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1995 PHOTOMETRY OF RT ANDROMEDAE

RT Andromedae (=BD +52°3383A=#201 in the catalog of Strassmeier et al. 1993) is a member of the short period eclipsing group of RS CVn stars. Budding and Zeilik (1987) first modeled the spots on this star. Zeilik et al. (1989) modeled the spot structure for available data from 1920 to 1989. This work builds on previous work by modeling the spot structure during 1995.

I observed RT And on the nights of 18 January and 2, 3, 4, 6, 7, and 20 February 1995 using the San Diego State University 61-cm telescope on Mt. Laguna. The telescope is equipped with a photometer using a Hamamatsu R943-02 tube operated at −1450V and cooled to −15°C. The BVRI filters are chosen to closely match the Johnson–Cousins system. The comparison star was BD +52°3384 (=SAO 35208). In January 1994, I calibrated the magnitudes of this comparison star using Landolt standards. I got: U=10.96, B=10.25, V=10.12, R=10.05, and I=9.99. Because February is rather late in the observing season for RT And I was only able to observe it for a short time each night. The light curves therefore contain significant gaps at the beginning of the secondary eclipse and at third quadrature. The data however are sufficient to model the spots. The data, plotted in Figures 1 and 2, are differential magnitudes (star–comparison) in the standard Johnson–Cousins system.

To model the data, I used the Information Limit Optimization Technique (ILOT) described in detail by Budding and Zeilik (1987). To perform the initial fits, I started with the orbital parameters found by Zeilik et al. (1989), including ellipticity effects. Unlike most of the short period RS CVns, RT And has an elliptical orbit. From the initial binary star fits, I extract a distortion wave and then fit the distortion wave for the longitude and radius of circular spots at 0K. The ILOT allows fitting for the spot latitude, but in this case I was unable to fit for the latitude simultaneously with the other parameters. I therefore used a fixed latitude of 45°, the value to which the latitude seemed to converge in preliminary trial fits. The fits for each wavelength are performed independently. I get:

	B band	V band	R band	I band
Longitude	110.9±5.1	112.7±5.2	117.9±5.6	125.2±4.86
Latitude	45	45	45	45
Radius	11.5±0.7	12.0±0.7	11.3±0.8	12.0±0.7
χ^2	110.6	82.3	70.2	135.1

