

# STAR-DISK INTERACTION IN T TAURI STARS: ANALYSIS OF THE MgII LINES.

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**ABSTRACT:** The MgII is a fundamental tracer of T Tauri stars (TTs) atmosphere and outflows.

The MgII doublet is the strongest feature in the 2800 Å range in the spectra of T Tauri stars. The rest wavelengths of the doublet are  $\lambda$  2795.523 Å / 2802.698 Å.

In the International Ultraviolet Explorer (IUE) and Hubble Space Telescope (HST) data archives there are 73 observations of the MgII lines in TTs that provide an excellent sample to study the circumstellar environment of TTs.

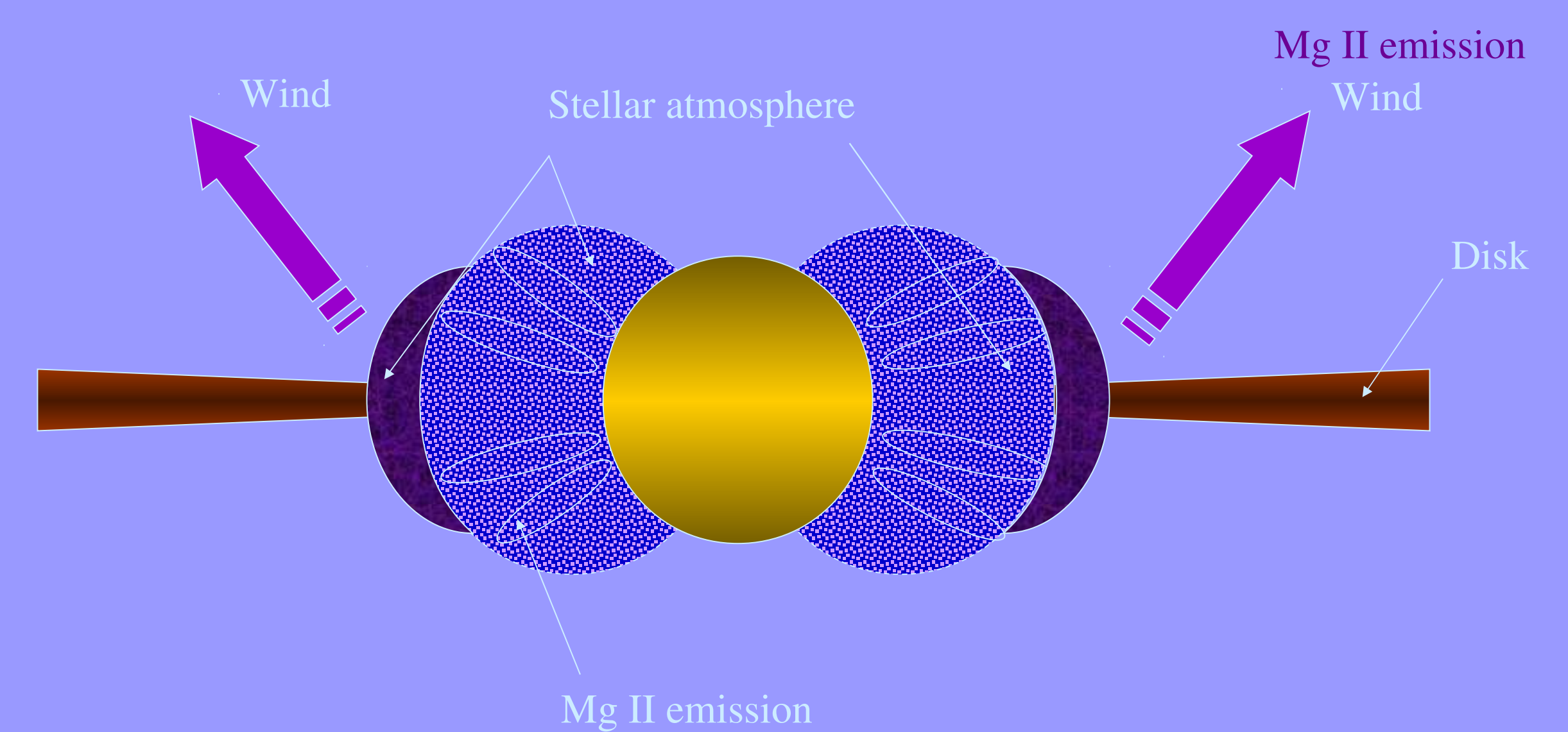
The profiles display a narrow central absorption produced by the circumstellar medium over imposed on a very broad emission. Evidence of inclination dependent high velocity flows is found in the blue wing of the profile. Accretion flows are occasionally detected in the red wing. Analysis of the properties of the outflows, atmospheres and the accretion process based on this tracer are presented in this contribution.

