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HD 12180: A NEW QUADRUPLE STAR SYSTEM

The star HD 12180 has long been known as a visual binary (ADS 1581). In 1971 the brighter component (SAO 167451) was recognized as being variable by Bloomer (IBVS Nos. 586, 587). This star was given the provisional designation BV 1481 and is now known as AA Ceti. In 1972 Bloomer (IBVS No. 745) determined its correct period to be  $0^d.5361735$ . More recent work by Grönbach (IBVS No. 890) has confirmed this period. This system is of the W Ursae Majoris type, and its eclipses appear to be complete. At maximum light the visual magnitude of AA Ceti is 7.3, and its spectral type is F2.

The companion of this system is SAO 167450, whose magnitude is 7.7. It is situated  $8''.5$  from AA Ceti, and most photometric data for the latter have included this star in the diaphragm.

Recently spectra were obtained of both of these stars by this investigator using the 1.0 meter coudé feed telescope of Kitt Peak National Observatory. SAO 167450 proves to be a double-lined spectroscopic binary. The lines are very sharp, and the spectral type is F5. Two systems of lines are observed, those displaced to the violet being somewhat the more intense of the two sets. The radial velocities obtained from a single plate are as follows:

Hel. JD	velocity
2444887.838	$-12 \pm 2$ km/s , $+68 \pm 1$ km/s

The dispersion used was  $16.9 \text{ \AA/mm}$ . Two spectrograms were also taken of AA Ceti on the same night. These show broad, diffuse lines, strongly affected by rotational broadening. The mean

radial velocity for the two spectrograms, both of which were taken near primary minimum, is  $+41 \pm 11$  km/s, a value which is in agreement with the center-of-mass velocity which can be estimated from the data given for SAO 167450.

No evidence has been presented that indicates SAO 167450 is an eclipsing binary. Observations should be made to determine whether or not this is the case, however, since SAO 167450 is a double-lined system which will probably be found to have a well-defined radial velocity curve. If the inclination of the orbit of this system can be determined, precise masses should be obtainable for both components.

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