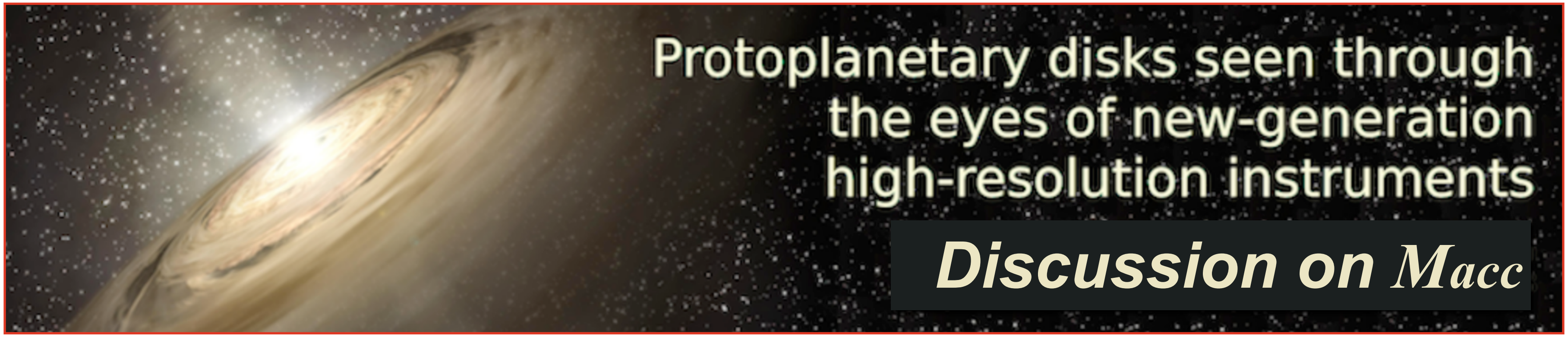


1. Accretion process (from inner disc onto the star)

2. Large samples of YSOs with M_{acc} measurements

3. Accretion in phases earlier than Class II

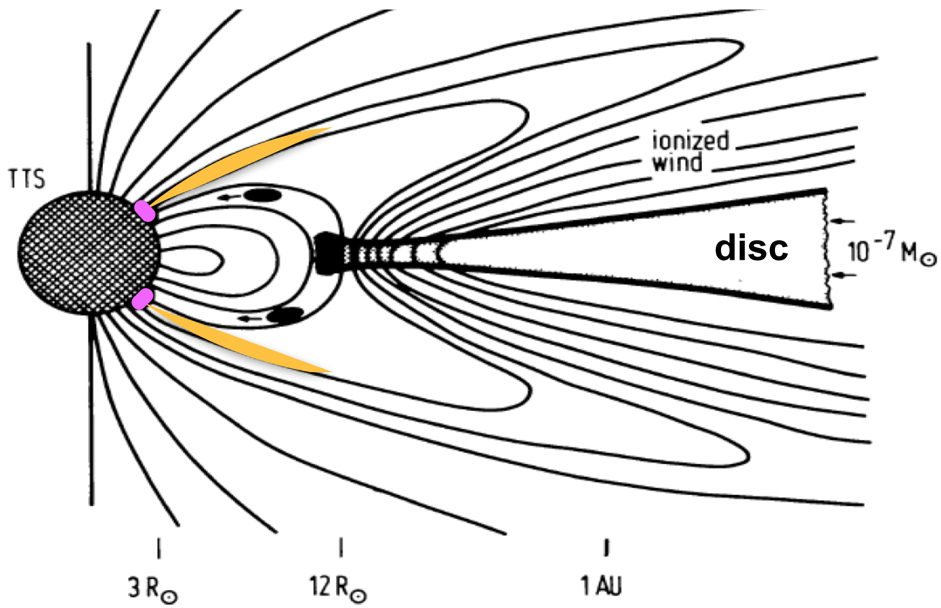
4. Accretion at late stages (Transitional discs)

5. M_{acc} measurements (methodologies)

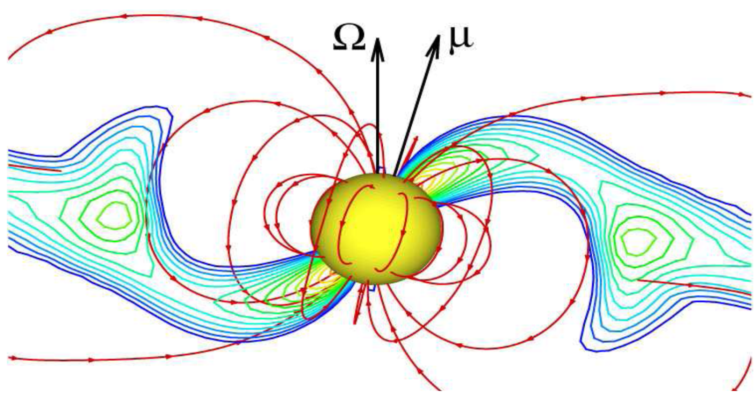
1. Accretion process (from inner disk onto star):

