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Hα VARIABILITY IN ALPHA LYRAE

Suspected variability is a valuable clue in finding new emission stars. Hα observations of bright stars with no history of line emission can lead to the discovery of hydrogen-emission stars. α Lyrae had been a well known standard star with spectral type AOV. Johnson and Wisniewski (1978) have reported violet shifted emission features associated with the OI λ 7774 Å and λ 8446 Å, as well as the infrared Ca II triplet lines in the infrared spectra of Vega. These features, however, could not be confirmed during later observations by Barker et al. (1978), Griffin (1978) and Bord and Messina (1980). Weak hydrogen-emission superimposed on absorption were noticed by us on 8, 18 and 20 September 1982. In confirmation with that we again observed α Lyrae for several nights. On 12 October 1983 the star α Lyrae again showed hydrogen-emission. We present Hα observations of α Lyrae showing variable Hα profile.

During our spectrophotometric programme of Be stars, the star α Lyrae, used as a standard, was surprisingly found to have Hα in emission. We obtained 18 spectrophotometric scans of α Lyrae on 12 October 1983. Observations were obtained with a Hilger and Watts monochromator on the Cassegrain focus of the 1.0 m telescope at Uttar Pradesh State Observatory on one night. The dispersion at the exit slit of the monochromator was 70 Å/mm. The scans were obtained with an exit slit of 0.7 mm, admitting 50 Å of the spectrum. The enlarged dispersion at the original tracings was 7.8 Å/mm.

Figure 1 shows a series of spectrum scans of α Lyrae. The emission at Hα is obvious. α Lyrae showed variation in the depth and shape of Hα over time scales of about 1.5 hours. First three scans show a normal absorption feature at Hα. The next four scans show peculiar type of Hα profiles with one component in emission and another in absorption. Later on centrally reversed emission was seen at Hα in about six scans. In last few scans the emission disappeared and α Lyrae showed a normal absorption feature at Hα again as it was at the beginning. The activity persisted for about 1.5 hours. We also observed ξ^2Cet(B9III) as the comparison star. The Hα scans of ξ^2Cet are shown in Figure 2. It is evident from Figure 2 that ξ^2Cet showed a normal

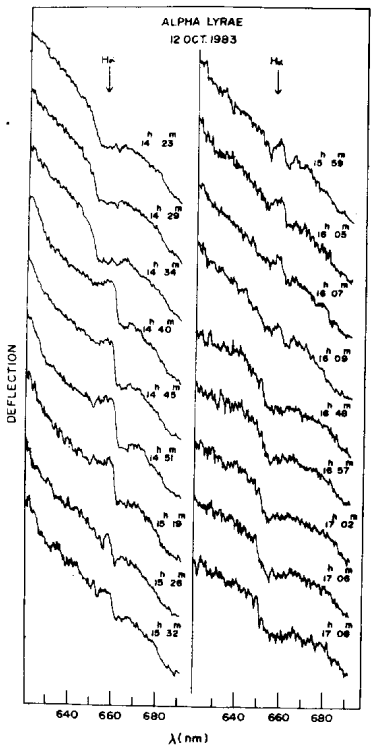

Figure 1

Original spectrophotometric scans of Vega at Hα line region.

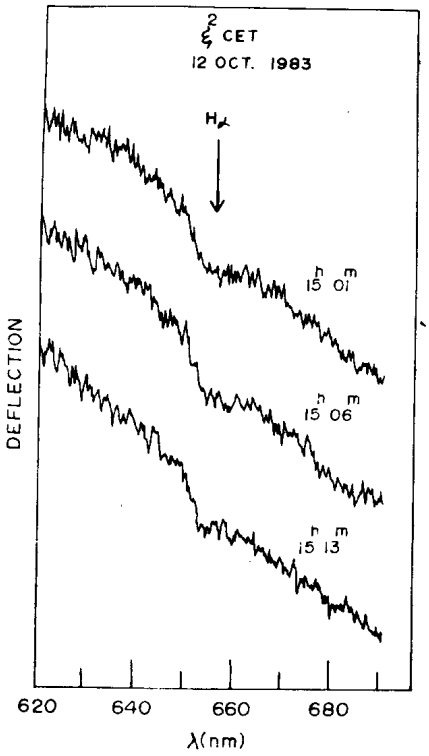

Figure 2

Original spectrophotometric scans of ξ^2Cet at Hα line region.

absorption feature at Hα.

Hydrogen-emission in single early-type stars whose luminosities place them on or near the main sequence may be associated with mass ejection produced by rapid rotation. The projected rotational velocity of α Lyrae is very small, i.e., 15km/sec (Hoffleit, 1982). Suspected variability in early-type stars, plus rapid rotation, is a strong indication that the star has been, is, or will be, a hydrogen-emission star. Since the presence of emission depends on the intrinsic and not on the projected rotational velocity, suspected variability in some of the apparently slowly rotating stars is probably also connected with line emission, e.g., α Lyrae. From this type of Hα variability we suggest that α Lyrae would be an excellent candidate for becoming Be star, as was proposed by Irvine (1975) for the star α Leo. We also suggest that α Lyrae may have a thin variable envelope.

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