Multi-wavelength diagnostics of accretion in an X-ray selected sample of CTTSs

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Introduction

- High resolution X-ray spectroscopy of CTTSs reveal soft X-ray emission (E<0.8KeV)
  - High density ($n>10^{11}$ cm^{-3})
  - T ~ 1-3 MK

    → Interpreted as due to mass accretion
    - Never observed in non-accreting stars
    - Too dense for coronal emission
    - Supported by hydrodynamic modeling (talk by G. Sacco…)

But…

- UV/Optical/NIR derived $\dot{M}$ much higher than X-ray derived $\dot{M}$

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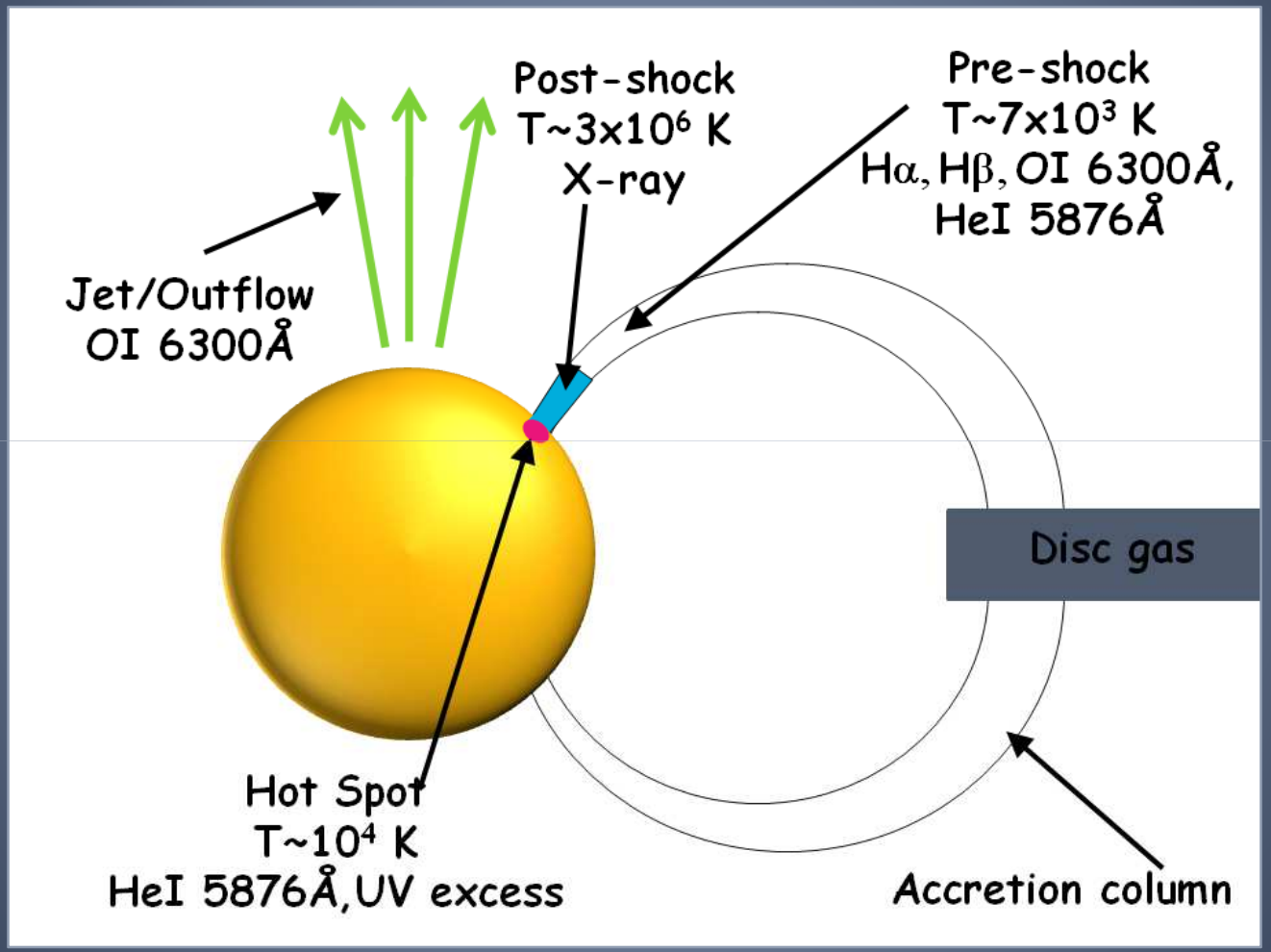
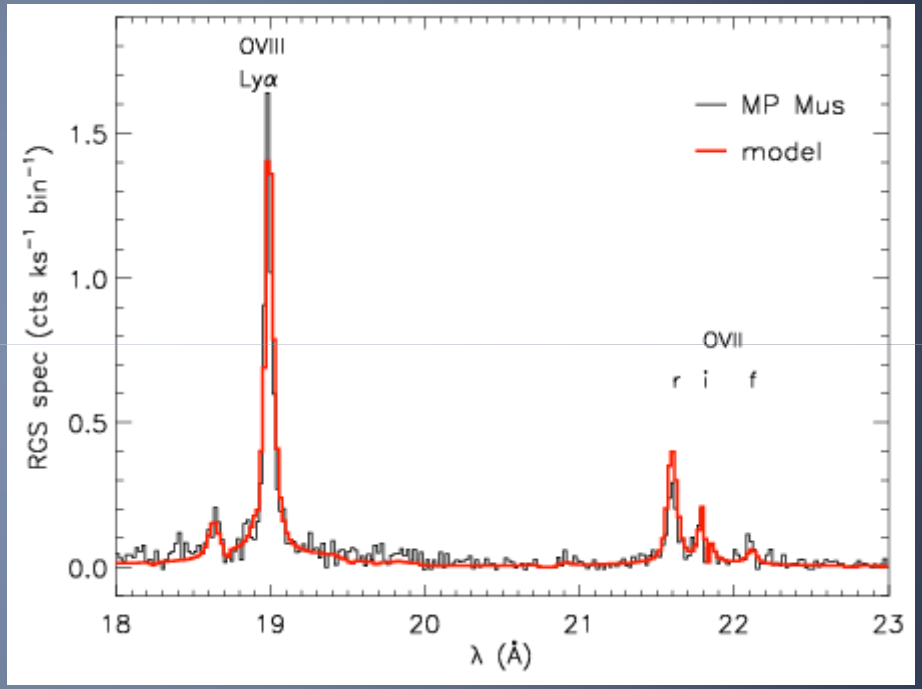
Accretion Mechanism



