 indicating a thin in a thinner absorbing layer as compared with the galactic plane.

The observed red-shift in NGC 5253 at the place of the supernova is in agreement with the velocity distribution in NGC 5253 (Sérsic, 1972).

A complete study will be published elsewhere.

Table 1. Radial velocities reduced to the sun (km/s).

Plate	Date 1972 May, UT	K_1	K_2	H_1	H_2
C-2595	26, 0^h00^m	0	+427	-11	+408
2613	29, 1:45	-11	442	- 7	420
2614	29, 2:46	- 5	428	-10	417
2615	29, 3:54	- 1	448	- 5	413
2616	29, 5:07	+ 6	434	- 5	438

References:

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