Characterizing accretion of Herbig Ae/Be stars from Xshooter/VLT

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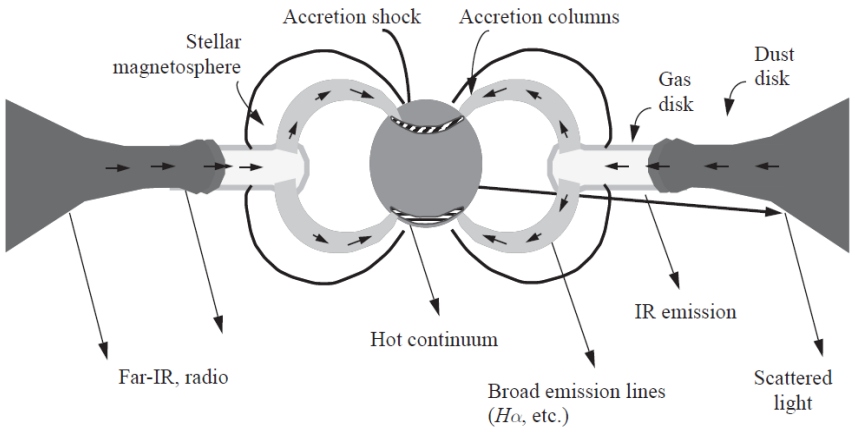
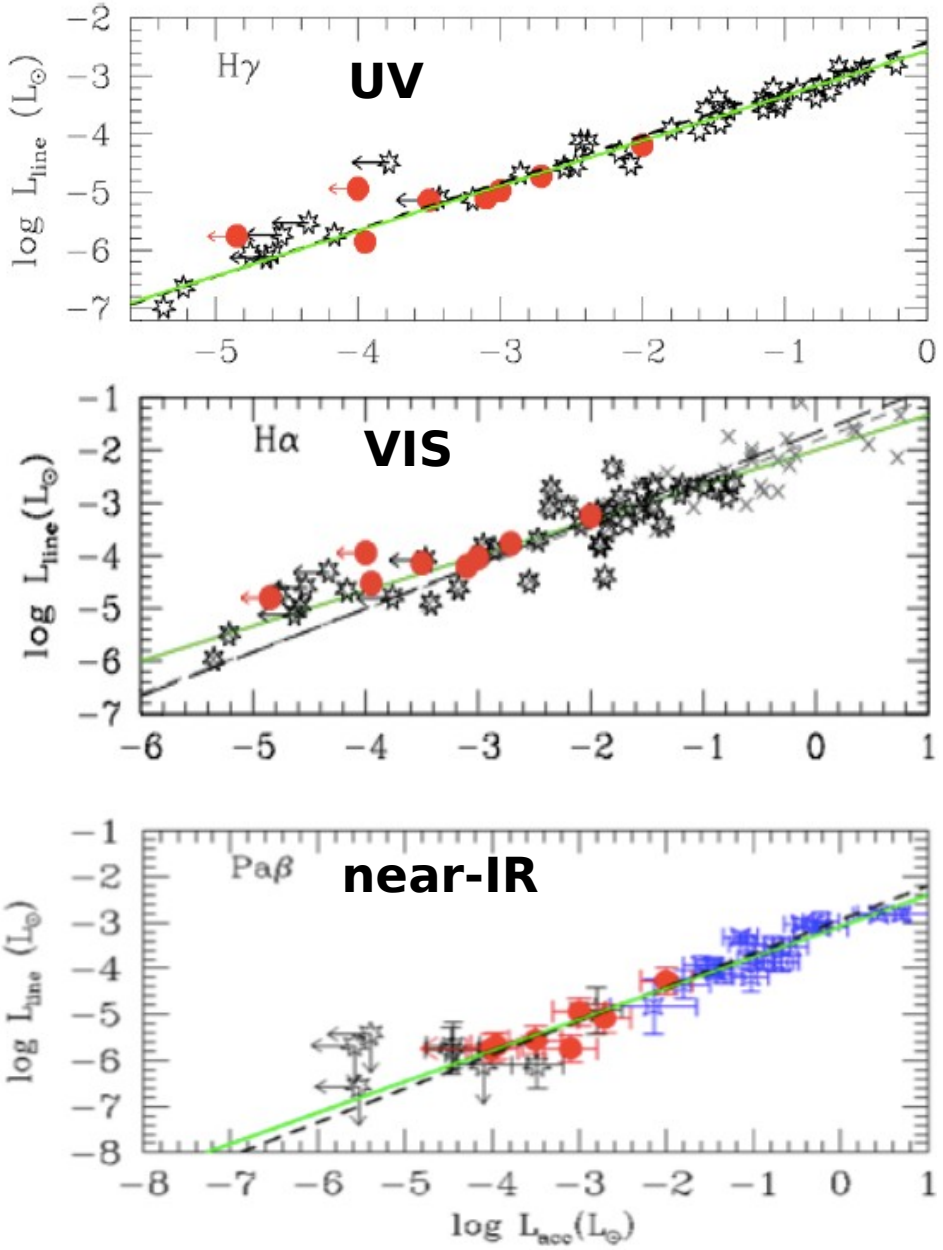
Context

Hartmann, L.



