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SPECTROSCOPIC EVIDENCE FOR SHORT PERIOD AND HIGH ECCENTRICITY OF THE BINARY
 ORBIT OF \circ ANDROMEDAE

\circ And is an eclipsing spectroscopic single lined binary. Guthnick (1941) suggested a light variation period of 1.5765 days. Schmidt (1959) gave a period of 1.5998398 days from his much more accurate photoelectric measurements. But Bossi et al. (1977), Pastori et al. (1982) and Baade et al. (1982) disagreed with this period. Pastori et al. (1982) gave a period of 23.5 years from spectroscopic analysis. Baade et al. (1982) have concluded that short term quasiperiodic radial velocity variations are not present during the initial stage of the new shell phase. Further, there is no spectroscopic evidence for \circ And to be a short period spectroscopic binary.

\circ And underwent a shell phase in 1981 and is still in shell phase (Bossi et al. /1982/, Hayes /1982/). We have been continuously observing this shell spectrum since 15 October 1981, in H α at a dispersion of 17.2 Å/mm on 09802 Kodak Plates. We report here our observations from 15 October 1981 to 5 October 1982 taken at the 100 cm reflecting telescope of Kavalur Observatory at its Cassegrain focus. In Table I we present, in order, date of observation, JD, phase (calculated from JD 2444948.147), measured radial velocity, calculated radial velocity and residual O-C from the elements adopted.

Table I

Date	JD	Phase	Radial Velocity observed km/s	Radial Velocity calculated km/sec	O-C
15 Oct. 1981	4893.166	0.167	-41.13	-	-
16 Oct. 1981	4894.094	0.278	-39.07	-39.06	- .01
8 Dec. 1981	4947.092	0.369	- 0.66	- 5.95	5.29
9 Dec. 1981	4948.109	0.977	22.00	21.98	.02
9 Dec. 1981	4948.132	0.991	29.26	-	-
9 Dec. 1981	4948.147	0.000	38.26	-	-
9 Dec. 1981	4948.157	0.006	22.00	23.71	-1.71
11 Dec. 1981	4950.063	0.144	1.12	6.97	-5.85
9 Jan. 1982	4979.102	0.485	21.59	22.34	-0.75
23 Jan. 1982	5144.430	0.213	-11.85	-14.74	2.89
5 Oct. 1982	5248.188	0.174	-27.06	-	-
5 Oct. 1982	5248.261	0.217	-19.11	-15.97	-3.14

The orbital elements obtained are as follows:

K	$= 34.165 \text{ km}$	T_o	$= \text{JD } 2444894.0905$
V_o	$= 13.50 \text{ km/sec}$	P	$= 1.67458 \text{ d}$
e	$= 0.539$	$a \sin i$	$= 662437.8 \text{ km}$
ω	$= 177.046^\circ$	$f(m)$	$= 0.004$

The radial velocity curve is shown in Figure 1. We omitted four observa-

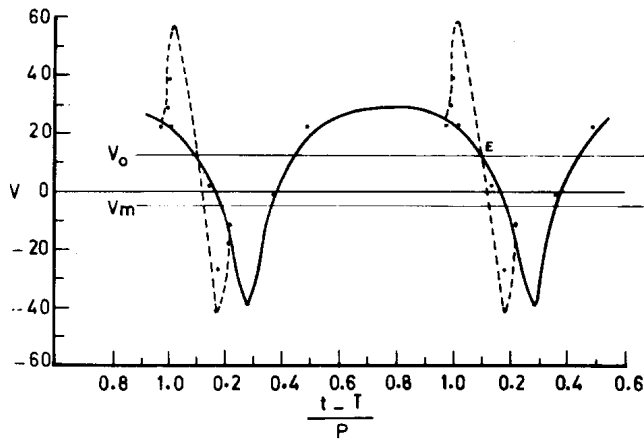


Figure 1
Radial Velocity Diagram

tions, in deriving the orbital elements. These observations do not lie on the RV curve adopted and differ in computed values from the elements adopted. The eclipse of the bright star occurs at E on the decreasing branch of the RV curve where it intersects the V_o axis. Just before E, two observed RV are + ve differing the RV curve and just after E, two observed RV are - ve differing the RV curve. This is explained by the rotation effect and the gas stream present around the binaries. The binaries in which this effect has been found are all very close so that one can expect interactions like tidal waves or more violent phenomena. The gas streaming distorts the RV curve, in the sense that we have a positive amount of distortion just before eclipse and a negative amount just after eclipse. Without applying the proper correction we may thus find incorrect orbital elements. This explains the omission

of the four observed RV for calculating the orbit.

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References:

- Baade, D., Pollok, H., Schumann, J.D., and Duerbeck, H.W., 1982, IBVS No.2125
Bossi, M., Guerrero, G., and Mantegazza, L., 1977, Astron. Astrophys. Suppl. 29, 327
Bossi, M., Guerrero, G., Mantegazza, L., and Scardia, M., 1982, IBVS No.2082
Guthnick, P., 1941, Vierteljahrsschrift d. Astron. Gesell. 76, 62
Hayes, D.P., 1982, IBVS No.2160
Pastori, L., Antonello, E., Fracassini, M., and Pasinetti, L.E., 1982,
Astrophysics and Space Science, 86, 179
Schmidt, H., 1959, Zeitschrift f. Astrophys. 48, 249