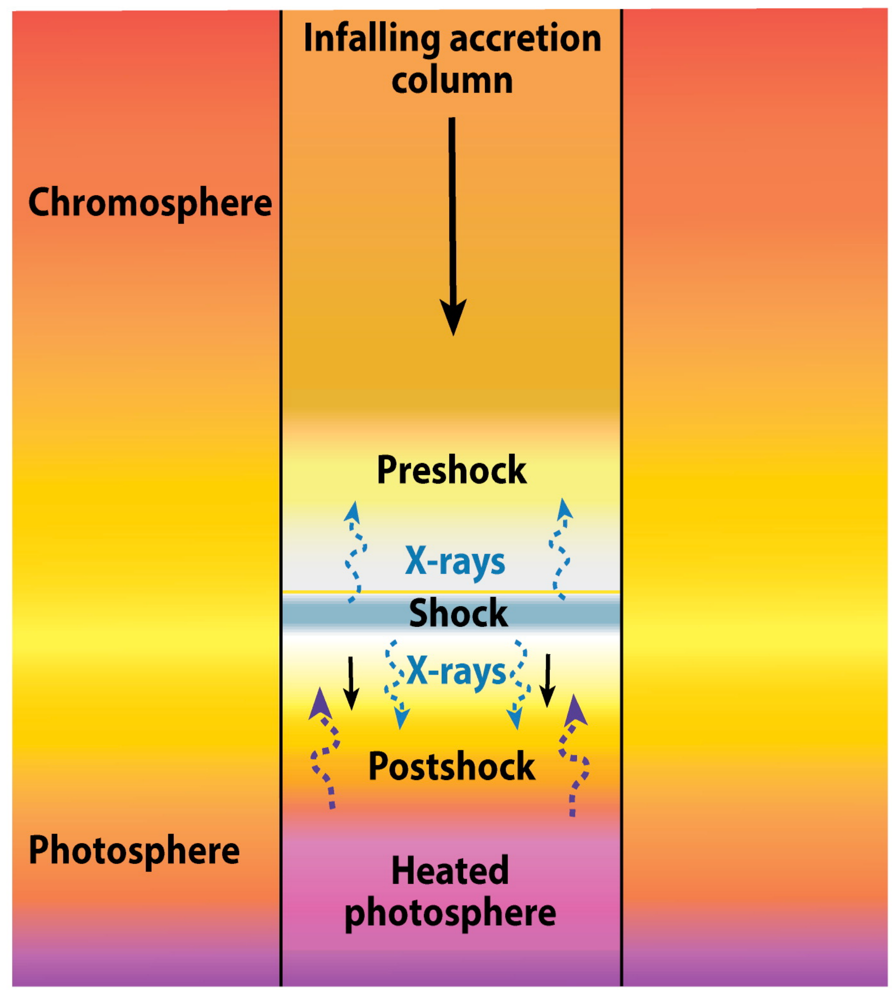
- *understand the star — disc interaction: Magnetospheric model Ok ?*
- *topology of the stellar magnetic field: generally bipolar ?*
- *variable Macc but also star rotation and obscuration (disc distortion)*
- *effects of accretion on the stellar photosphere ?*