Rigliaco et al. (2012)



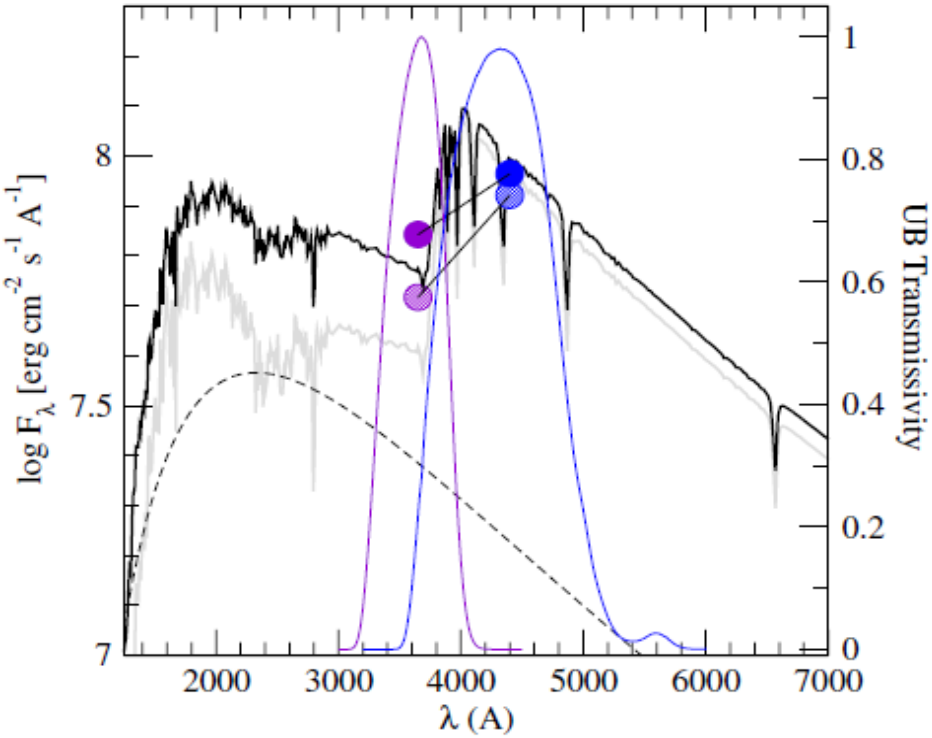
Low mass T Tauri stars:

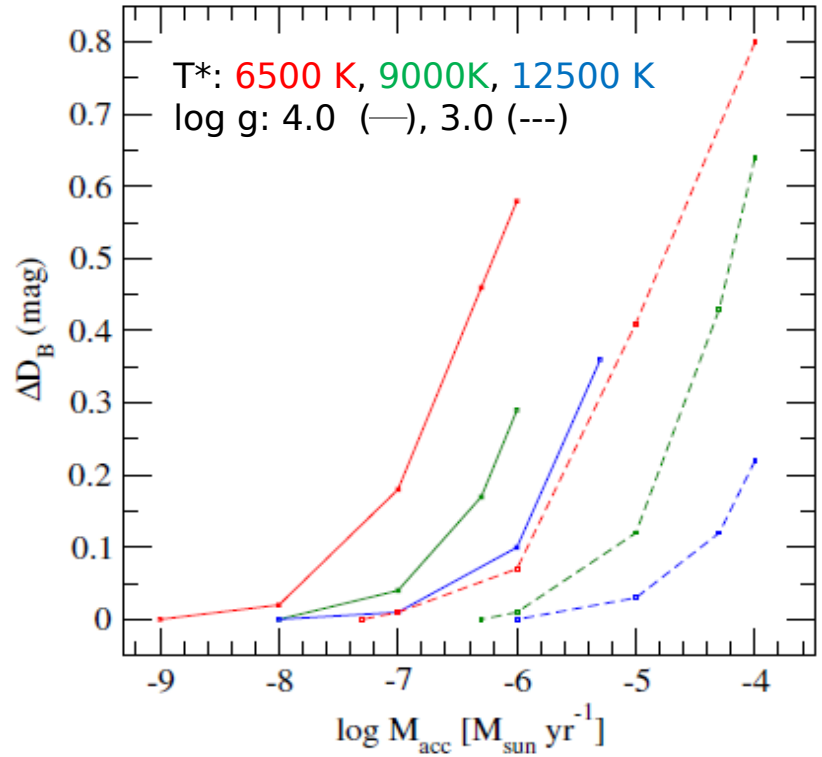
- Magnetospheric accretion (MA)
- Spectral lines are an easy way to estimate accretion rates.
- Accretion surveys over wide samples are common (*hundreds* of stars: e.g. Najita et al. 2004)