Analysis

- Sample is composed of *all* CTTSs that have been observed with high resolution X-ray spectroscopy
- X-ray $\dot{M}$ calculated only from the soft X-ray emission
- Optical $\dot{M}$ calculated from Hα, Hβ, HeI 5876Å & OI 6300Å



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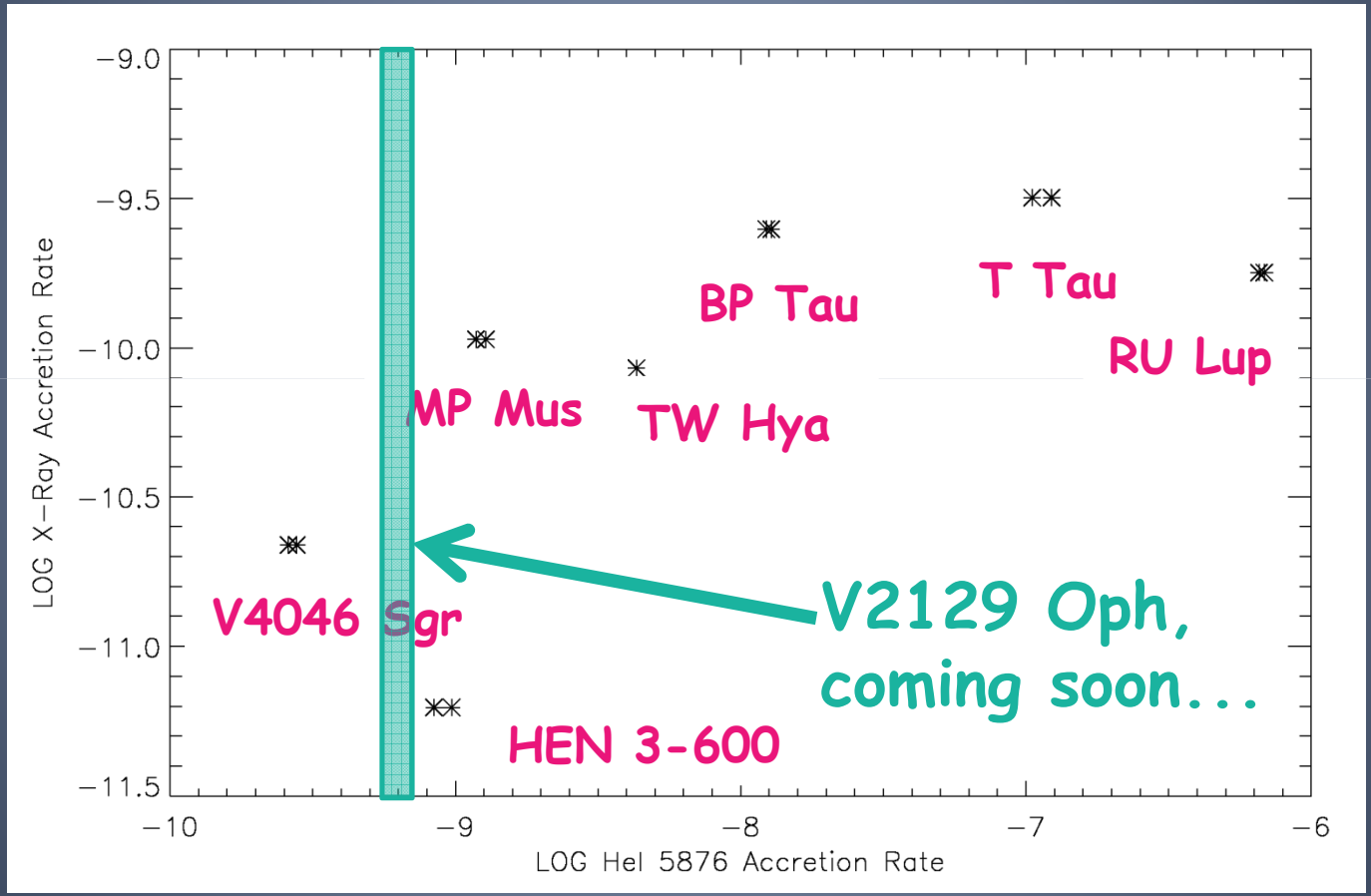
Results: HeI 5876 Å



