

# A new Doppler image of the weak-line T Tauri star V410 Tauri

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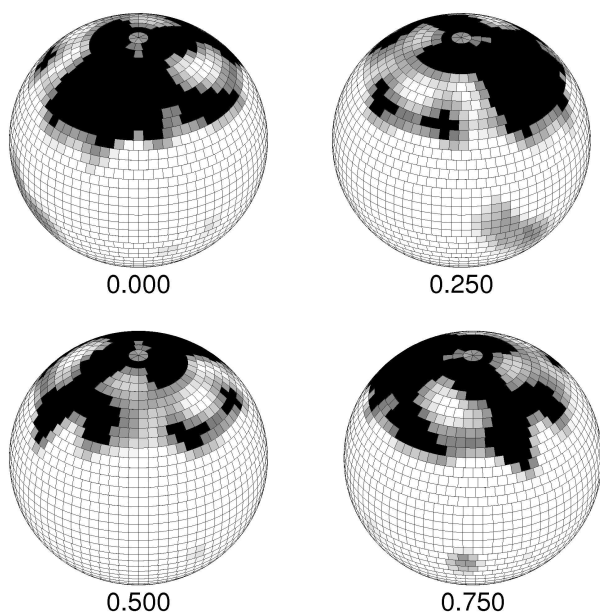
In order to be able to create a new Doppler image of the spot distribution of V410 Tauri 13 spectra were taken at different rotational phases of the approximately 1.872 days period of the weak-line T Tauri star. The data were acquired on 13 nights spanning 128 days in late 2004 and early 2005 using the Coudé Echelle Spectrograph of the Thüringer Landessternwarte Tautenburg 2m telescope and a 2000 x 2000 CCD detector. The VIS channel was chosen so that a wavelength coverage of 4750 – 7070 Å was obtained.

Furthermore photometry has been measured simultaneously with MONICA at the 80 cm telescope at Wendelstein Observatory and at the 1.2m telescope at the Michael Adrian Observatory in Trebur.

A number of Doppler images were derived using a Maximum Entropy method and 11 photospheric absorption lines. An averaged image calculated using all the lines, namely five iron lines, four calcium lines, a nickel line and a lithium line, shows a spot distribution dominated by a high-latitude spot (see below). This spot seems to be long-lived because it already appears in Doppler images from data taken in 1990 by Joncour, Bertout & Ménard, in 1992 by Strassmeier, Welty & Rice, in 1993 by Rice and Strassmeier and in 1993/1994 by Hatzes.

The photometry is used to compare it to an artificial light curve derived from the calculated Doppler image to check the quality of the resulting image. This artificial light curve corresponds to the measured absolute photometry.

Moreover the photometry is taken to investigate if there still is a tentative cycle in the mean V band magnitude with a length of 5.4 yr which was found by Stelzer et al. in 2003. This first tentative detection of an activity cycle on a PMS star could not be confirmed.



The averaged Doppler image of V410 Tau shown in stereographic projection at four rotation phases marked below the pictures. All pixels with a temperature more than 800 K below the photospheric value are shown as black regions. All pixels with more than 500 K below the photospheric value are shown as grey regions. All other image pixels are displayed as photosphere (white) with a temperature of 4400 K.

## References:

T. Schmidt, Diploma thesis 2005  
Schmidt et al., in prep.