Context

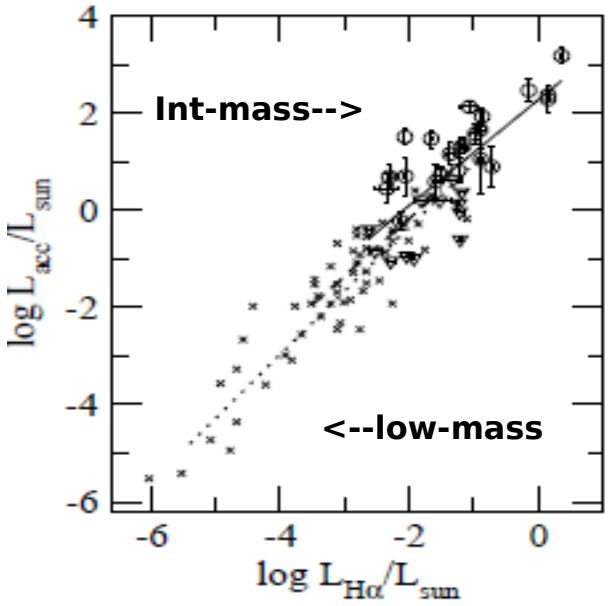
Herbig Ae/Be stars:

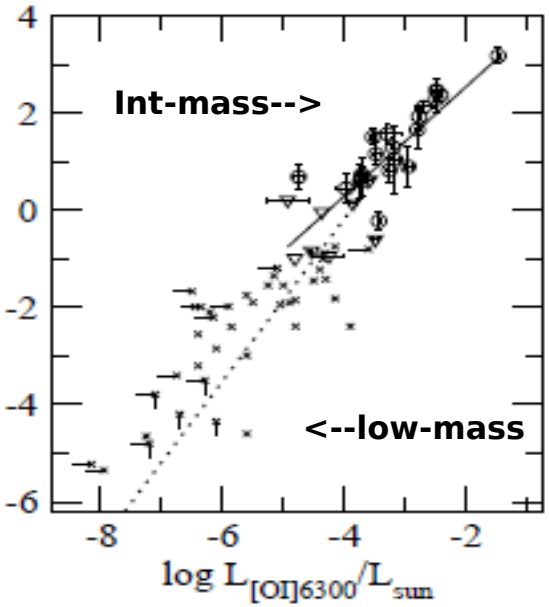
- B fields and MA in –some- HAeBes (e.g. Vink, Mottram et al. 2002-2007; Hubrig et al. 2009-2011; Grady et al. 2010...)
- Muzerolle et al. (2004): **UV-excess** as a signature of MA in HAeBes
- Scarcity of accretion rate estimates *(~ 40 stars*, Donehew & Brittain 2011, Mendigutía et al. 2011, Pogodin et al. 2012)

