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GAMMA Cae: A BINARY WITH A SUSPECTED VARIABLE SECONDARY

Gam Cae [$5^{\text{h}} 00^{\text{m}} 48.5^{\text{s}}, -35^{\circ} 37' 11''$; 1900] is on the University of Virginia parallax program at Mt. Stromlo as part of an effort to measure parallax for a sample of southern giants (Ianna and Culver 1985).

While inspecting a number of our plates, it was noted that the secondary was not always apparent. Close examination of all the accumulated plates shows that this cannot be accounted for purely as a result of variable seeing conditions at the time of exposure.

Gam Cae (=HR 1652 = HD32831) is a K3 III for which Eggen (1973) gives $V = 4.55$, $B-V = +1.20$, $(R-I) = 0.46$. The secondary is located at a distance of $3''$ in a position angle of about 310 degrees. In the Innes catalogue (Cape Annals) the magnitude of the primary and secondary are given as 4.7 and 9.6; Eggen and Stokes (1970) not a companion to HR 1652 of magnitude 8; the Index Catalog of Double stars lists $m(A) = 4.7$, $m(B) = 8.2$. Thus the published magnitude differences range between about 3.5 and 5.

We have scanned several of our plates having the best images of the secondary with the PDS microdensitometer at Mt. Stromlo. The secondary is still weak and not cleanly separated from the primary. These are IIA-0 plates exposed unfiltered with the 66 cm Yale-Columbia refractor having a plate scale of 18.85 arcsec/mm and approximate a B magnitude. Double peak Gaussian functions are fit to marginal distributions derived from the scan map topography. From these fits magnitude and position data can be extracted. The following results were found:

Plate #	# images	sep	P.A.	Δm	date
4391	3	3.15	324	1.4	16 Feb 1983
4856	3	3.11	327	1.7:	3 Jan 1984

The fitting routines failed to converge for 6 other plates where the secondary image is weaker. In these cases we estimate a Δm of about 2.0 or more. The programs have been checked using pairs of simulated stars

and seem to work well in the range of separation and magnitude difference found in the present case. On several plates the companion is not visible at all, and, although the seeing is not very good on these plates, it does not appear to be poor enough to account for the non-appearance of the secondary.

There seems a fair probability that the secondary in the Gam Cae system is variable. A hotter companion could account for a somewhat reduced magnitude difference in the blue, however there seems no very likely object that could be two magnitudes brighter in the blue and two to four magnitudes fainter than the primary simultaneously. Of course the observed visual magnitude differences also may not completely characterize any variations. The evidence suggests additional observations of the secondary would be useful to clarify the nature of this object.

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References:

- Eggen, O.J. 1973. Publ. Astron. Soc. Pacific 85, 542.
Eggen, O.J. and Stokes, N.R. 1970. Astrophys. J. 161, 199.
Ianna, P.A. and Culver, R.B. 1985. Astron. J., in press.