Max Camenzind 1990



Romanova et al. 2004





Hartmann et al. 2016

1. Accretion process (from inner disk onto star):

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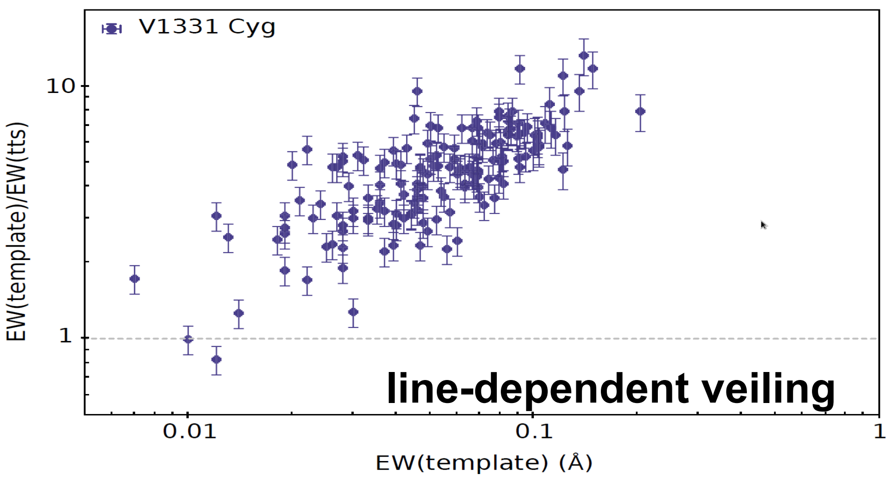
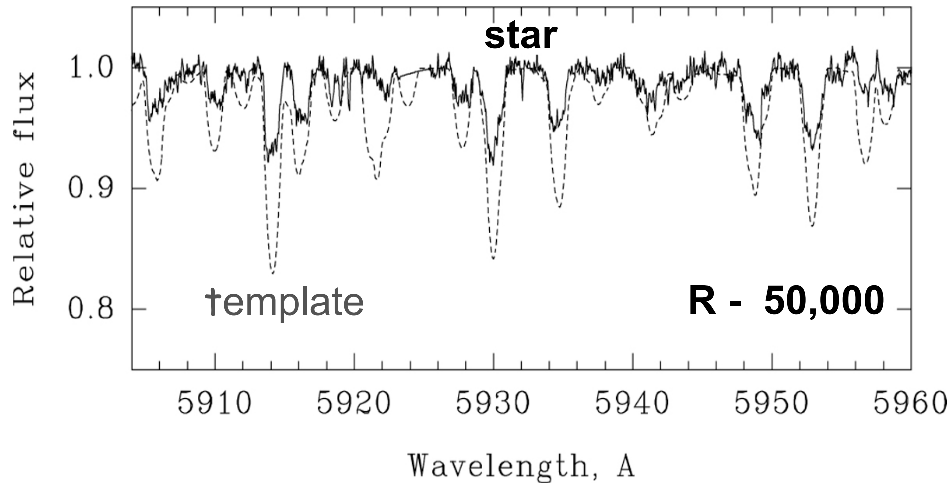
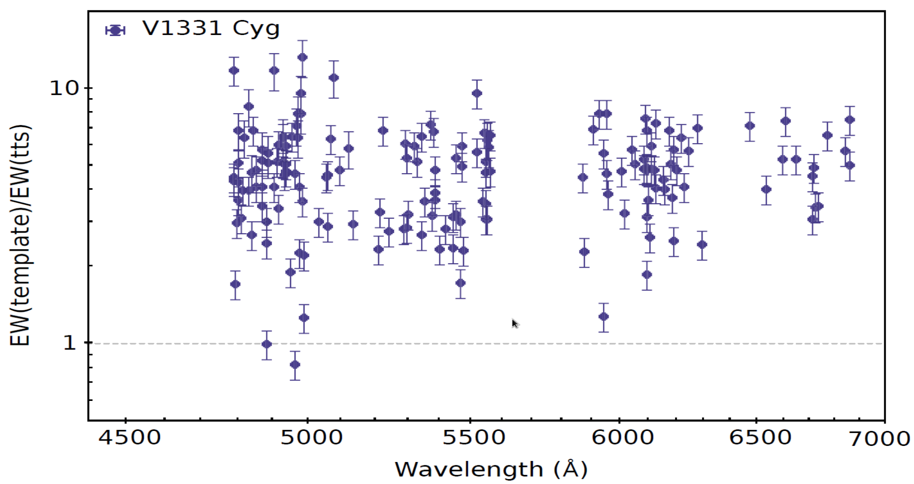
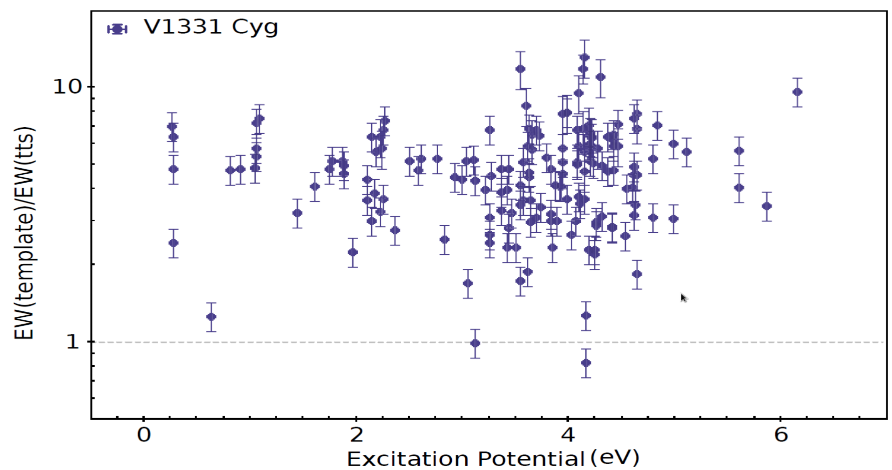




