

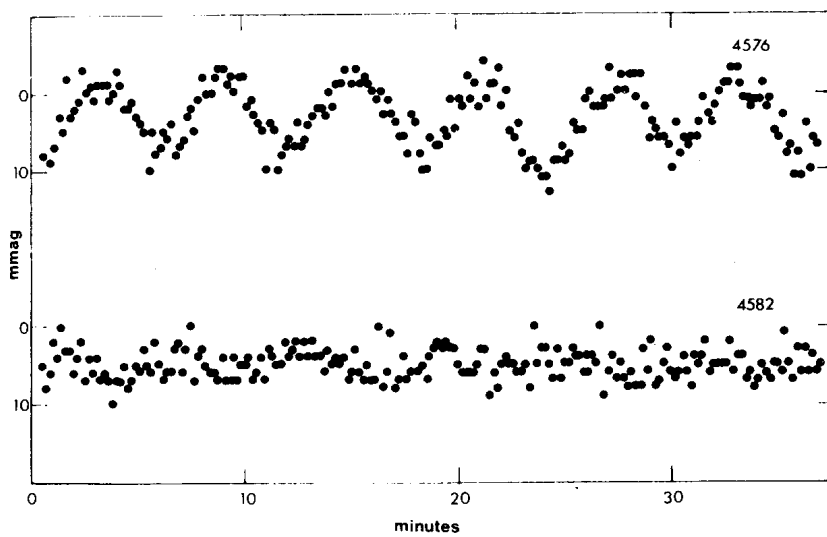
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DISCOVERY OF 6.15 MINUTE OSCILLATIONS IN THE COOL
MAGNETIC Ap STAR HD 24712

In 1978 the discovery of light variability in HD 101065, Przybylski's star, with the remarkably short period of 12.14 minutes was announced in these Bulletins (Kurtz 1978). An extensive analysis of the light variations and new infrared spectra led Kurtz and Wegner (1979) to suggest that HD 101065 is simply an extreme example of the cool magnetic Ap stars rather than a unique object as has often been suggested. One immediate inference of this suggestion is that other cool magnetic Ap stars may also pulsate with hitherto unsuspected short periods.

On the night of 27/28 October 1980 observing from the Wise Observatory at Mitzpe Ramon, Israel, oscillations with a period of 6.15 minutes were discovered in the cool magnetic Ap star HD 24712. Extensive observations of this star are now being made from the South African Astronomical Observatory at Sutherland. Figure 1 shows small sections of the B light curves of HD 24712 obtained in December 1980 on two nights separated by six days. On the first night shown the peak to peak variation is nearly 0.01 mag and unequivocal. On the second night shown the variation is slightly less than 0.002 peak to peak, but can still be seen and stands out clearly in an amplitude spectrum. The ob-



Figure

Sections of the Johnson B light curves of HD 24712 obtained on J.D. 2444576 and 2444582. The light curves extend for hours on either side of the sections shown with similar appearance. Each point represents a 10-s integration. Light curves have also been obtained on all the nights in between those shown with a decreasing amplitude from night to night.

Observations extend for hours on either side of the small pieces shown in Figure 1. Observations have also been obtained on all of the nights between the two illustrated with steadily decreasing amplitude from night to night.

The 6.15 minute variability of HD 24712 is thus established with certainty. It has been observed on a dozen nights from two different sites and with two different telescope-photometer combinations. It is also apparent that the variability is multi-periodic and seems likely that the major beat period is near to, or the same as, the rotation period of this star of 12.448 days.

HD 24712 is perhaps the second coolest Ap star known next to HD 101065. It is a spectrum variable and has a magnetic field which varies from 300g to 1300g during the 12.448 day rotation period (Preston 1972). We suggest here that there exists a class of cool magnetic Ap stars with short period light variability and that the discovery and study of these stars will make an important contribution to our understanding of stellar pulsation, magnetism, abundance anomalies and the relationships among them.

Photometric searches for these objects must be done using high speed photometry with stable equipment from a good site. Weiss (1978), using conventional photometry with two comparison stars, suspected variability in U in HD 24712 with a period around 3 hours. It is quite possible that 3 hours was the beat period between his sampling frequency and the actual frequency of variation in this star. Because of the possibility of beat periods on the order of days, observations on one night are not sufficient to rule out variability. Several 1 hour runs on different nights would be desirable.

We are in the process of carrying out such a program. An extensive discussion of HD 24712 as well as other newly discovered variables of this type will be published in the near future.

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