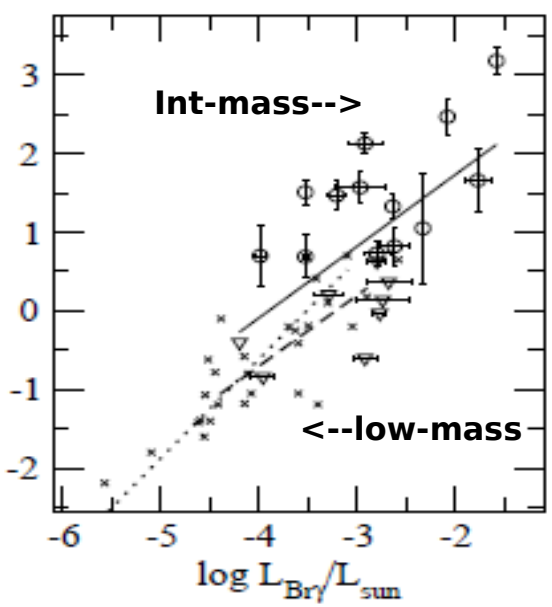




Context

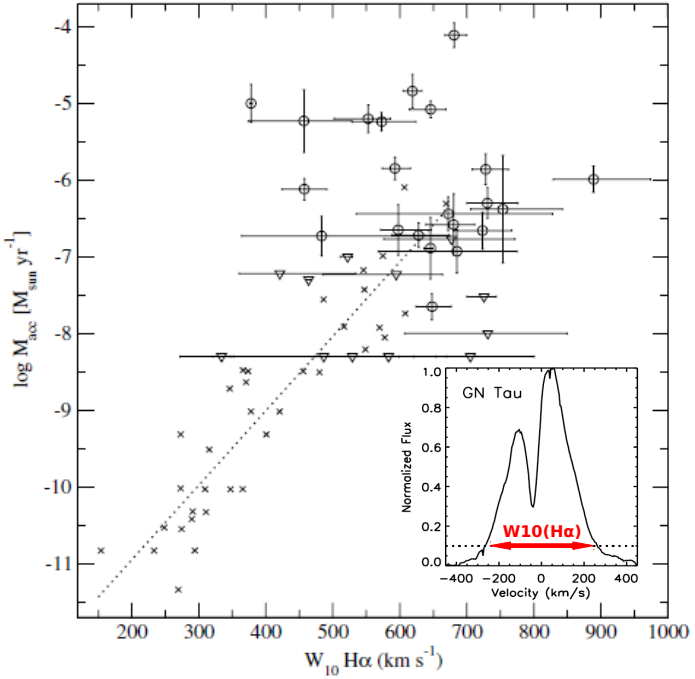






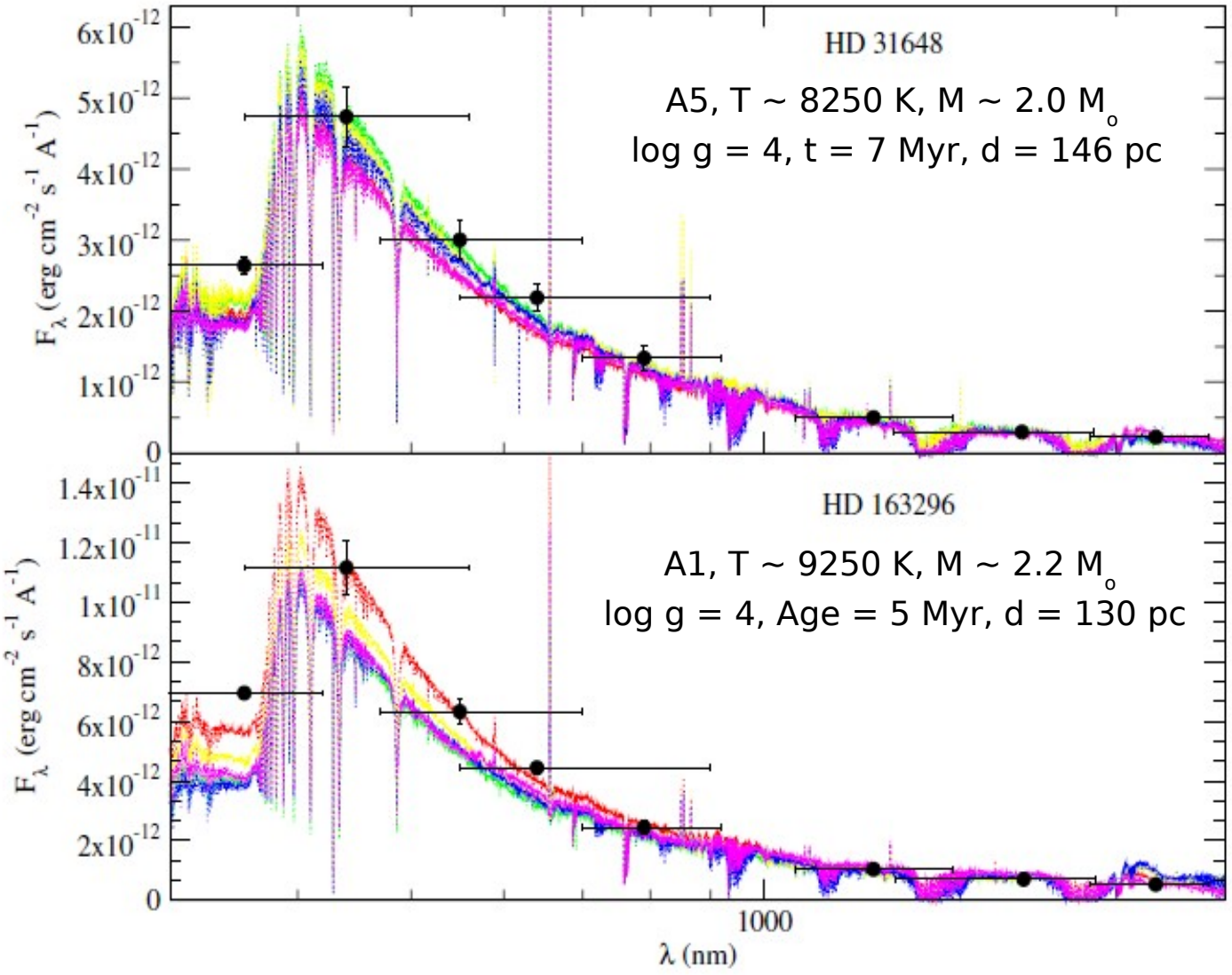
Several spectroscopic accretion tracers (not all) are valid for both TTs and HAeBes

