

A Possible Detection of a Secondary Light-Time Orbit of the Massive Early-type Eclipsing Binary Star AH Cephei

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All published and newly observed times of minimum light of the massive, early-type eclipsing binary star AH Cep were analyzed. After subtracting the light time effect due to the well-known third body from the residuals of the observed times of minimum light, it was found that the second-order $O-C$ residuals varied in a cyclical way. It was assumed that the secondary oscillations were produced by a light time effect due to a fourth body so all the times of minimum light were reanalyzed with a differential least-squares scheme in order to obtain the light time orbits due to both the third and fourth bodies. The periods, eccentricities, semi-amplitudes of the light time orbits for the third and fourth-bodies were derived as : $P_3=68.^y3$ and $P_4=9.^y3$, $e_3=0.53$ and $e_4=0.83$, $K_3=0.^d0585$ and $K_4=0.^d0045$, respectively. The analysis of the radial velocities of AH Cep published so far, do not conflict with the hypothesis of the multiplicity of the system but their accuracies are not high enough to be useful to support the interpretation. Other properties of the distant bodies are discussed for assorted possible inclinations of their orbits.