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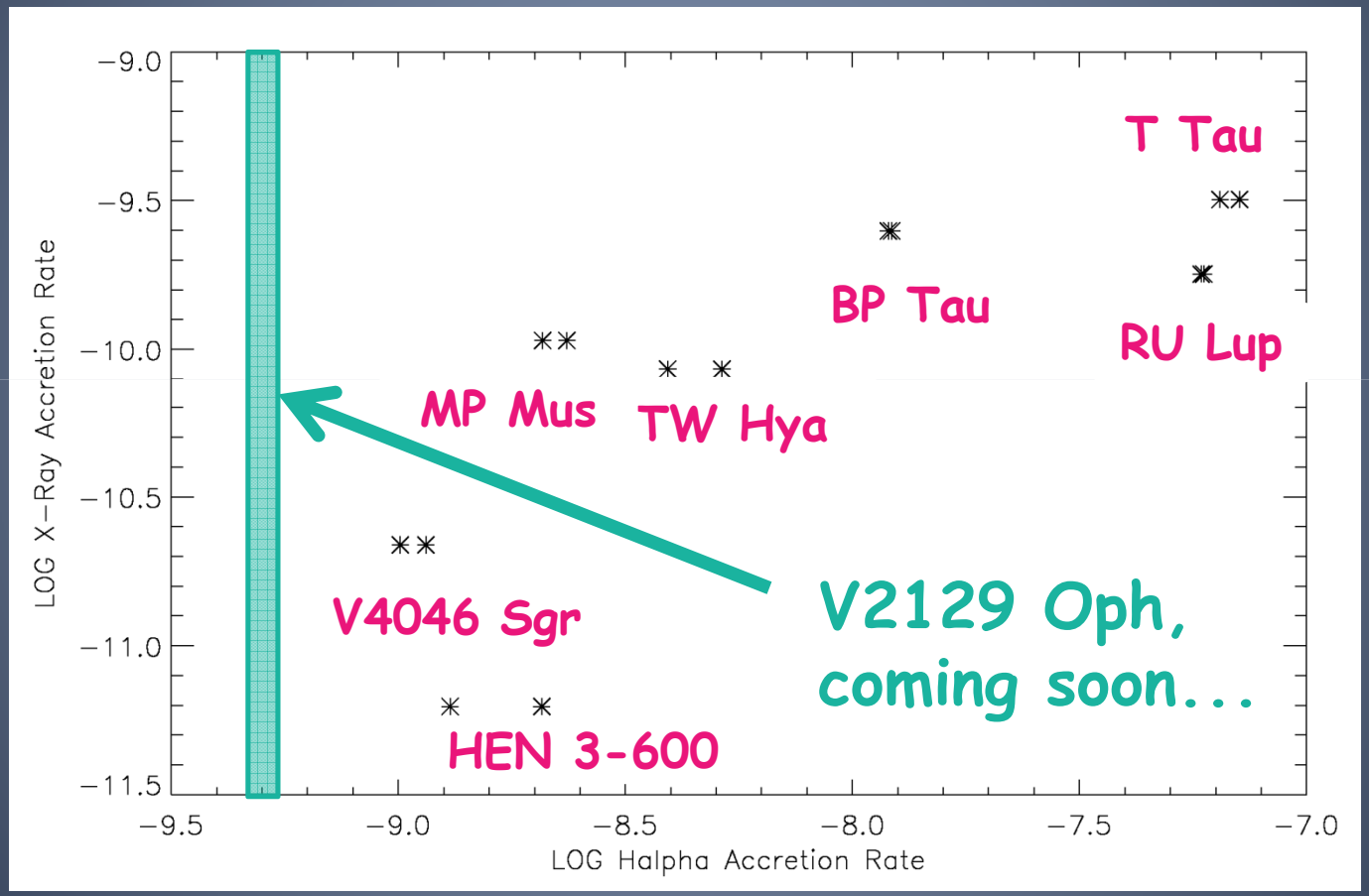
Results: Hα