Mendigutía et al. (2011)
see also Donehew & Brittain (2011), Pogodin et al. (2012)

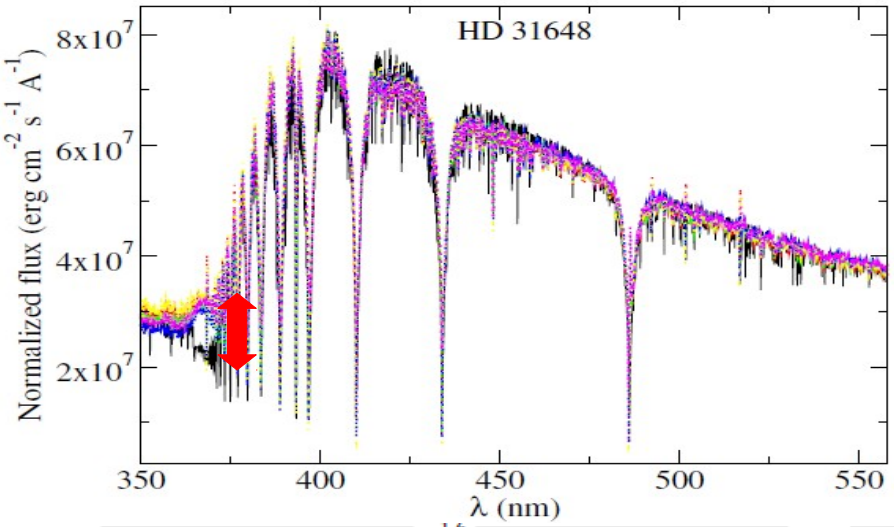


HD 31648 & HD 163296

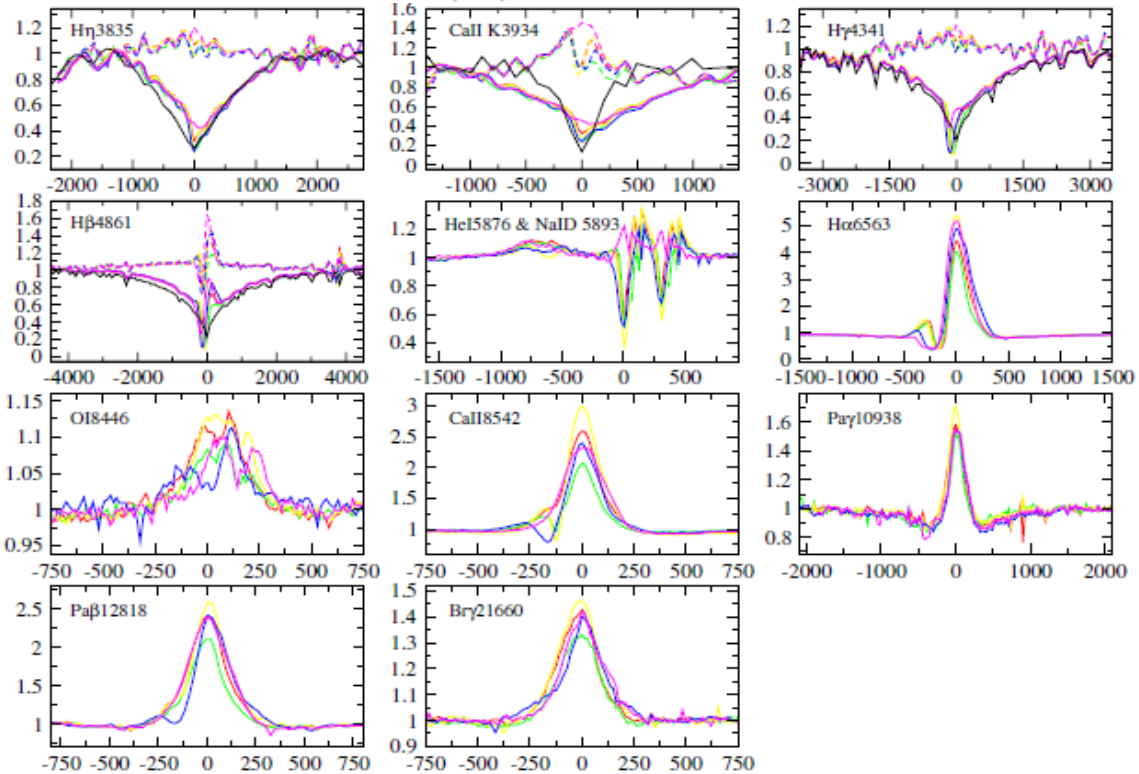
XShooter/VLT (300-2500 nm, R ~ 5000), 5 multi-epoch (days/months)