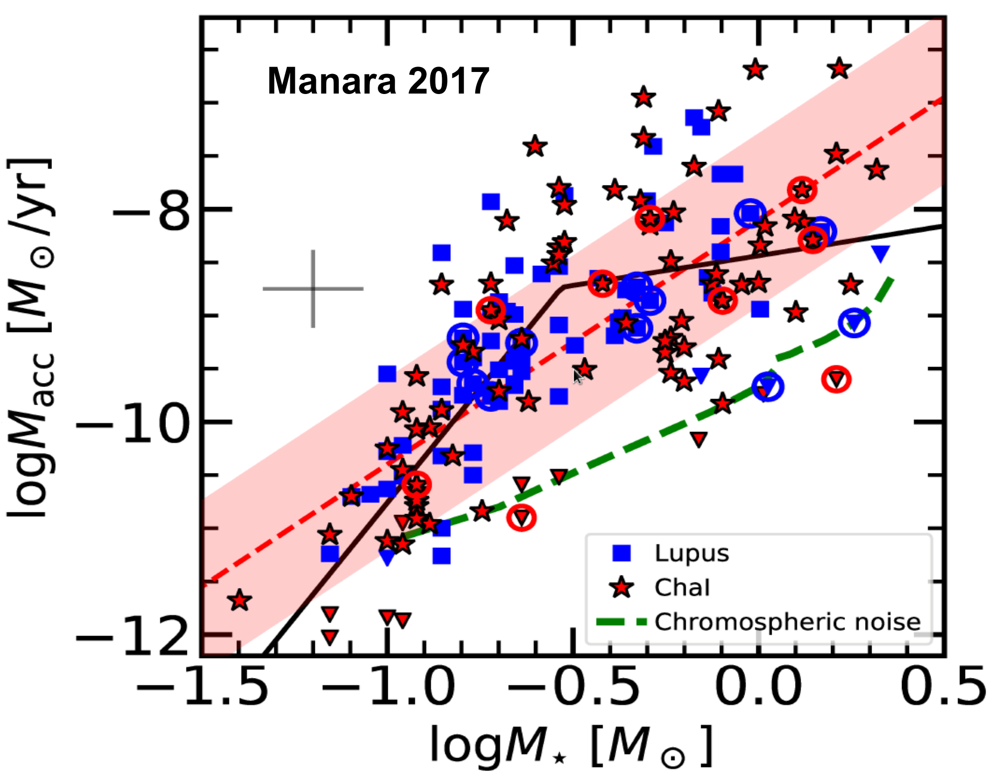


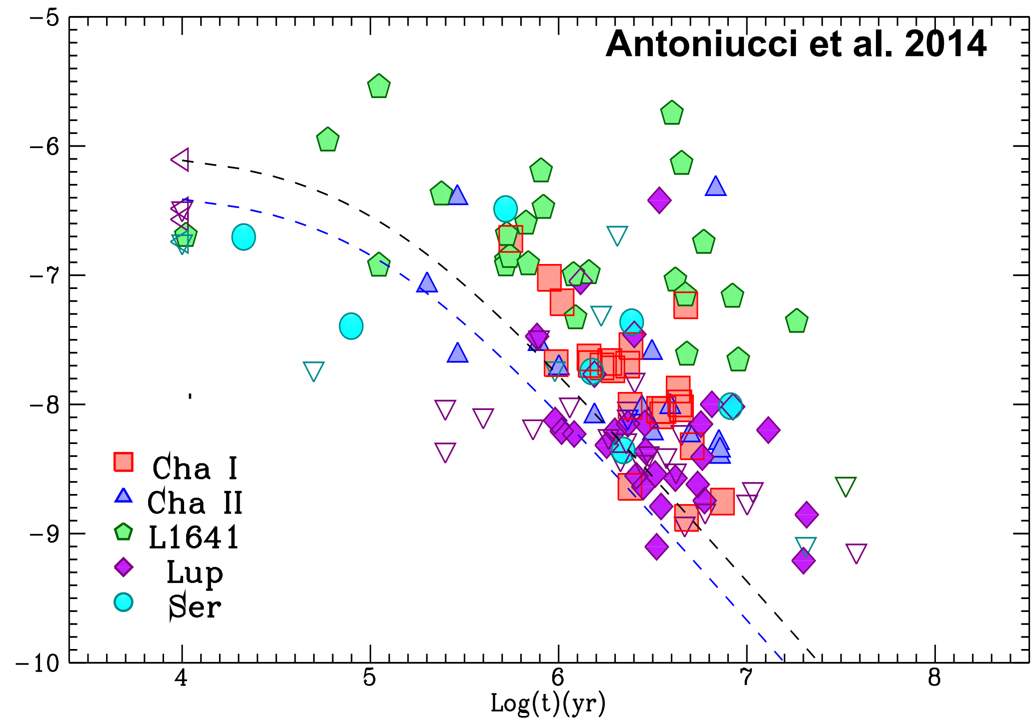


Ana Rei PhD thesis (Rei et al. 2018)

2. Large samples of objects with measured M_{acc}

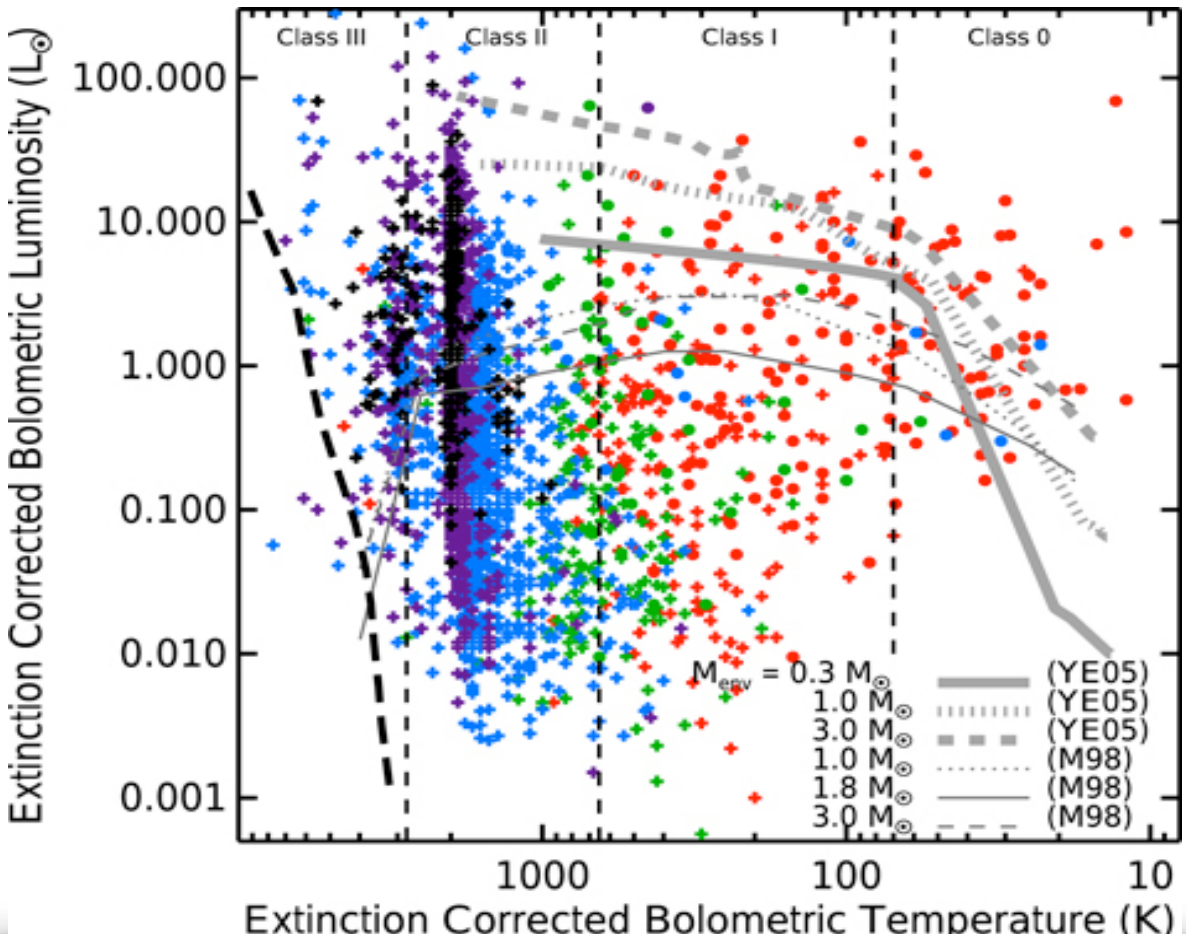
- ***M_{acc} decreases with M_{star}, more steeply at low M_{star} (?): mechanisms ?***
- ***M_{acc} decreases with time (smoothly): after some 5Myr no discs (at [Fe/H]=0)***
- ***for each value of M_{star}/age, large spread of M_{acc}***
- ***different accretion mechanisms may occur at early times***
- ***effects of metallicity (much higher Macc ?): EELT studies in LMC &SMC***