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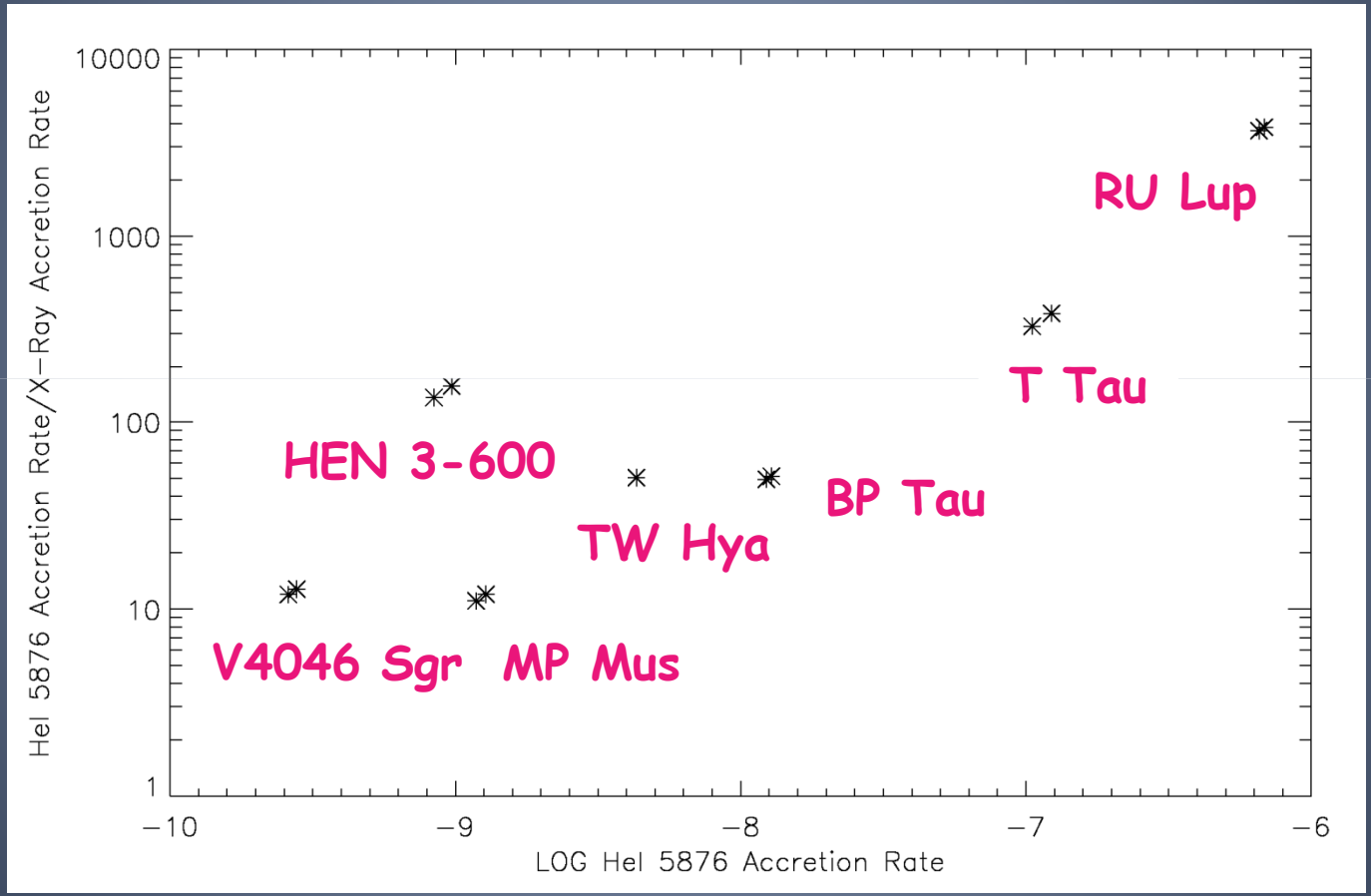
Results: Accretion rate discrepancy



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Conclusions

- Correlation between X-ray accretion rates and optical/NIR derived rates
  - Correlation shows a saturation at high accretion rates
    - X-ray emission becomes optically thick at high accretion rates?

→High density soft X-ray emission is due to accretion, rather than activity