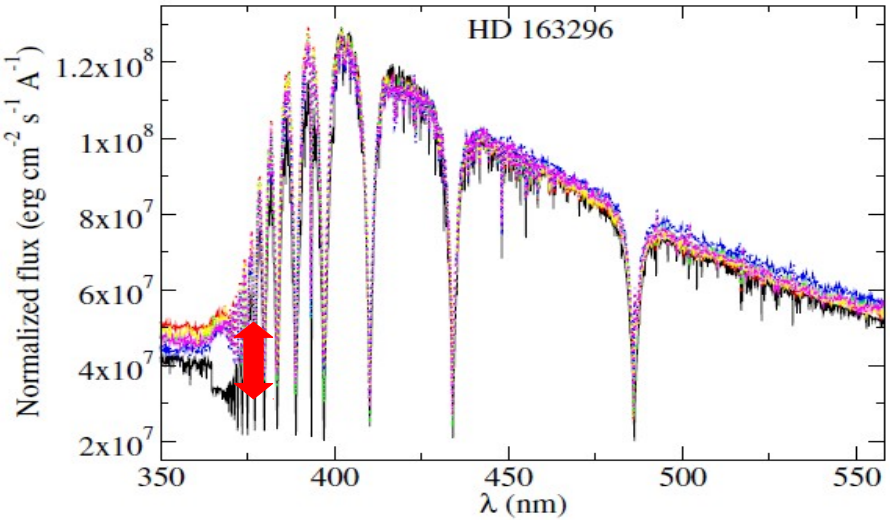
HD 31648 & HD 163296



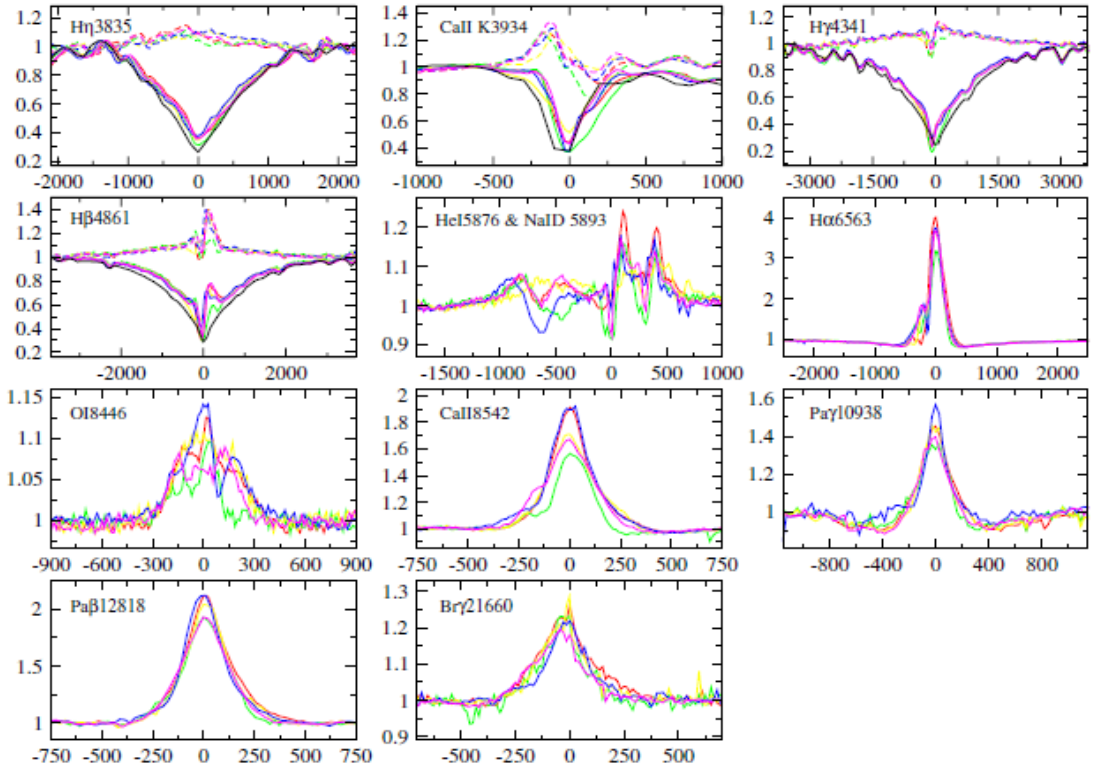
