TEMPERATURE STRUCTURE OF THE DISK IN V1315 AQL

C. MORENO, R. G. M. RUTTEN, V. S. DHILLON
Royal Greenwich Observatory, Isaac Newton Group, La Palma, Spain

Abstract. We present a progress report on the analysis of time-resolved spectrophotometric observations of the cataclysmic variable V1315 Aql. The spectral range of the data covers the entire Balmer series up to and including the Balmer jump. We aim to use these data to test the steady-state accretion disk model.

1. Introduction

First studied in detail spectroscopically by Downes et al. [1] and widely studied since, V1315 Aql is a high-inclination nova-like system that undergoes deep (~ 1.5 mag) eclipses. Previous studies of the intensity structure of the disk in V1315 Aql have shown the disk to be highly symmetric without evidence for a hot spot.

From broad band photometric eclipse studies it was deduced that the disks radial temperature profile is much flatter than expected from standard accretion disk theory [2]. In order to study the disk structure in more detail we obtained time-resolved spectra through several eclipses.

2. Results

All studies carried out on V1315 Aql to date show symmetrical eclipses [2, 3]. Our data, however, exhibit large variations from one eclipse light curve to the next, and the pre-eclipse and post-eclipse light levels vary by substantial amounts. From our time resolved spectra we obtained narrow band light curves from $\lambda\lambda$ 6770 Å to 5220 Å. Although the emission line flux remains largely uneclipsed [1], the continuum light curves may be used to map the disk brightness distribution using the eclipse mapping technique. The brightness temperature as a function of radial distance from the centre

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is deduced from these maps and shown in Fig. 1 for two wavelengths. From Fig. 1 we find that the mass accretion rate is $\sim 0.3\,10^{-8}\,M_{\odot}\,yr^{-1}$.

The brightness temperature profiles in the outer disk appear to follow that of the canonical disk model with $T(R)$ closely following the predicted relation for a constant $\dot{M}$. In the inner disk however, $T(R)$ is much flatter than predicted, in accordance with previous studies [2].

A full analysis of the disk temperature, as well as the behaviour of the emission lines and the light curve shape will be published elsewhere.

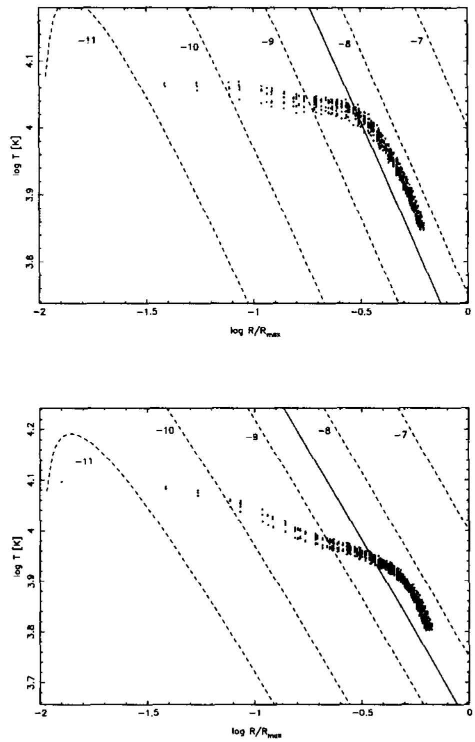

Figure 1. Fits of radial temperature profile for λλ 6770 Å (top panel) and 5220 Å (bottom) as a function of distance from the centre of the disc, the best fit to the given temperature distribution is shown by the solid line.

References

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