COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 505

Konkoly Observatory
Budapest
1971 January 9

# THE SPECTRUM OF THE JULY 1970 SUPERNOVA IN M 101

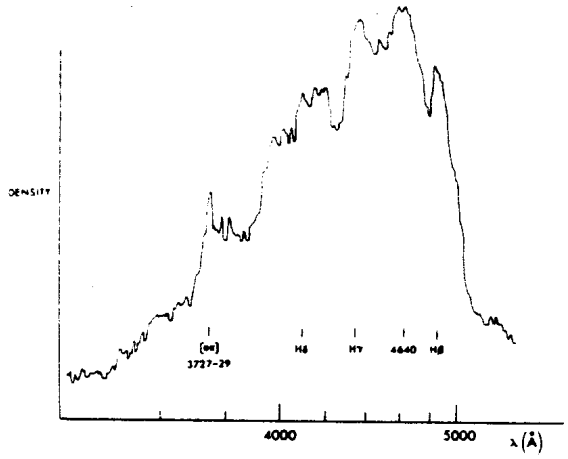
On the nights of August 5th and 6th, 1970, we obtained two well exposed spectra of the supernova in M 101 discovered by Lovas (I.A.U.C.2269). Two underexposed plates were taken later. All of the exposures (see Table for details) were made on blue-sensitive plates taken with the 60-90 cm Burrell Schmidt.

Exposure data for supernova plates

| UT date 1970 | exposure time | A/mm at $H_\gamma$ | Remarks |
|---|---|---|---|
| Aug 5.07 | $12^m$ | 1300 | |
| Aug 6.07 | 30 | 580 | |
| Aug 25.11 | 30 | 580 | badly underexposed |
| Aug 26.11 | 30 | 580 | faint |

The Figure is a density tracing of the spectrum of August 6, in which the prominent emission features are identified. The spectrum is clearly that of a type II supernova, as all of the bands also appear in the spectra of ordinary novae. Although it is difficult to be quantitative, the gradient of the continuum energy distribution was clearly less than that of an F star used for comparison purposes. Changes in the appearance of the spectrum were not marked over the time interval covered by our data. There was only a general fading of about 0.5 to 1.0 magnitudes between the first and last plates, as estimated from a comparison with neighboring stars.

We have also measured the expansion velocity of the shell from the widths of $H\beta$ and $H\gamma$. Because of the small size of the spectrum and the rather low contrast, we have measured the widths in three ways: with a measuring engine, with an 0.1 mm scale, and with a ruler on the tracings. The results for $H\beta$ are in good agreement, but those for $H\gamma$ show a spread of 50$\mu$ (out of 200$\mu$). This scatter is no doubt due to the slow change of density on the red side of $H\gamma$ seen in the tracing. The seeing disc of the star has a negligible effect upon the true widths of these lines for all reasonable assumptions about the size of the seeing disc and the true line profile. Accordingly we have calculated an expansion velocity by simple averaging of the




measured widths. The mean velocity corresponding to the line half widths is 3700 km/sec with a formal standard deviation of 130 km/sec.

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