$1x10^{-7}$ M_o/yr, var ≤0.5 dex



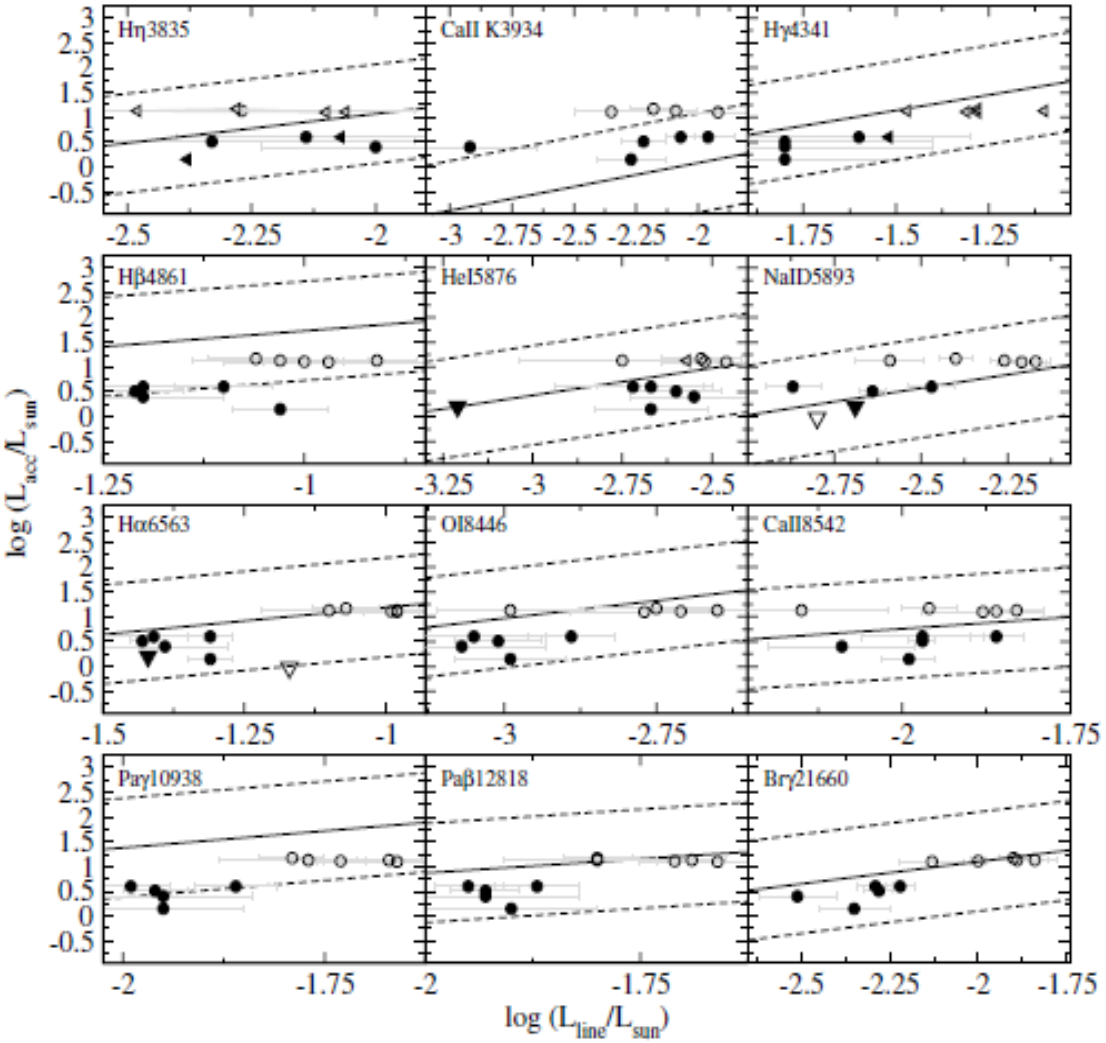
HD 31648 & HD 163296



$4x10^{-7}M_o$/yr, var 1 dex (years)