3. How does accretion work at earlier phases ?

- ***early stages (disk still fed by collapsing core, high M_{acc})***
- ***spasmodic episodes of high M_{acc}***

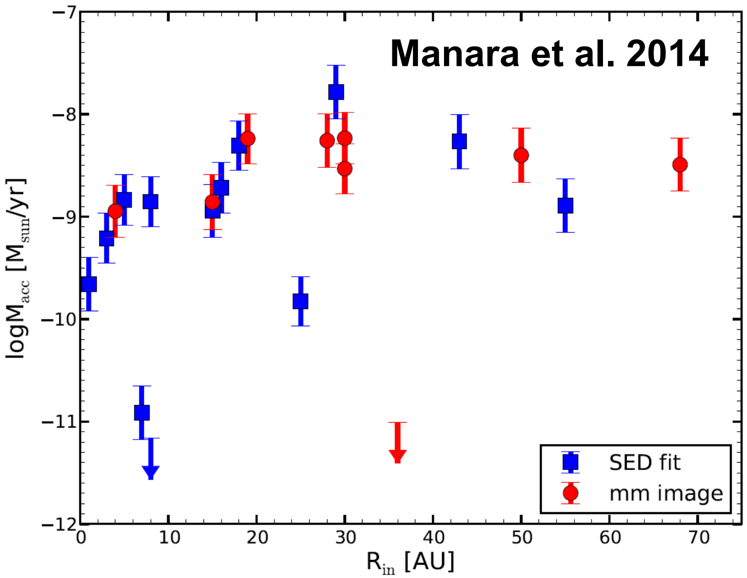


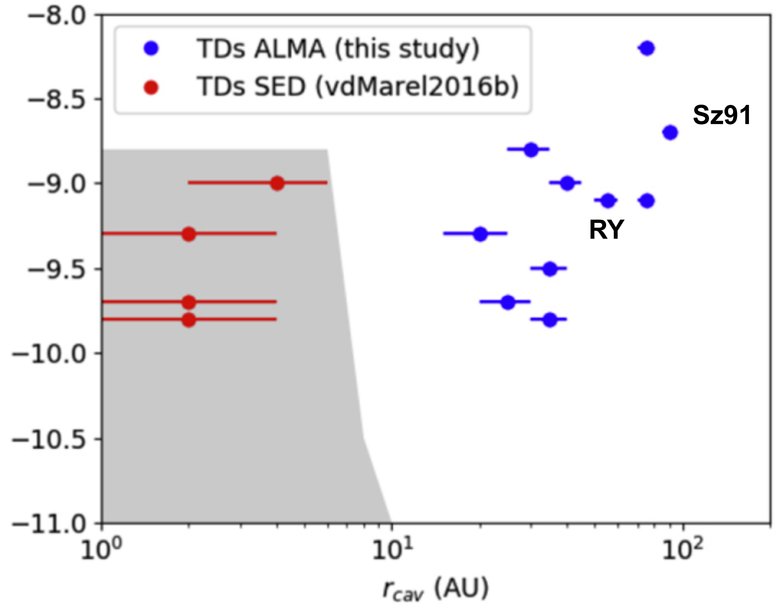
Spitzer Legacy: From Cores to Disks — c2d — CfA CIT IPAC JPL NAU UL UMd UT

Evans et al. 2009
Dunham et al. 2015

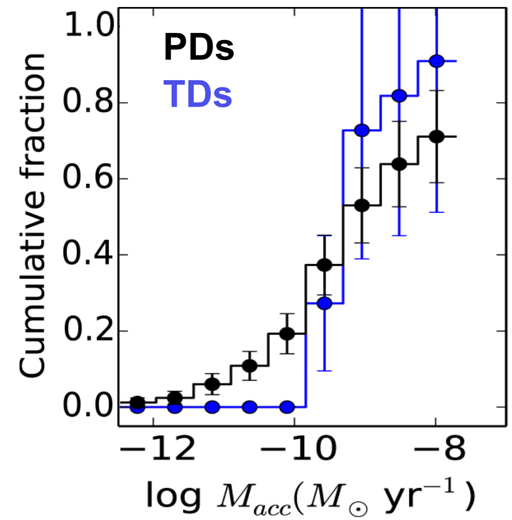
4. Accretion at later stages (transitional discs) ?