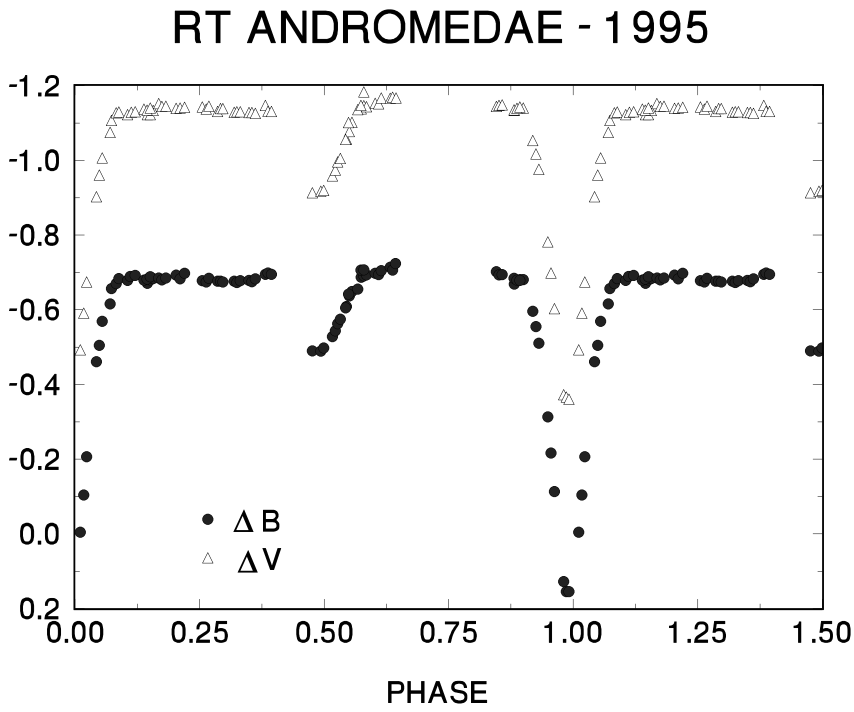

Figure 1

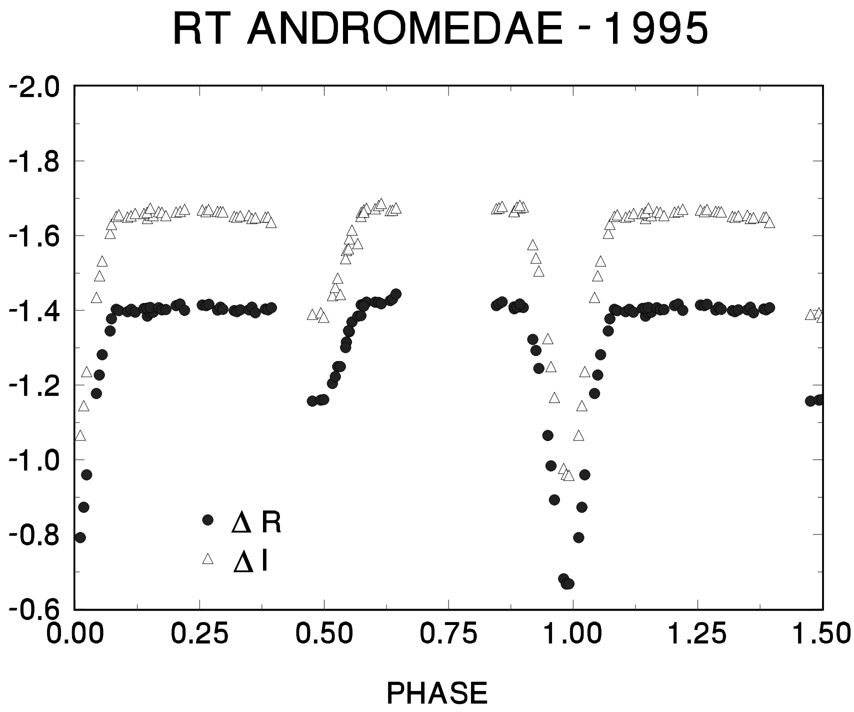

Figure 2

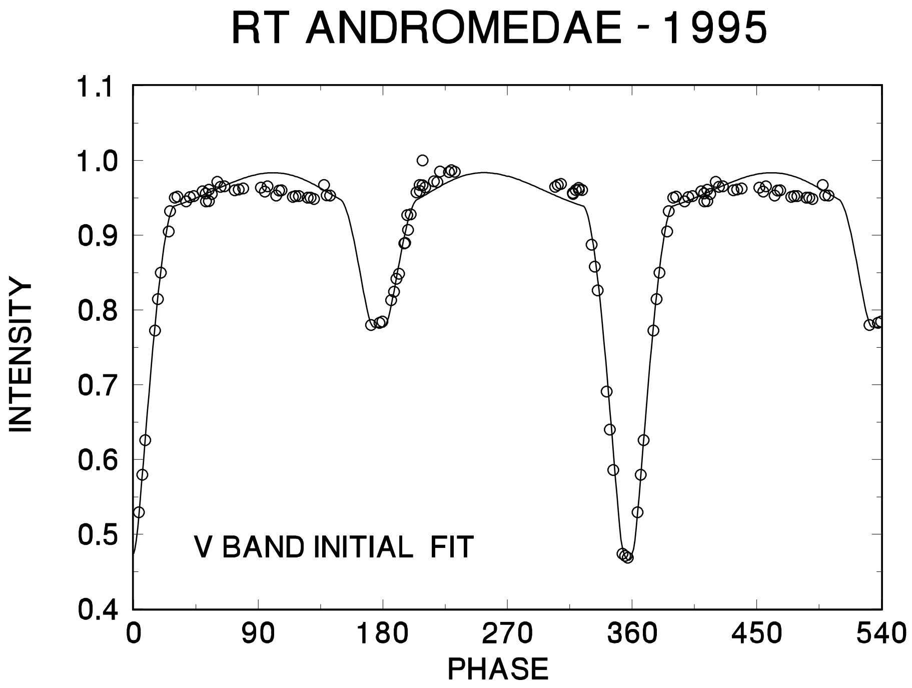

Figure 3

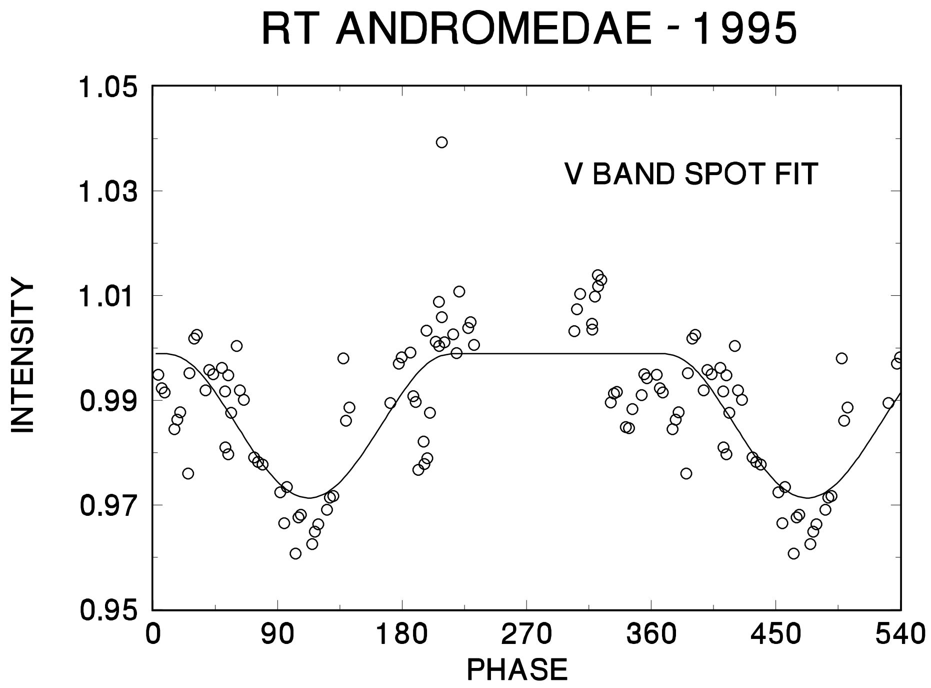

Figure 4

Figures 3 and 4 show the initial and spot fits in the V band. I made no attempt to do clean fits to remove the spot effects and find the binary star parameters because the incompleteness of the light curves would reduce the confidence in these solutions. Because there is a gap in the light curves at roughly longitude 270° it is not possible to completely rule out the possibility of a spot at this longitude. To investigate this possibility I tried to fit both a single spot and a second spot at this longitude. In neither case was I able to fit a spot, so the available data indicates that RT And has a single spot in the 90°Active Longitude Belt. This result is similar to the previous long term trends found by Zeilik et al. (1989) for a single spot in one of two Active Longitude Belts.

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P.A. HECKERT
Dept. of Chem. & Physics
Western Carolina University
Cullowhee, NC 28723
USA

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