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THE ECLIPSING BINARY V651 CASSIOPEIAE

The binary V651 Cassiopeiae (also known as BV 326, CSV 8883 and NSV 14717) was discovered by Strohmeier and Knigge (1960), although they published only a finding chart. Using 193 Hartha Sky-patrol-plates, Berthold (1982) derived ephemerides of JD2,437,016.435+0^d.4900267.E for the interval from JD2,436,637 - 2,439,029 and JD2,443,015.413 + 0^d.4900322.E for the interval from JD2,439,052 - 2,443,016. He claimed that an abrupt period change in October 1965 had been detected. He also classified the star as a W UMa variable and gave photographic magnitudes of 10.5 - 11.0. The variable received its current name recently (Kholopov *et al.* 1985).

The binary was put on the program of spectroscopic orbital determinations of short-period eclipsing binaries. Since July 1985, forty-one spectrograms have been obtained with the 1.8-m telescope of the Dominion Astrophysical Observatory (DAO) at a dispersion of 15 Å mm^{-1}. Twenty-three of them were secured with the intensified Reticon detector and measured by the program VCROSS (Hill 1982); while the rest were obtained with the shectograph and measured by the software package RETICENT (Pritchet, Mochnacki and Yang 1982).

The velocities obtained do not agree with the period of 0^d.49. A new period of 0^d.9969, a little longer than double the old one, has been derived. The new ephemeris is:

$$\text{Min. HJD} = 2{,}446{,}430.3159 + 0^d.996864.E$$

Preliminary orbital solutions were tried with circular orbits assumed and the systemic velocity of -30 km s^{-1} fixed. This value was estimated from the spectrogram taken at HJD2,446,442.6299, which looked single-lined. Radial-velocity curves are shown in Figure 1. These curves must be very preliminary since only one node is covered. However, the minimum mass of the system can be estimated to be 1.61 (0.83 + 0.78) $M_{\odot}$. The mass ratio then is close to unity (0.94), which is significantly different from those of the W UMa group.

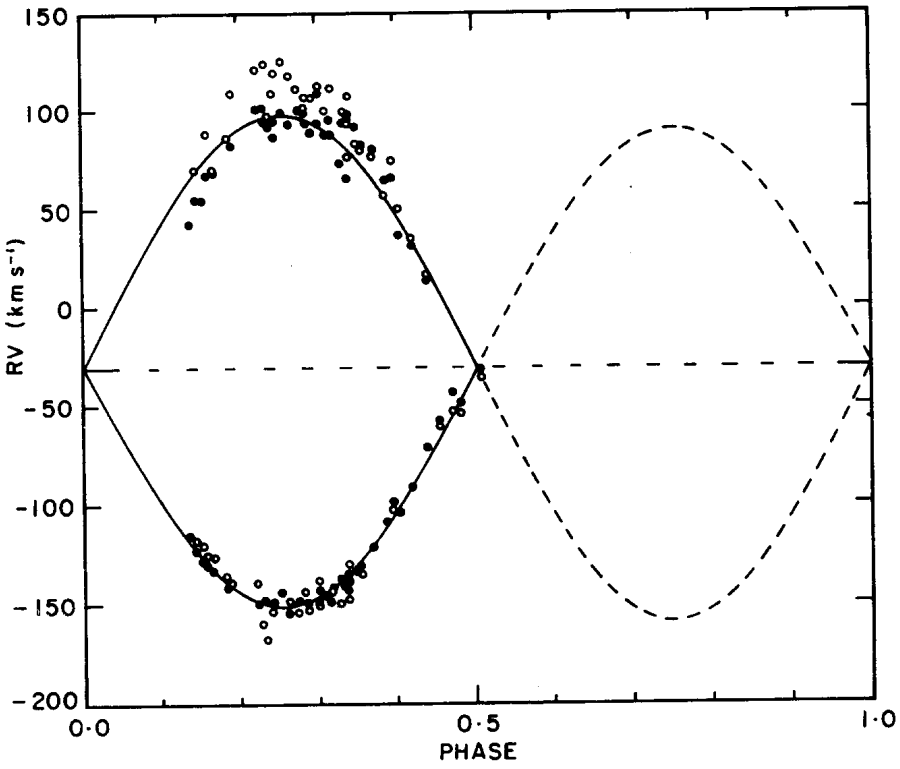

Figure 1. Incomplete radial-velocity curves of V651 Cas. Dots denote absorption-line velocities and open circles CaII H and K emission-line velocities.

Absorption features in the spectrum are quite sharp and not distorted. This also indicates that the binary is probably not a member of the W UMa group, whose spectral features are usually severely broadened, diffused and distorted. Both components clearly show H and K lines in emission, the velocities of which (also shown in Figure 1) agree well with the absorption line velocities arising from the same component. In the MK system, the components of the binary can be assigned to G5V (more luminous component) and G8-K0 with some uncertainty. In addition, the line-strength ratio was measured to be about two.

These properties suggest that the binary may be a member of the RS CVn group (Hall 1976). If it is, the period of about one day (if correct) is very important because it fills the period gap between the long and short-period RS CVn groups.

Further observations will be continued in future observing seasons at DAO. Both photoelectric and spectroscopic observations at other longitudes would be useful.

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WENXIAN LU*

Dominion Astrophysical Observatory, Herzberg Institute of Astrophysics,
5071 W. Saanich Road, Victoria, B.C., Canada V8X 4M6

* On leave of absence from Shanghai Observatory, Academia Sinica,
Shanghai, People's Republic of China

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