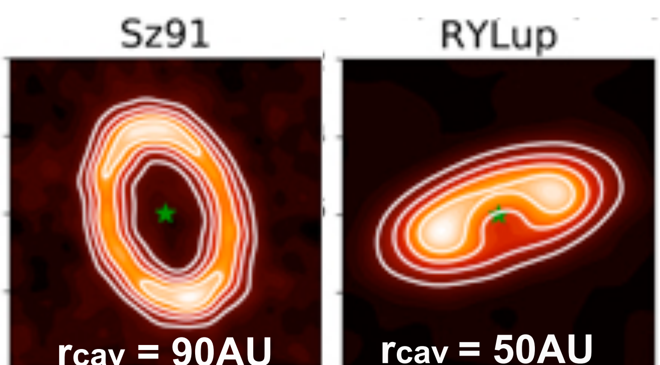
- *accretion rate in TDs with large dust cavities*
- *accretion in transitional discs (TDs) vs. primodial discs (PDs)*
- *accretion in TDs with large dust cavities: accretting planets ?*



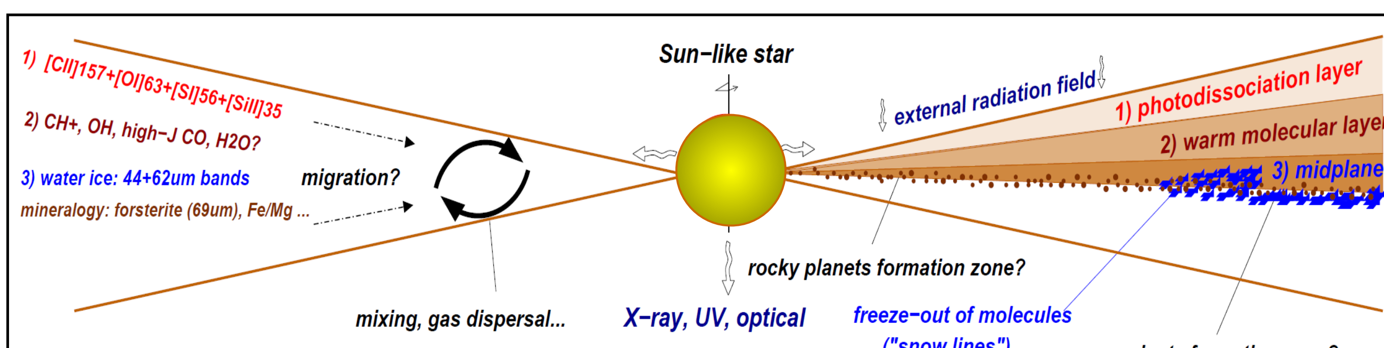


Van der Marel et al. 2018





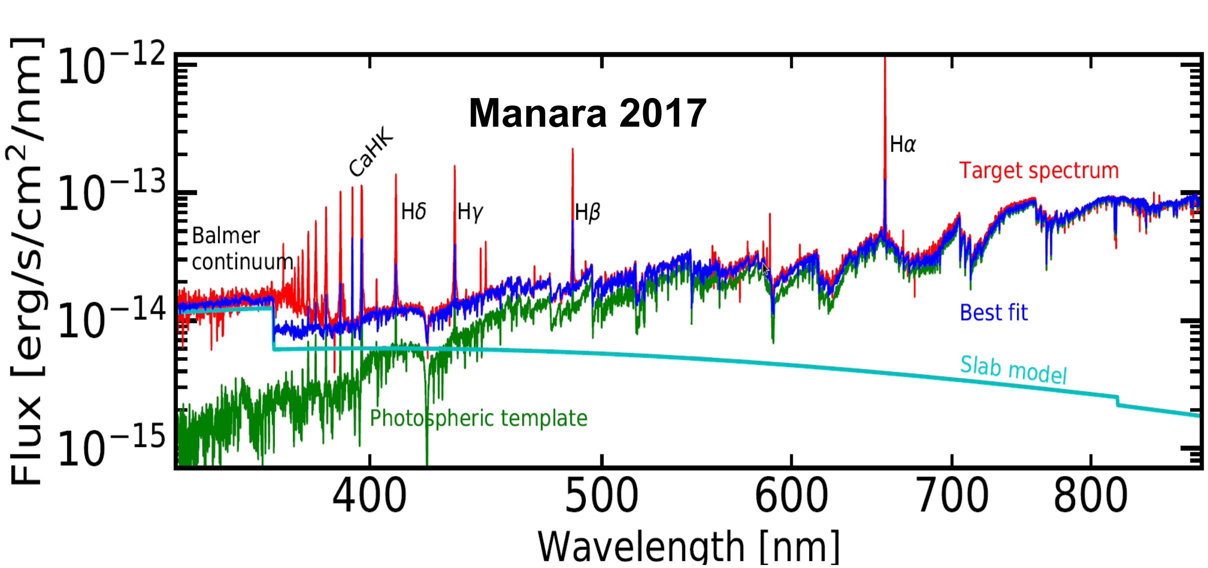
ALMA band-7

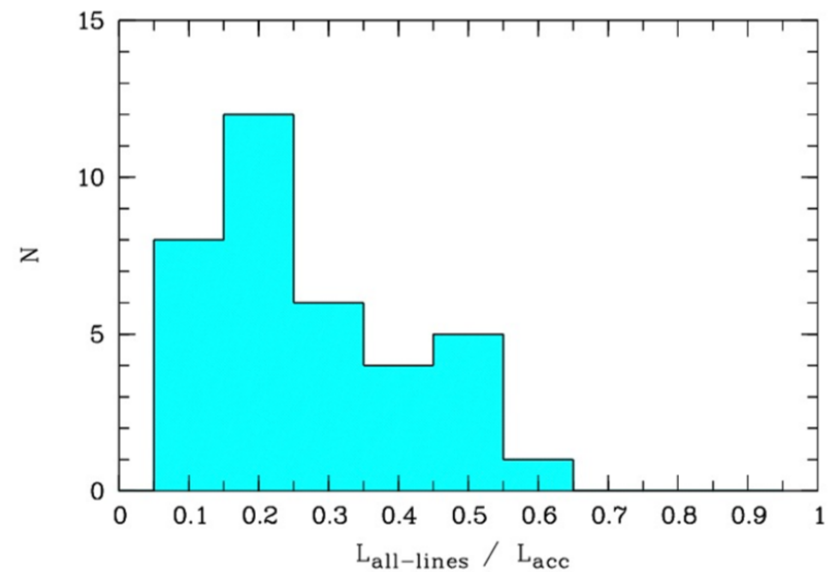


Spectral diagnostics of TDs @ FIR (SPICA?)