## 1. Mg II and T Tauri stars.

The Mg II resonance doublet is produced in the cromosphere of T Tauri Stars (TTs) at 2795/2802 Å. The Mg II feature is the strongest in the near-ultraviolet spectra of TTs. These profiles display a broad emission with a central narrow absorption.

In some profiles blueshifted absorption is observed overimposed to the broad emission indicating the presence of a wind.

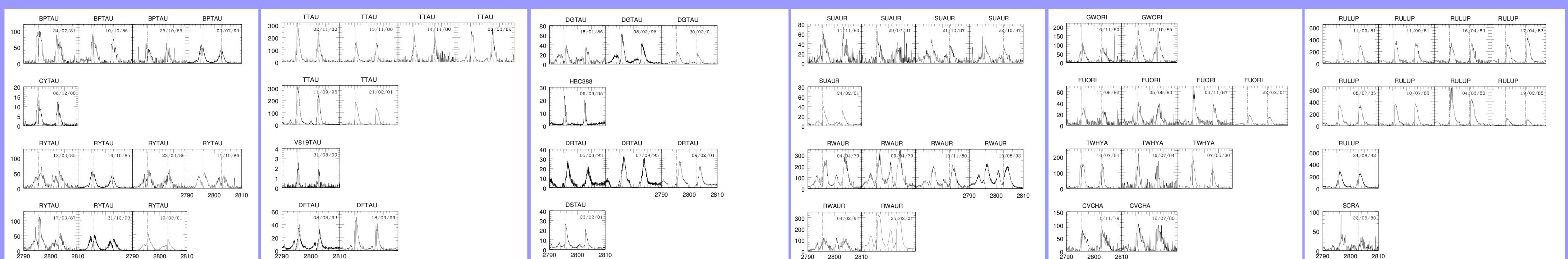
The narrow (15 Km/s) central absorption can be produced either in the interstellar medium or circumstellar environment. Some profiles present redshifted absorptions produced by plasma blocks accreting onto the star. Henceforth, the Mg II is a fundamental tracer of TTs atmosphere and circumstellar environment (see Gómez de Castro, 2009 for a recent review)



## 2. Observations.

The profiles of 19 TTs have been studied, some of them have more than one observation. These profiles have been retrieved from the International Ultraviolet Explorer (IUE) and Hubble Space Telescope (HST) data archives.

The observations from the HST have been carried out with the instruments STIS (with filter/grating E230M) and HRS (filter/grating G 270M). The IUE observations are obtained in the high dispersion mode. All profiles are shown below.

