COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
NUMBER 393

Konkoly Observatory
Budapest
1969 October 17

A SPECTROSCOPIC STUDY OF THE TRIPLE SYSTEM VV ORIONIS

The importance of a new spectroscopic study of this eclipsing system has been pointed out by several authors. VV Orionis consists of a system of three bodies; but the orbit of the 3rd body is given, with great reserve, only by Daniel who lists the approximate values of the elements. There is also a great uncertainty in the mass ratio of the two principal bodies ranging from $m_2/m_1=0.34$ according to the catalogue by Kopal and Shapley to $m_2/m_1=1.0$ according to Struve and Luyten.

From 26 plates (dispersion 34 A/mm) secured at the Observatory of Merate we have computed new spectroscopic elements by means of the programme by Bertiau; we have then computed the following orbital elements of the long period variation from all the residuals obtained up to date, covering about 200 cycles of the 3rd body:

$K = 15.75 \pm 4.98$	$P = 115.8741 \pm 0.0139$
$V_0 = 0.778 \pm 4.00$	$T_0 = 2419827.129 \pm 9.933$
$e = 0.295$	$f(m) = 0.042$
$\omega = 46^\circ.06 \pm 2.38$	$a \text{ seni} = 24.237 \cdot 10^6$

After correction for the 3rd body in our velocities, we have computed the following elements for the two principal bodies:

$K = 139.92 \pm 8.86$	$P = 1.4854 \pm 0.035$
$V_0 = 26.34 \pm 7.70$	$T_0 = 2440251.801 \pm 1.285$
$e = 0.077 \pm 0.74$	$f(m) = 0.419$
$\omega = 84^\circ.25 \pm 2.66$	$a \text{ sen } i = 2.85 \cdot 10^6$

From the microphotometer tracings we have noticed that the violet (red) side of the hydrogen lines have faint extensions when the primary receeds (approaches): this effect must be due to the secondary component. We have measured the relative Doppler shifts of the two components from the tracings and, within the large uncertainties of such measures, we have determined K_2 about 320 km/sec. This gives a mass ratio of $m_2/m_1=0.44$.

We have then determined the masses of the three bodies, without any assumption:

$M_1 = 10.2$ $M_2 = 4.5$ $M_3 = 2.3$

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