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OPTICAL PHOTOMETRY OF CF Tuc, MID-1995 THROUGH 1996

CF Tuc (=CABS[1] #8) is a relatively bright ($V \sim 7.5$) RS CVn type binary (Hearnshaw and Oliver, 1977). It consists of a G0 type Main Sequence dwarf orbiting in a 2.797672d period (Budding, 1985; epoch HJD 2445606.9165) with a K4 subgiant. The star appears in front of the southern end of the SMC, and has received significant attention from observers in Australasia (Budding and Zeilik, 1995, and refs. cited therein).

The scale of related photometric (starspot/maculation) activity has varied from very large (tenths of mag, cf. Hall, 1981) to apparently insignificant ($\sim$0.01 mag; Budding and McLaughlin, 1987), with many observers recording irregularities on the order of 0.05 mag.

Drake *et al.* (1992) pointed out appreciable X-ray emission from CF Tuc. It is listed in the ROSAT (EUV) Bright Source Catalogue (Pounds *et al.*, 1993), and Kürster (1994) reported a very large flare observed by ROSAT. It has also been found to be a reasonably active radio source (Slee *et al.*, 1987), and this has prompted efforts toward 'multiwavelength' observational studies (Gunn *et al.*, 1996). The present article attempts to put together recent photometric information as a background to such multiwavelength studies, involving further observations at the Australia Telescope in June 1996, which covered a complete orbital cycle of the binary.

In Figure 1 we show data which has been collected from two sites in New Zealand from mid-1995 up to the end of the year. The earliest points, observed from the Kotipu Place Observatory's APT ('KPO' — cf. Hudson *et al.*, 1993) may be slightly brighter than the later trend towards a low secondary minimum. This is in the sense that later KPO data, combined with that from T Rounthwaite, indicate that towards the end of 1995 there was a reasonably coherent maculation wave, centering at phase around 0.6. This wave may have previously been at a higher phase and subsequently drifted down in longitude. Such effects are frequently observed for RS CVn stars showing spot-waves, and the rate of this drift for CF Tuc has been found to be typically of order 50 deg per year (Budding and Zeilik, 1995), in keeping with what could be expected from the trends studied by Henry *et al.* (1995), although appreciable variations in the apparent rates of spot drifts are found in particular cases.

Figure 2 indicates that the maculation wave continued its downward migration into 1996, decreasing somewhat in amplitude in the process. The overall rate of drift over the whole of 1996 would then appear to be about 100 deg, and if the drift was uniform over this period then the phase of the main minimum should have been about 0.45 at the time of the radio observations in Australia carried out at the end of June, 1996.

[1] CABS refers to the Catalogue of Strassmeier *et al.* (1993).

