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Hα SPECTROSCOPY OF THE Be STAR ω ORIONIS DURING 1986 - 1987

Between 1 April 1986 (JD 2,446,521) and 2 January 1988 (JD 2,447,162) we obtained 10 high-dispersion Reticon spectra of the Hα region in the B3 IIIe star ω Orionis (HR 1934). This star has recently been observed to exhibit variations in visual brightness, polarization, and UV line profiles (Sonneborn et al. 1988). While the polarization, photometric colors, and continuum flux in the UV show variations that are correlated, the Si IV and C IV resonance line profiles vary independently of the polarization. Both Guinan and Hayes (1984) and Bergin et al. (1989) discuss episodes of enhanced mass-loss in ω Ori where the star becomes dimmer and redder, and the broad-band polarization increases.

Our Hα spectroscopy of ω Ori was obtained at Ritter Observatory using the intensified Reticon system described by Bopp, Dempsey, and Maniak (1988). The spectral data have 0.3 Å resolution, and signal-to-noise ratio from 30-50:1. A log of the observations is given in Table 1.

While our data set is too small to permit us track the behavior of the Hα line in any detail, it may be useful to compare our profile, intensity, and equivalent width (EW) data with the occasional observations reported by others. The EW measures listed in Table 1 show the emission to have varied by more than a factor of two between April 1986 and October 1986. There was a further enhancement in EW that took place between March 1987 and January 1988, when the Reticon observations concluded. There also appear to be EW variations on timescales of days as well as weeks or months: four Reticon scans obtained during April 1986 show a variation of 50%, when the spectrophotometric precision of the data should be no worse than ±10%. Our EW values for ω Ori may be compared with those reported by Hanuschik et al. (1988) and Andrillat and Fehrenbach (1982) which range from 5.7 to 7.7 Å.

We illustrate some of our Hα profiles of ω Ori in Figures 1-6. The line shows profiles qualitatively similar to those illustrated

by Andrillat and Fehrenbach (1982) and Hanuschik et al. (1988): it always shows blue and red emission peaks of essentially equal

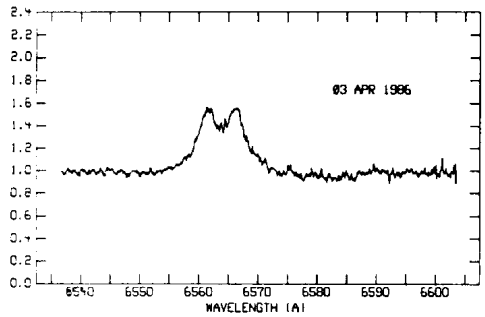

Figure 1

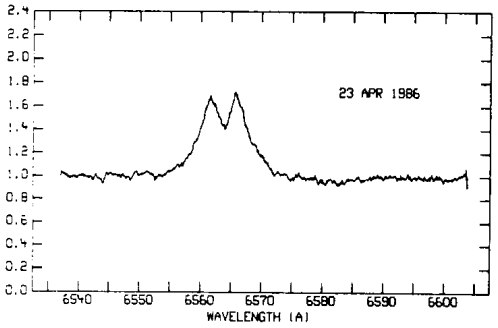

Figure 2

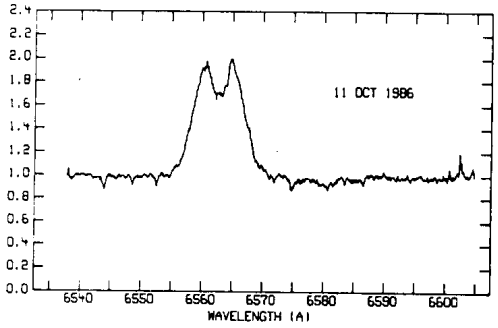

Figure 3

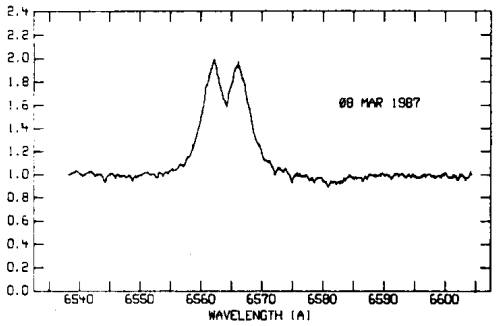

Figure 4

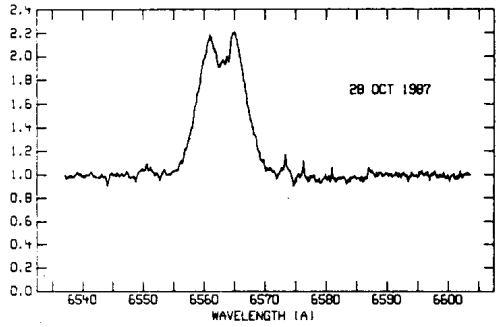

Figure 5

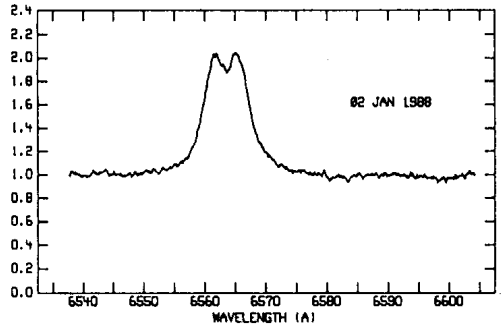

Figure 6

Figures 1-6: Ritter Observatory Reticon scans of the Hα region in ω Ori.

Table I Hα Observations of ω Ori

Date UT	JD (2440000+)	EW(Hα) (Å)
1 Apr. 1986	6521.53	4.18
3 Apr. 1986	6523.54	4.55
19 Apr. 1986	6539.57	3.70
23 Apr. 1986	6543.56	5.76
11 Oct. 1986	6714.88	8.34
8 Mar. 1987	6862.59	8.11
28 Oct. 1987	7096.73	10.00
4 Nov. 1987	7103.72	9.01
6 Nov. 1987	7105.70	9.82
2 Jan. 1988	7162.65	9.92

intensity, with a separation in velocity of 150-200 km s^{-1}. The change in EW of the line that we observe is the result of varying emission intensity, which is about 1.6 times the continuum level on 3 April 1986, rising to 2.2 times the continuum on 28 October 1987.

It would clearly be useful to monitor the Hα profile on an intensive basis, to establish a lower limit on the timescale of EW variability and to probe its behavior over the course of the 10 month outburst cycle suggested by Bergin et al. (1989).

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