5. Macc measurements: L_{acc} not too bad, but

- ***homogeneous and self-consistent methods to measure M_{acc} and stel. pars.***
- ***lines not included in estimates based on continuum excess fitting***



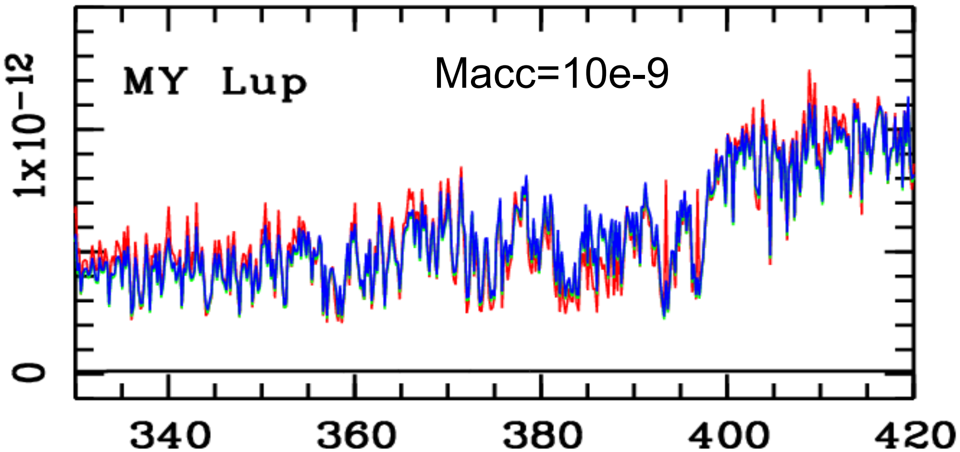


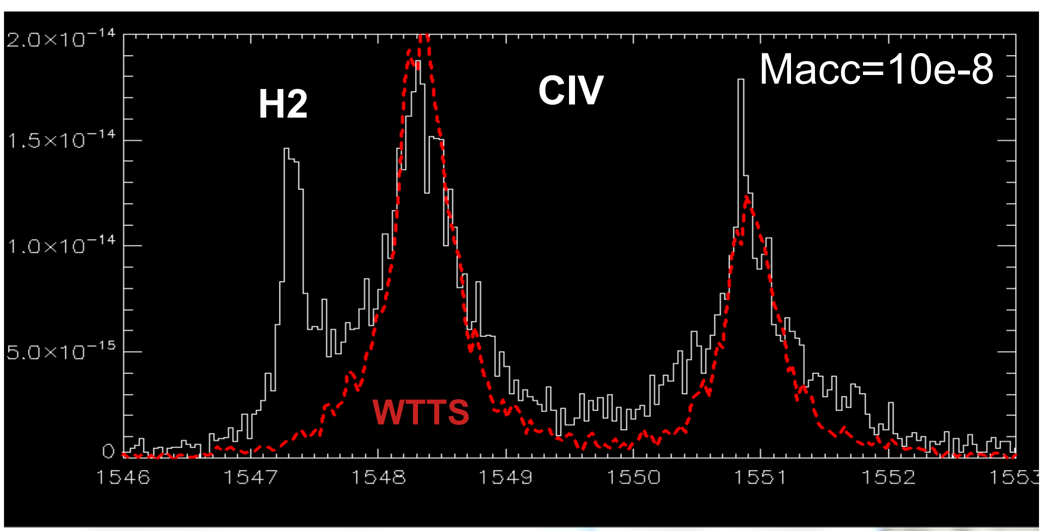
$L_{all\text{-}lines}$: sum of all permitted lines (H, Ca II, He) + $L_{pseudo\text{-}continuum}$