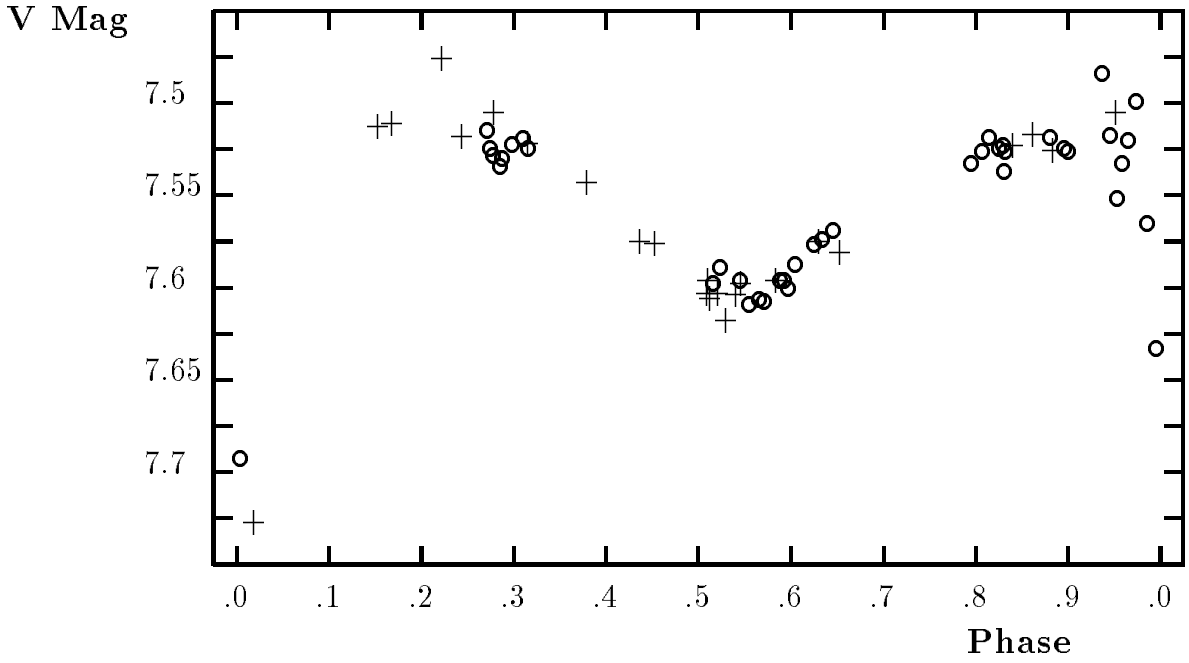

Figure 1: V light curve of CF Tuc: Aug-Dec 1995; KPO (∘) & Rounthwaite (+).

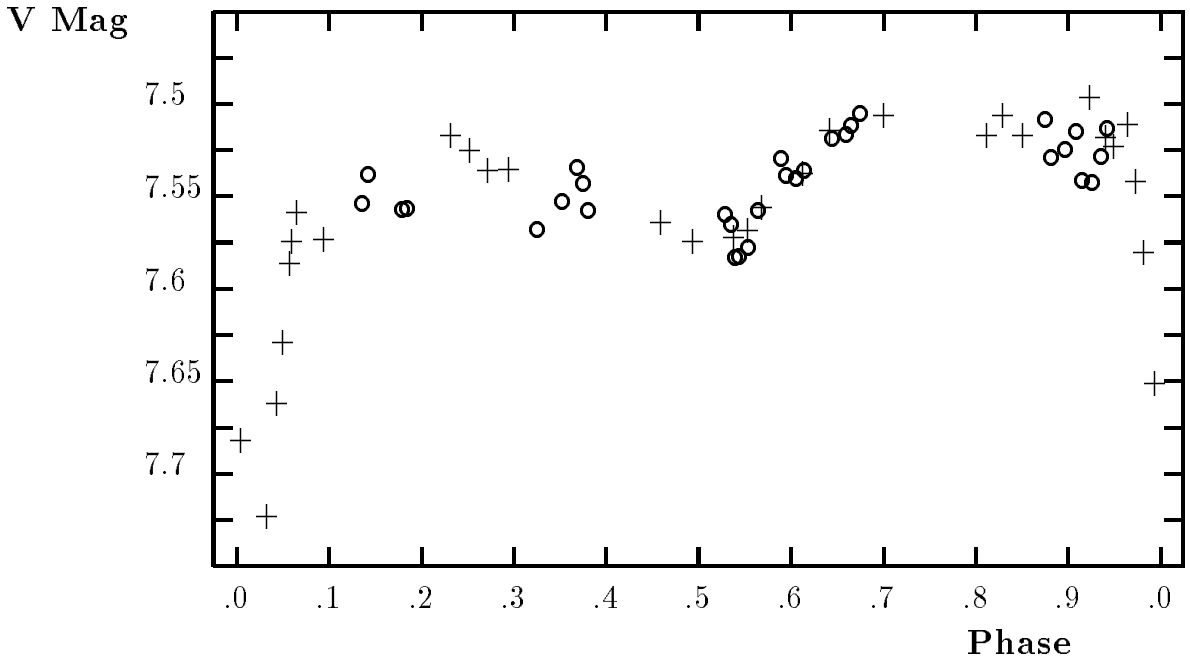

Figure 2: V light curve of CF Tuc: Jul-Dec 1996; KPO (∘) & Rounthwaite (+).

Data continue to be assembled and checked as part of a wider programme of active star studies. More intensive and detailed analyses can be expected in further stages of this programme.

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