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FURTHER OBSERVATIONS OF ET ANDROMEDAE

A solution for the spectroscopic orbit of the binary Ap variable ET And = HD 219749 has recently been published by Ouhrabka and Grygar (1979; hereafter OG). Here we report independent spectroscopic observations which support their solution. Also, we briefly describe the variations in spectral line strengths which occur in this star and which, we suggest, will be found ultimately to correlate with the photometric variations.

Twenty-six radial velocities measured by this writer and not previously published are available. Four of these are from 1.2 nm mm^{-1} grating plates obtained at the David Dunlap Observatory (DDO); three are from Dominion Astrophysical Observatory (DAO) archival prism plates of dispersion 5.1 and 3.0 nm mm^{-1}; the remainder are from 1.5 nm mm^{-1} DAO grating plates. All plates were measured on oscilloscopic-setting comparators.

The data are presented in Table 1, where the phase is relative to the time of periastron passage, and the (O-C)s are relative to the velocity curve as determined by OG. These radial velocities are plotted in Figure 1, where the DDO velocities are represented by crosses, the higher dispersion DAO velocities by large open circles, and the other DAO velocities by small circles. The solid curve is the velocity curve from OG. The broken line results from a least-squares correction procedure applied to these new velocities and using the OG elements as preliminary values. The differences between these two curves are not considered to be significant. In particular, the orbital period of 48.304 days is confirmed.

Spectral line variations have long been known to occur in this system (cf. Renson 1977 and references therein). While visual examination of these plates does not permit a completely reliable estimation of the degree of variation of relatively strong lines such as the SiII λ4128-30 pair, it is strikingly apparent that relatively weaker lines are variable in strength. To the eye, the most obvious variations occur in the λ3954 line which can be attributed to SiII. In this respect HD 219749 is similar to HD 73340 (Hube and Walker 1976). This line varies from complete invisibility to approximately two-thirds the strength of the K-line. (Note that the K-line is of interstellar origin although there may be a weak, blending stellar component since the plate-to-plate velocity is not as constant as one would expect. The average heliocentric K-line velocity is -5.7 km s^{-1}.) An unidentified line near λ3906, the Sr-Si complex near λ4077, and groups of lines in the regions λ4150-4230 and λ4500-4630 are also clearly variable in strength. These lines do not seem to vary relative to one-another in a consistent manner. For example, when λ3954 is near maximum strength λ3906 is not visible; when λ3954 is near half-maximum λ3906 may, or may not, be visible.

The line strengths do <u>not</u> vary in phase with the orbital velocity. In Figure 1 we have indicated with strokes the approximate line strengths at various phases in the orbit.

In their present form the data on line strengths are not sufficient to permit an independent search for periodicities, nor to make a reliable comparison with the several photometric periods which have been proposed. However, it is interesting to note that the intervals between the three maxima of λ3954 do correspond to integral multiples of the 1.618 day period suggested by Renson (1977).

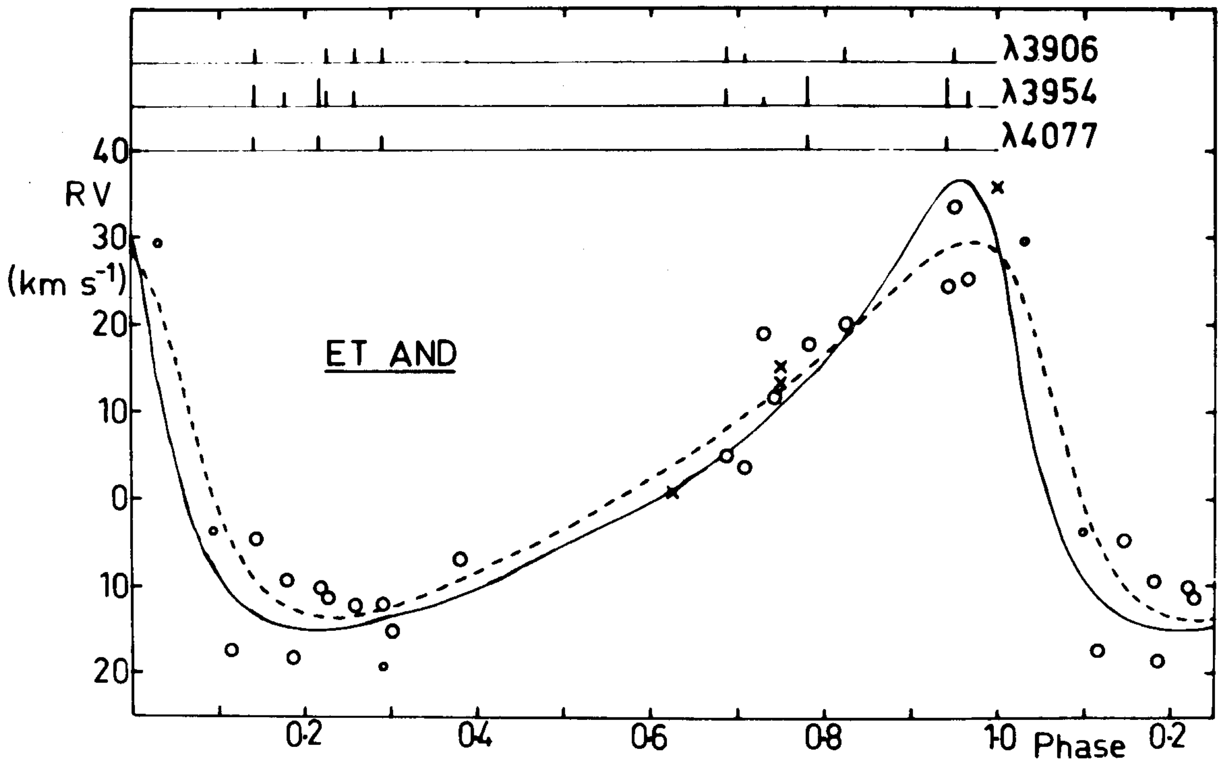

Fig.1. Radial velocity curve of ET And and spectral line strength variations.

Table 1

J.D. (⊙) 2400000+	Dispersion (Å mm^{-1})	RV (km s^{-1})	O-C (km s^{-1})	Phase
38613.976	51	-19.3	-5.8	0.292
38987.836	30	29.4	17.2	0.031
38990.886	30	-3.8	4.4	0.095
39680.959	15	-7.0	3.7	0.381
40449.955	15	-15.4	-2.1	0.301
40803.722	12	0.5	-0.6	0.624
40809.805	12	13.4	2.7	0.750
40835.855	15	-12.3	1.3	0.290
41147.850	12	15.2	4.6	0.749
41159.747	12	35.9	6.3	0.998
42644.977	15	11.7	1.7	0.742
42648.982	15	19.8	0.8	0.825
42955.890	15	-9.7	4.9	0.179
42992.957	15	33.5	-2.8	0.946
43054.819	15	-11.4	3.3	0.227
43081.726	15	17.6	3.4	0.784
43102.732	15	-10.3	4.5	0.219
43104.638	15	-12.3	2.0	0.258
43330.886	15	24.1	-11.8	0.942
43331.924	15	24.8	-11.6	0.964
43366.890	15	4.9	-0.6	0.688
43367.804	15	3.6	-3.3	0.706
43368.828	15	18.9	10.6	0.728
43823.687	15	-4.8	8.6	0.144
43825.666	15	-18.7	-3.7	0.185
44063.817	15	-17.5	-6.4	0.115

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