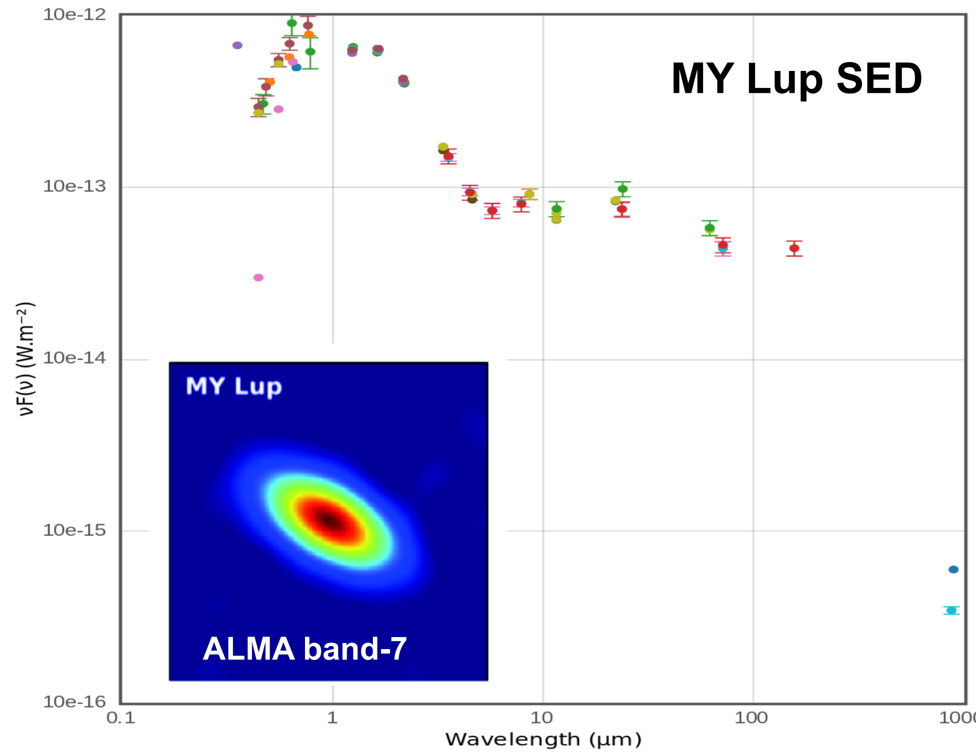
- more than 70% of integrated line luminosity is in Balmer lines
- in most (90%) YSOs L_{Balmer} > 60% of $L_{all\text{-}lines}$
- in some YSO (Sz73, Sz83, Sz88A & Sz113) emission in other lines is up to 50%

5. Macc measurements: L_{acc} not too bad, but

- *at early SpT (<K3): low-contrast cont. excess — photospheric cont.*
- *alternative methods: FUV, NUV (HST) measurements of H_2 (Ly-a), CIV, etc*





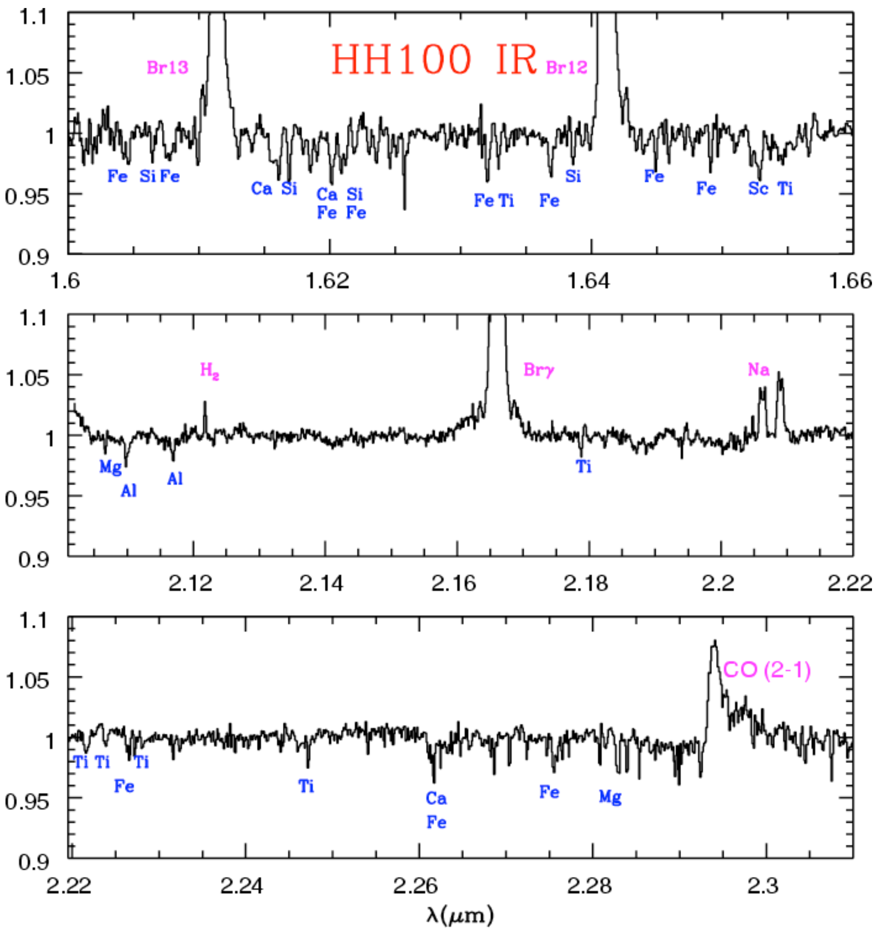


- **LCIV — Macc relations yield Macc**
- **investigation of disc inner regions**
- **complementary to interferometric methods**

5. Macc measurements:

- ***Macc and stel. pars. for phases earlier than class II ?***

Nisini et al. 2005

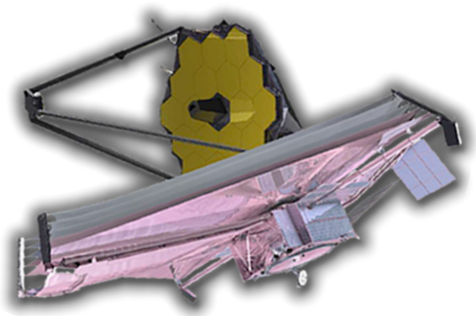


VLT-ISSAC spectroscopy

Teff : from photospheric line ratios
Lstar: from dereddened K-mags
Lacc : Lbol — Lstar

Most protostars heavily extinct and veiled:

- **no photospheric lines, no Teff & Lstar**
- **Lacc: from Lacc—Lline relationships**



- **use JWST ?**