Critical Complements: Progress on the Orbit of T Mon[1]

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Abstract.   A preliminary orbit has been derived for the high luminosity, 27-d classical Cepheid T Mon. Velocities for the hot companion have been measured from an HST GHRS spectrum and 3 IUE spectra. The companion velocities are inconsistent with binary orbital motion and it is likely that the companion is itself a short period binary. The HST spectrum also shows that the companion is a chemically peculiar star, probably magnetic.

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1. Introduction

Galactic Cepheids can provide some "critical complements", parameters needed for a quantitative interpretation of information from large scale surveys of the classical Cepheid instability strip. We report here new results in a long-term program to determine the masses of Cepheids to an accuracy which can constrain evolutionary calculations. Orbits for galactic Cepheids have been derived and combined with orbital velocity amplitude measurements of hot companions from satellites (Hubble Space Telescope [HST] and IUE).

2. Orbit

The most recent system studied in this series is the long period (27 d) Cepheid, T Mon. New velocity data have been obtained and a new pulsation curve derived. The pulsation period has recently undergone a substantial change. While not quite a full orbit has been observed since the first velocities in 1905, both orbital maximum and minimum velocity have now been covered, and velocity observations within a few years will provide a complete orbit.

3. Companion

We have also measured the velocities of the companion from an HST GHRS spectrum and three IUE spectra. The velocities of the companion appear to be inconsistent with binary orbital motion from the preliminary orbit, and it is likely that the companion is itself a short period binary. The brightest companion is a chemically peculiar star, probably magnetic. The mass function from the preliminary orbit implies that the inclination of the long period system is close to 90 degrees. The long period of the system makes it a good candidate for resolution. Full results are given in Evans et al. (1999).

Reference

Evans, N. R., Carpenter, K., Robinson, R., Massa, D., Wahlgren, G., Vinkó, J., & Szabados, L. 1999, ApJ, 524, 379