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THE HIGH VELOCITY VARIABLE QT CrA

Ahnert (1) drew attention to the fact that of the stars listed as galactic cepheids in the Variable Star Catalogue (2), QT CrA has an exceptionally long period (79 days). Besides being of interest for this reason, the star has recently assumed some importance as being used in a comparison of SMC cepheids with their galactic counterparts (3). Suspicion that the star may not be a normal population I cepheid is aroused by the fact that the period is known to vary ($78^d.57$ to $79^d.14$) and that the (objective prism) spectral type is given variously as Ae or Fe to K (4) and Me (5). Possibly these considerations led Petit (6) to classify the star as a type II cepheid. The period would of course be unusually long for this type of star also. The star has been observed spectroscopically a few times during recent years with the 1.88m (74 inch) Radcliffe reflector. Three spectra at 48 A/mm at $H\gamma$ (Cassegrain, two-prism spectrograph) are listed in the Table. None of the spectra are suitable for accurate spectral classification but the spectrum seems to be peculiar and probably that of a metal weak G type star. These three plates in the blue region all show hydrogen in absorption although the spectrum on 1967 May 3 shows very weak emission wings on either side of $H\beta$. The last plate listed in the Table covers the red region at 82 A/mm (coudé, grating spectrograph with f/1 camera). This shows $H\alpha$ to be double in emission with the red component strongest. Judging from the report of $H\gamma$ and δ in emission on one objective prism plate (M.W. Mayall see (4)), the hydrogen emission can at times become quite intense. The chief point of the present note is to draw attention to the very large, negative, radial velocity of the variable. The measured velocities are listed in the Table with the number of lines used in brackets. For the blue spectra the lines recommended by the Victoria workers for late type stars (7) were used. The measures on the red plate refer to $H\alpha$ and it is clear that the absorption (or gap) between the two emission peaks agrees reasonably well with the absorption velocities in the blue region. The peculiar spectroscopic features and the high velocity show that the star should not be classed

TABLE

48 A/mm spectra (blue region)		Radial Velocity km/sec
1966 May 30		-362 (5)
1967 May 30		-361 (10)
1967 May 17		
82 A/mm spectra (red region)		
1969 Aug. 2	Hα em	-465
	Hα abs	-373
	Hα em	-280

with population I cepheids. Further work (especially photometric observations) should allow the star to be classified more exactly. It seems likely however that the star belongs to the SRd class or (like TY Vir for instance (8) (9)) is related to this class. These stars are high velocity metal poor objects lying in the HR diagram near the termination point of the giant branch of halo globular clusters. The mean radial velocity of QT CrA is -362 km/sec or, corrected for local solar motion, -354 km/sec. Since the star lies close to the direction of the galactic centre (l^{II} = 352°.6 b^{II} = -09°.8), the measured radial velocity (of which only a small amount is likely to be due to atmospheric pulsation effects) must chiefly reflect a very high velocity radially outwards in the Galaxy (the U component). Comparison with the data for halo stars discussed by Oort (10) or Eggen (11) suggests that the U component velocity of QT CrA must be amongst the largest known.

Radcliffe Observatory,
Pretoria,
March 1970.

M.W.FEAST

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