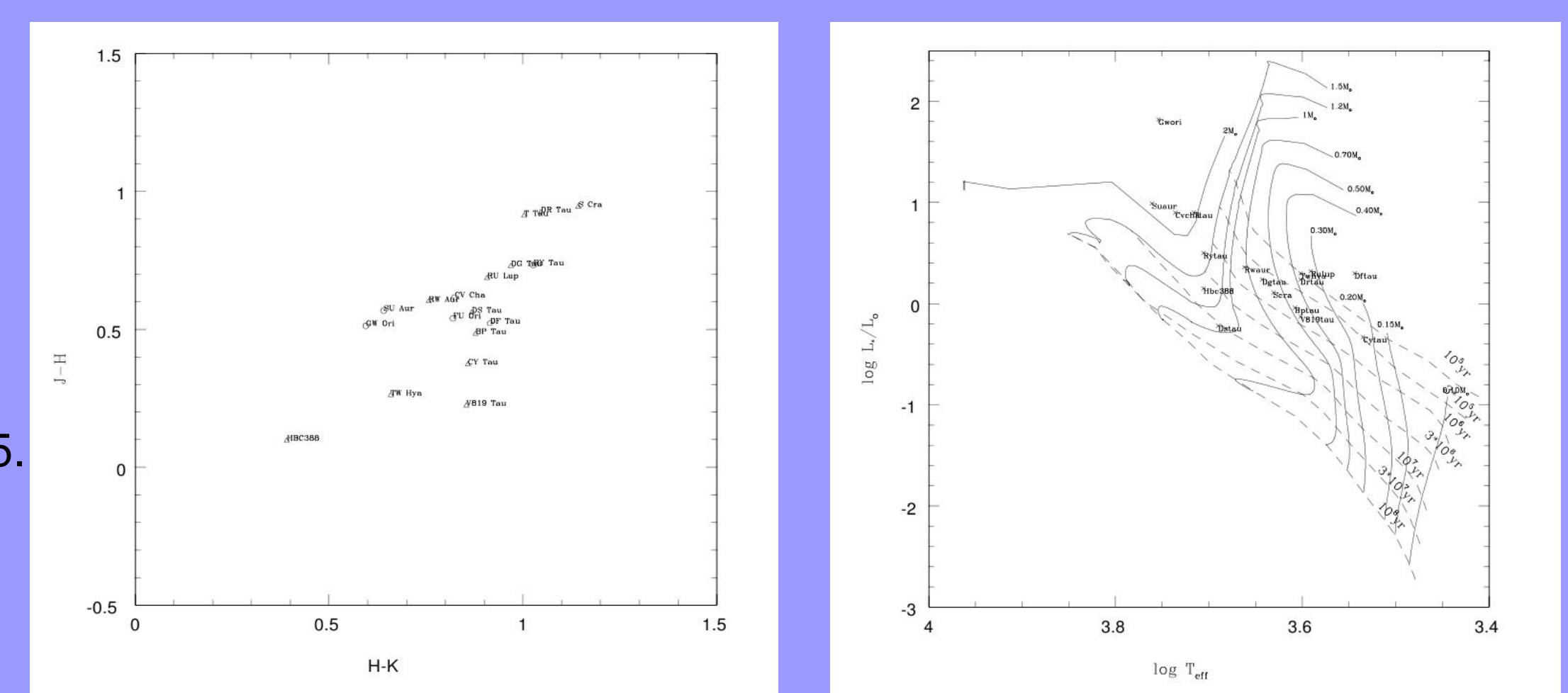


## 3. Characteristics of the TTs sample.

The characteristics of the sample are shown in the figure:

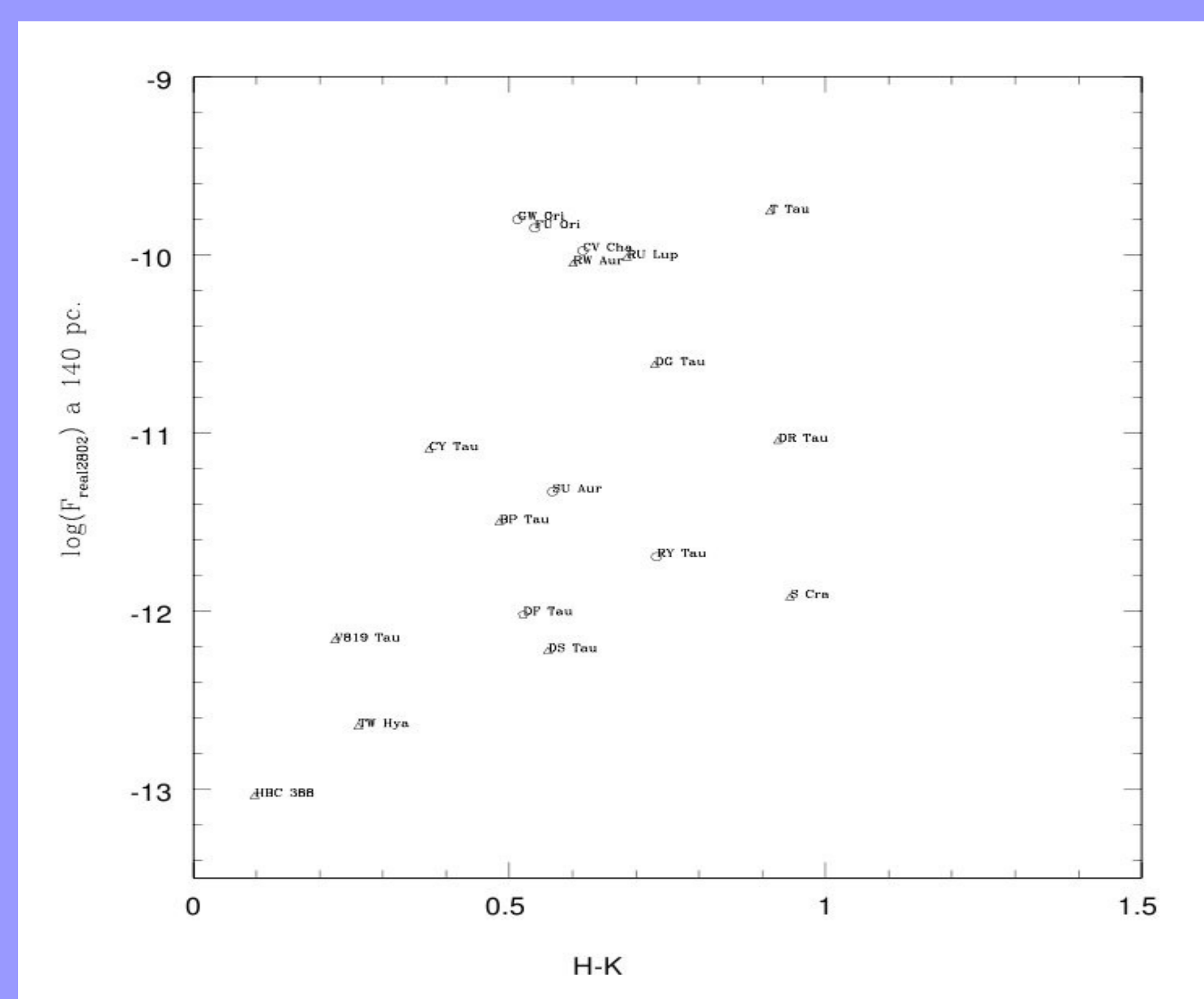
\* Most of the stars have strong IR excesses, pointing out the existence of a circumstellar disks. The IR excesses have been taken from Spitzer data archive.

\* The stars cover a broad range of masses, but the most of them have ages of around  $10^6$  years (approximately the inner disk dispersal time). (The effective temperature and luminosities have been obtained from Hartigan et al, 1995. The tracks have been taken from D'antona & Mazzitelli, 1994.)

