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PLEIONE AGAIN WITHOUT SHELL

Pleione (BU Tauri = HD23862 = HR1180 = 28Tau: B8Ve, $V_{\text{ini}} = 341 \text{ km s}^{-1}$) is a well known Be/shell star. It has been widely explored for nearly one century and during this time underwent through different (Be, shell and normal B) phases. Full description of the variations and discussion on the observations of Pleione can be found in Gulliver (1977) and Doazan (1982). After a shell phase from 1938 to 1954 the star entered a Be phase with strong hydrogen emission lines exhibited in its spectrum (Morgan et al., 1973). In the course of this Be phase emission lines of Fe II had also been present. In December 1972 Pleione entered a new shell phase and since then the shell strength had been found continuously increasing till 1981. Recently Goraya et al. (1987) reported about increase of the brightness of Pleione at two wavelengths (3300 and 3600 Å) after 1981. This increase may be considered as a first precursor of the shell phase end which is in agreement with the conclusions of Doazan (1982) about the photometric behaviour of Pleione in the time of previous phase changes.

Pleione was among the stars included in the Be star observing programme carried out in the National Astronomical Observatory "Rozhen". During the autumn season of 1987 six plates were obtained with the coudé spectrograph of the 2m RCC telescope in NAO. Some data for them are listed in Table I.

Table I

Plate No.	JD • 2447000+	Spectral range (Å)	Dispersion (Åmm ⁻¹)
2c2920	26.545	3350 - 4900	9.0
2c2925	39.573	3450 - 5000	9.0
2c2928	40.575	3450 - 5000	9.0
2c2933	43.586	3450 - 5000	9.0
2c2954	164.267	3350 - 4900	9.0
2c2965	167.317	4800 - 6800	17.8

Our observations showed that significant changes happened to Pleione in 1987. In Figure 1 the shell spectrum of the star and its spectrum after the shell lines had disappeared is compared. One can see that instead of the huge amount

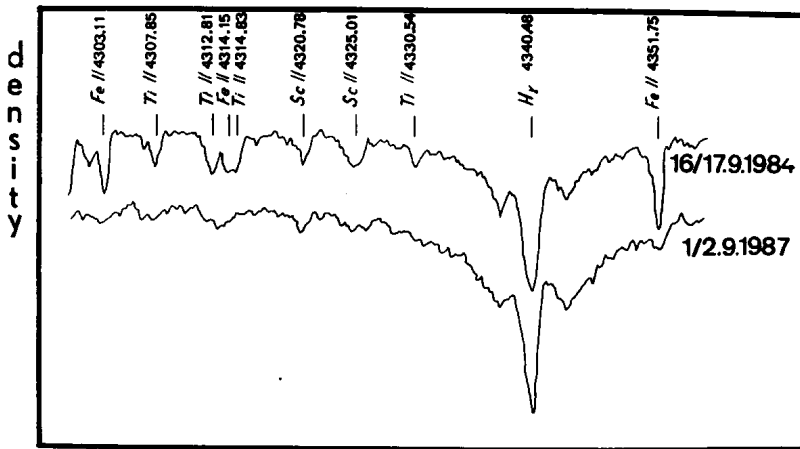


Figure 1

Density tracings of H γ region of Pleione's spectrum with and without shell lines.

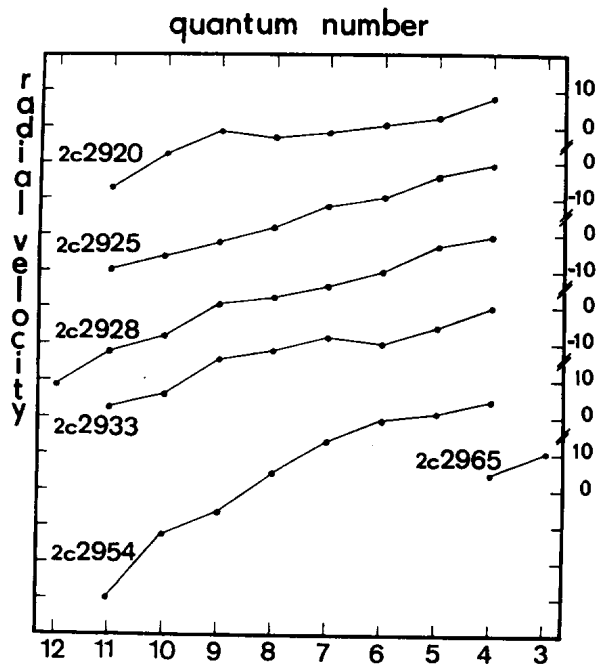


Figure 2

Radial velocities of the Balmer lines' absorption cores.

of sharp shell lines only a few shallow lines, mainly of singly ionized metallic ions, have remained. There is no evidence of the broad absorption of the Ca II K line, which was present in the star's spectrum in the time of the last shell phase (Gulliver, 1977; Hirata and Kogure, 1976, 1977). No He absorption lines are noticeable. Balmer absorption lines are visible up to H_{20} . On all our plates they have significant asymmetry in their profiles with the violet wing widened. One has to mention that the lower Balmer lines have greater asymmetry than the higher. The low members also show double peaked emission which is seen up to $H\delta$. Throughout the period of observations the V component of the hydrogen emission was less than the R component. On the 2c2965 plate from 6/7 January 1988 some Fe II lines can be seen to have P Cygni type profiles with weak red-wing emission. The strongest among them are the Fe II lines at 4923.92, 5018.43, 5169.03, 5316.61 and 5891.36 Å. It must be noticed that Fe II emission were formerly present in the spectrum of Pleione when hydrogen emission lines reached their maximal intensity during the previous Be phase in 1954-1972. All our plates were measured for radial velocities with the oscilloscopic comparator device in NAO. The radial velocities were measured at the minima of the line profiles. On all the plates there was found remarkably great Balmer progression with the lower members less blueshifted (Figure 2). The observed progression is bigger than that reported for the preceding phases (Gulliver, 1977; Ballereau, 1980). Throughout the period of the observations no significant variations in the radial velocities of the hydrogen and metallic spectral lines were detected.

Even from this very preliminary results it is clear that Pleione is undergoing quick evolution now, caused by the expansion of its shell. The question now is how it will continue and the answer could be obtained only from further observations.

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