HD 31648 & HD 163296



——: $\log L_{acc}/L_o = a + b \log L_{line}/L_o$

------: ± 1 dex max uncertainty

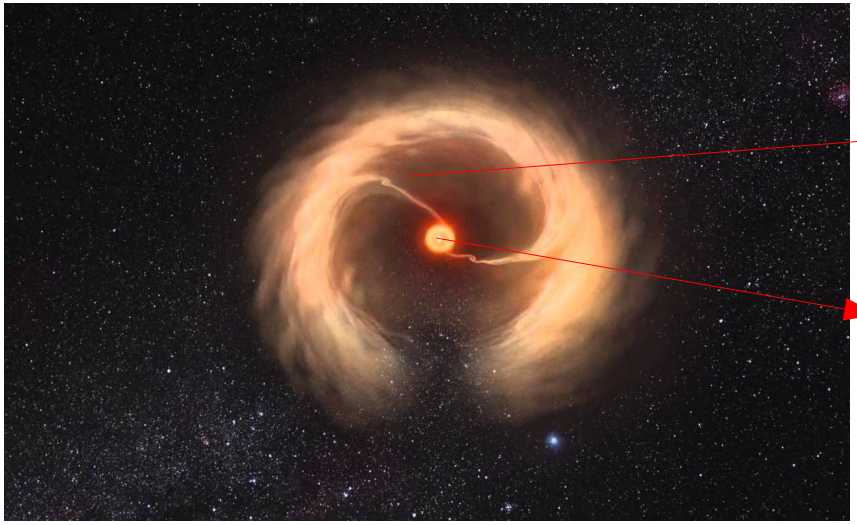
• : HD 31648

o : HD 163296

All line luminosities used for TTs are also valid to estimate "typical" accretion rates of HAeBes, **but** not to trace accretion variability
(Mendigutía et al. 2013, ApJ)

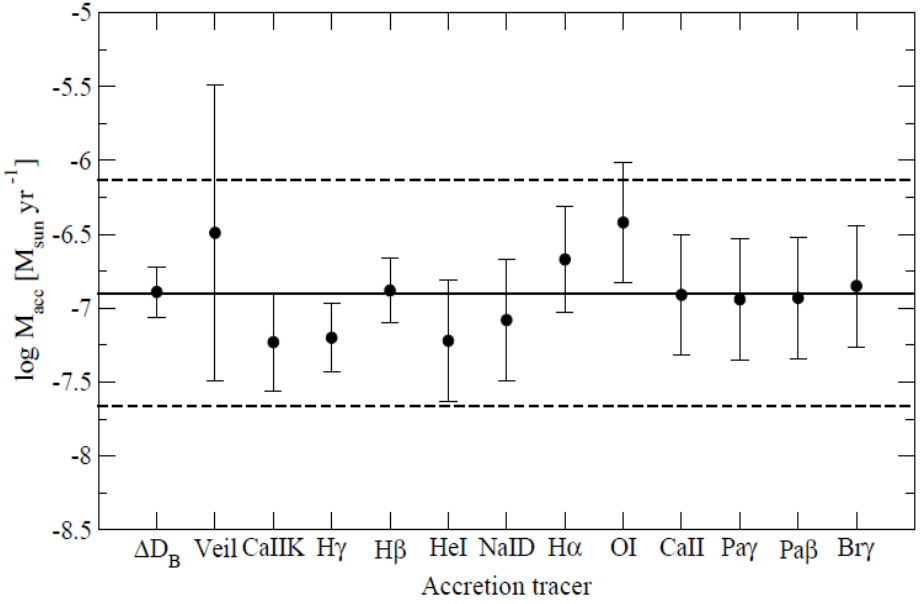
HD 142527 (F6, 6500 K, 2M_o, 5 Myr, 140 pc)

a planet-forming/stellar-companion candidate



$7x10^{-9} < M_{acc}$ (disk-to-disk, M_o/yr) $< 2x10^{-7}$
(Casassus et al. 2013, Nature)

M_{acc} (disk-to-star) = $2(\pm1)x10^{-7}$ M_o/yr
7x increase in years
(Mendigutía et al. submitted to ApJ)



Accurate **estimates of M_{acc} could provide clues about possible stellar/planetary companions (?)**

Conclusions

* MA also reproduces observations for (most) HAeBes
* Spectroscopic tracers valid for TTs (not W_{10}(Hα)) can also be used to estimate *mean* accretion rates for (several) HAeBes
* Accretion variability lower than 0.5 dex on days/months (could be larger on years)

?? MA does not fit strong UV excesses of *early-type HBes* (VV Ser, R Mon, VY Mon, LkHa 234, HD 85567...)