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# Z ANDROMEDAE: LONG TIME SCALE VARIATION OF Hα DURING QUIESCENT PHASE

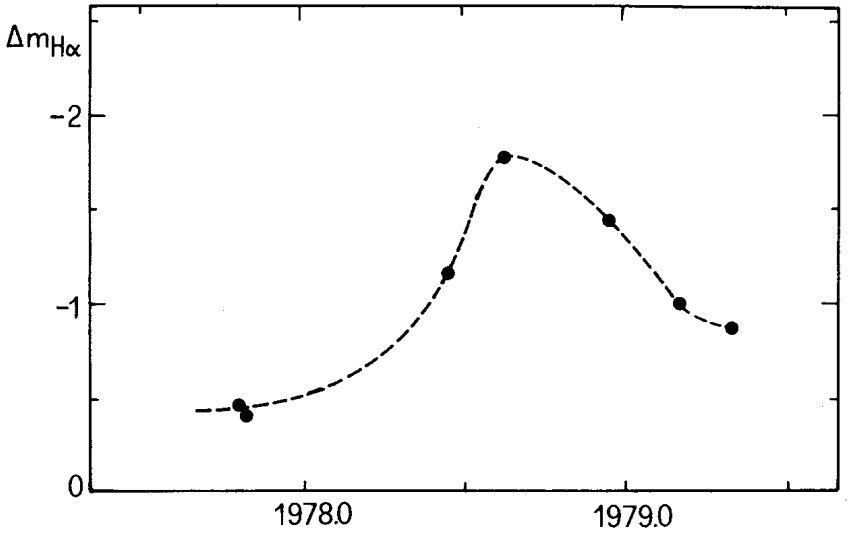
The light history of the symbiotic star Z Andromedae during the last half century is characterized by active phases with recurrent nova-like variations, followed by long periods during which the star is at minimum luminosity (Mattei 1978). The mean repetition time between the light maxima according to Mattei is 632 days, but the single time intervals largely differ from their mean. Merrill (1944) suggested a periodic variation of the radial velocity of the emission lines with a similar period, but Boyarchuk (1968) pointed out that these variations seem to be primarily due to variations in the physical conditions of emitting envelope, rather than to a real orbital motion. Strong spectral variations have been largely reported in the literature (e.g. Swings and Struve 1941, Bloch et al. 1969), but at our knowledge no systematic observations of the spectrum of Z And during its quiescent phase have been so far published.

Since 1973 Z And is in a quiescent phase, and this is a good opportunity to look deep in the system, disregarding all those phenomena that are related to the outbursts. We have monitored the spectrum of the star with the Schmidt telescope of Campo Imperatore from October 1977 to May 1979, to look for any long time scale variation, and to derive a better spectral classification of the cool spectrum. Several objective prism plates were collected on IIaO, IIIaJ, IIaF and IN Kodak emulsions. Low and high resolution ultraviolet spectra were obtained during the same period of time with the IUE satellite (Baratta et al. 1978, 1979). The visual magnitude remained constant with $V=10.8\pm0.1$ (Observations of Variable Stars Report, No.32 Groningen, and Feijth, private communication).

The objective prism plates show that the cool spectrum is the main contributor to the continuum of Z And longwards of 4100-4300 Å.

Several TiO absorption bands were identified, and their strength is in agreement with a spectral type of M 6.5. From a careful comparison with the spectra of nearby stars, we found that the continuum of Z And does not show significant variations during the whole period of our observations. In particular the near infrared continuum was constant within $\pm$0.1. This value is much smaller than the upper limit for the luminosity variation of the cool component derived by Boyarchuk (1968). This result leads one to reject the hypothesis that the cool star is mainly responsible for the large variations of Z And.

On the other hand the Balmer emission lines markedly varied with respect to the stellar continuum. Hα increased its intensity by a factor of about 3 between October 1977 and August 1978, and decreased again in 1979 to nearly the same intensity as in 1977. The behaviour of this line is illustrated in the Figure.




Such a variation was not displayed by the emission lines of the other ions. In particular the He II 4686 line remained nearly at constant intensity during the period 1977-79.

This long time scale variation of Hα and of the other Balmer

lines has some resemblance with the luminosity variations of Z And during the active phases, and the epoch of maximum Hα emission seems to be in phase with the last reported light maxima (Mattei, 1978). This, however, does not imply the same origin for the two phenomena, principally because of the large variation of the time interval between the light maxima. Radial velocity and line profile measurements of $H_\alpha$ over a long period of time would be of great help in the study of the nature of Z And.

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