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POSSIBLE ECLIPSES OF BETA CAPRICORNI

Beta Capricorni (HR7776, V = 3.07, B8V+KO II-III, $\alpha=20^h15^m24^s$, $\delta=-15^o06'$ (1900)) is a triple system with a late B star and unseen companion of period 8.68 days orbiting a late type giant in 1374 days (Sanford 1939). Recently Evans and Fekel* have derived a visual orbit for the long period system by combining occultation, speckle, and spectroscopic observations. With the speckle observation excluded, the derived long period orbital inclination is 90^o. The best compromise with the inclusion of the lone speckle point is an inclination of 84^o. From occultation observations the limb darkened angular diameter of the KO II-III star is 3 arc milliseconds. The minimum separations of the components of the long period orbit on the sky are of the same order with the exact values depending on the true value of the inclination. The possibility of eclipses, perhaps only grazing or coronal, arises and Table I gives the predictions for $i = 84^o$.

Table I

Predicted Eclipse Circumstances

Eclipsed components	Date	ρ (arc ms)	θ (degrees)
short period pair	1979 Mar 30	6.5	122.8
KO II-III	1981 Aug 20	3.0	302.8

The former event should best be observed at short wavelengths ($\lambda < 4200$ Å). Complications may arise because of the duplicity of the visual secondary, B8V star, which should have an orbital angular diameter of 0.7 arc milliseconds, though in which relative direction this pair will be elongated at the time of the eclipses it is impossible to say.

From occultation observations the visual components have equal magnitudes at about 4230Å. The magnitude difference

$\Delta m = m_{B8} - m_{KO}$ in Strömgren b = 1.1 and in y = 1.8.

We suggest that photometric observers, particularly those in the southern hemisphere, should search for eclipses. The first possible eclipse occurs early in the observing season for β Cap and will be difficult for northern observers.

The solution of Evans and Fekel has position angles decreasing with time. Radick has made an independent solution which is closely similar to this in which he finds an inclination of $89^{\circ} \pm 6^{\circ}$ using the spectroscopic, occultation and speckle data and $89^{\circ} \pm 1^{\circ}.4$ if the single speckle observation is omitted. Both give a very elongated orbit with only small changes in position angle but he prefers a solution in which position angles increase with time. Of course if the inclination is exactly 90° the two solutions coalesce and the eclipses should be the more striking.

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Reference:

*Evans, D.S. and Fekel, F.C., in press, Astrophysical Journal 1979