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# PERIOD CHANGE IN AN RS CVn BINARY - WHAT DRIVES CF Tuc?

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CF Tuc is an RS CVn eclipsing binary of period ∼2.8 d. Its orbital period changes, as was first noted by Thompson, Coates and Anders (1991) and further discussed by Anders et al (1999) in terms of the mechanism proposed by Applegate (1992) for orbital period modulation of active close binaries. Anders et al. (1999) predicted that this mechanism would probably lead to a period shift for CF Tuc in the subsequent two years, and an increase in the spot-wave amplitude for the cooler stellar component.

We have timed two primary eclipses for CF Tuc in early 2000, via CCD photometry at Monash University, and have also obtained high-resolution spectra taken nine hours apart in 2002 June, as service observations using the University College London Echelle Spectrograph (UCLES) at the coude focus of the Anglo Australian Telescope (AAT). Initial measurements of the radial velocities of the stellar components using these spectra gives another epoch of primary eclipse.

The observations of 2000 yield an epoch of HJD 2451605.099±0.003, and those of 2002 June HJD 2452452.742±0.020. The second value was obtained independently by two of us, using cross-correlations between the spectrum of CF Tuc and that of a radial-velocity standard star ($\beta$ Hyi). The Heliocentric radial velocities of the hotter star were determined to a precision of 2.0 km/s (sample standard deviation), which leads to a precision of 0.007 in the orbital phase, and which corresponds in time to 0.02 d. The radial velocity was converted to orbital phase using fits to the radial-velocity data of Collier Cameron (1987) and Balona (1987).

The figure shows the $O - C$ graph for CF Tuc using the ephemeris given in Anders et al. (1999): 2444219.270 + 2.797715 × E. The latest two data are obtained as above, the remainder are from Anders et al. (1999). The predicted shift in period has clearly not happened. The period remained essentially constant at 2.797492 d from about 1995 to mid 2002. Based on this information the current ephemeris would be: 2450351.825 + 2.797492 × E.

Clearly, more eclipse timings and multicolour photometry are needed for this interesting binary, so that the mechanisms involved in its period changes can be better understood. We encourage southern observers to include this system on their observing programmes.

We thank the AAO for the UCLES service observations used to obtain the radial velocity measurements, which were carried out by S. Ryder. The spectral analysis was performed using the IRAF package from the US National Optical Astronomy Observatories.

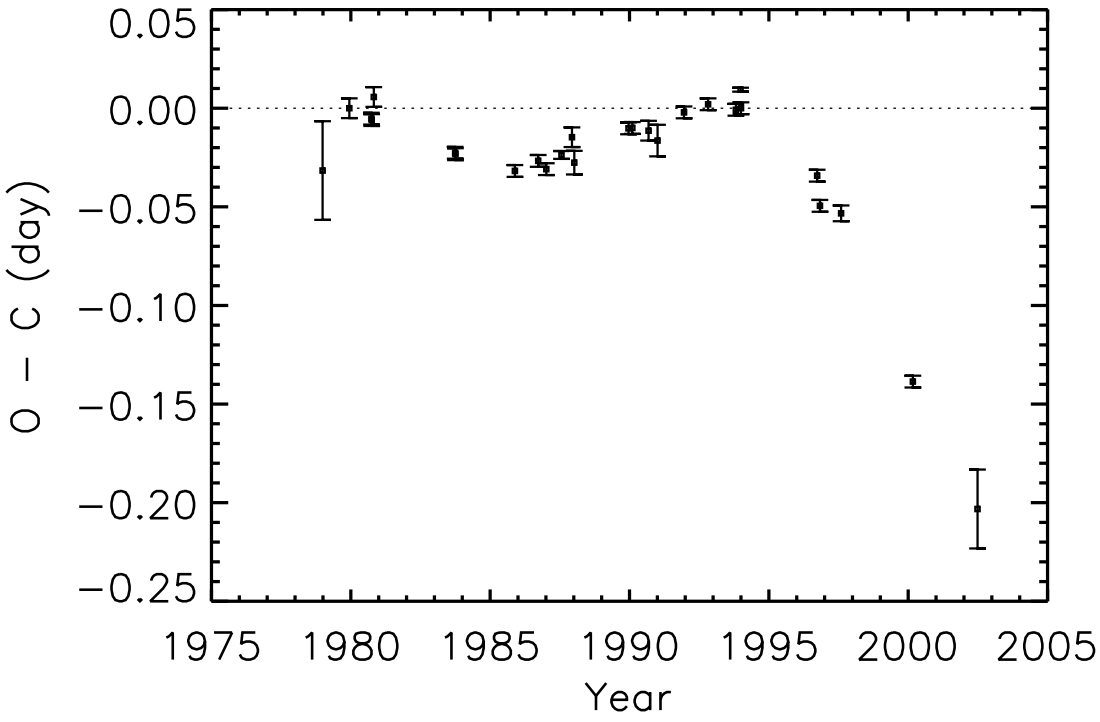


**Figure 1.** The O-C diagram for CF Tuc from 1978 to 2002

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