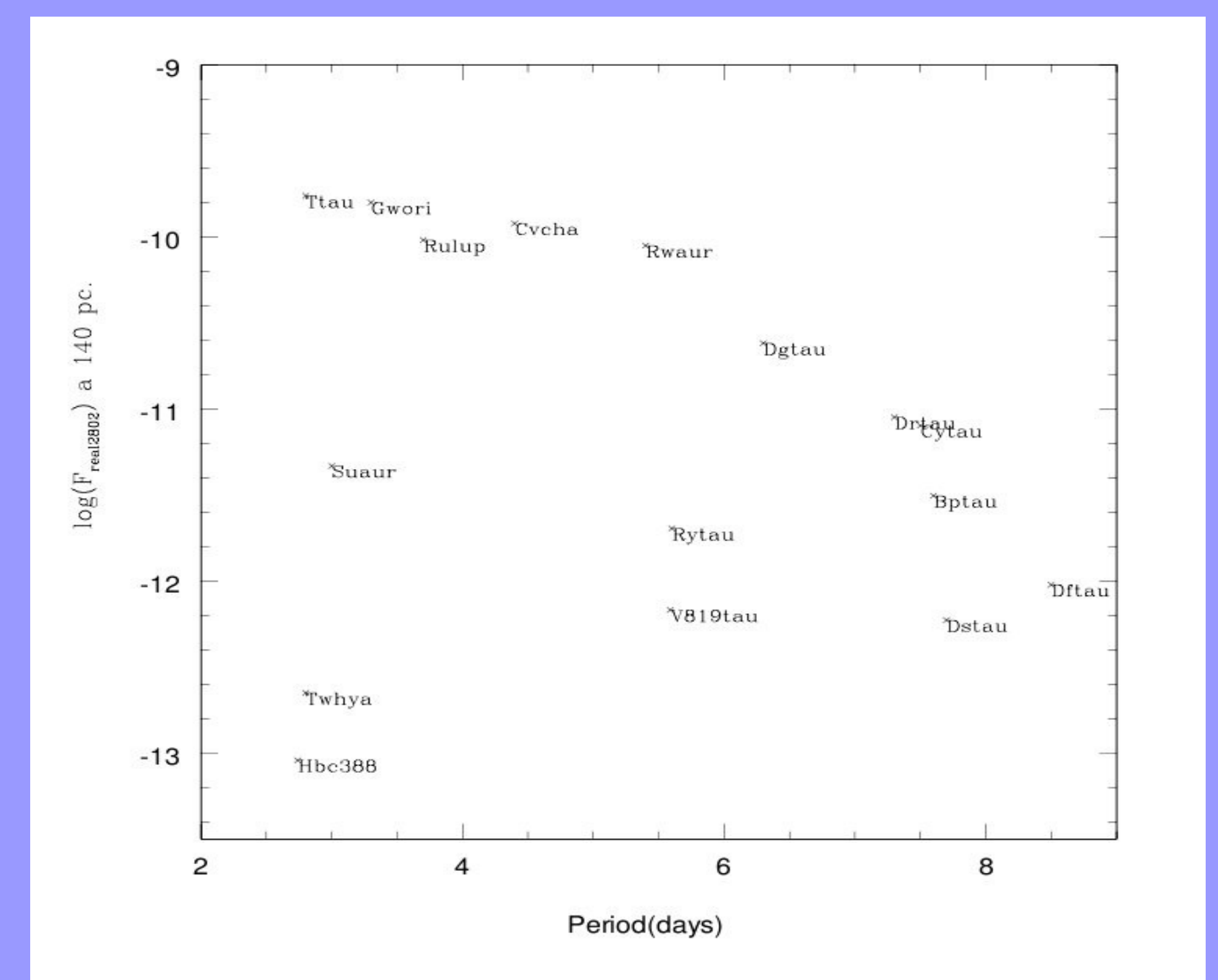


## 4. Interpretation.

We have been found a rough correlation between H-K colour (tracing the accretion disk) and the MgII flux.



We have not been found any correlation between the rotational properties of TT's and the MgII flux.



(The periods have been taken from Kundurthy & Meyer, 2006; Gudel et al., 2007; Johns-Krull et al., 2000.)

The ratio between the 2795/2802 lines is around of 1 (instead of 2) in most sources, indicating that the doublet is saturated. The 2802 line will be used for correlation studies of the MgII flux with other physical magnitudes.

