

Ubiquitous broad absorptions in LMXBs: their impact on accretion-disc wind studies

Mata Sánchez et al. (2026)

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Ramón y Cajal Fellow



UNIÓN EUROPEA



MINISTERIO
DE CIENCIA, INNOVACIÓN
Y UNIVERSIDADES



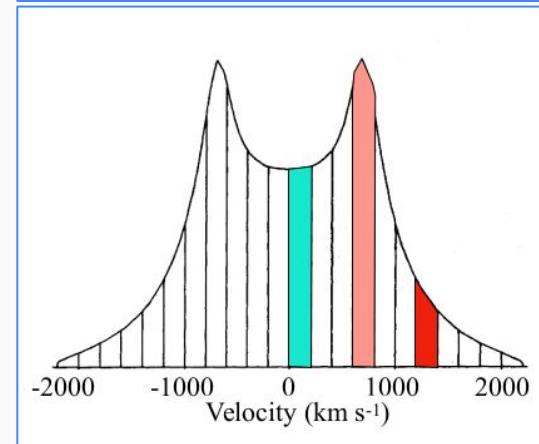
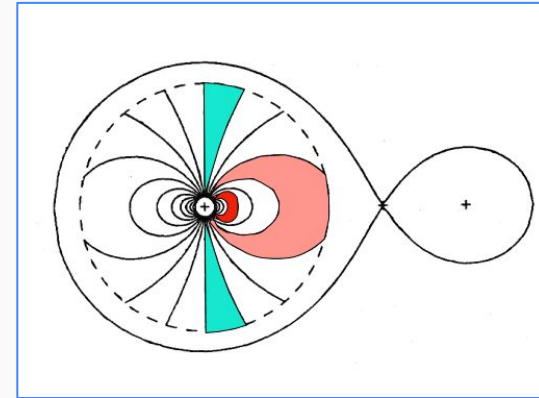
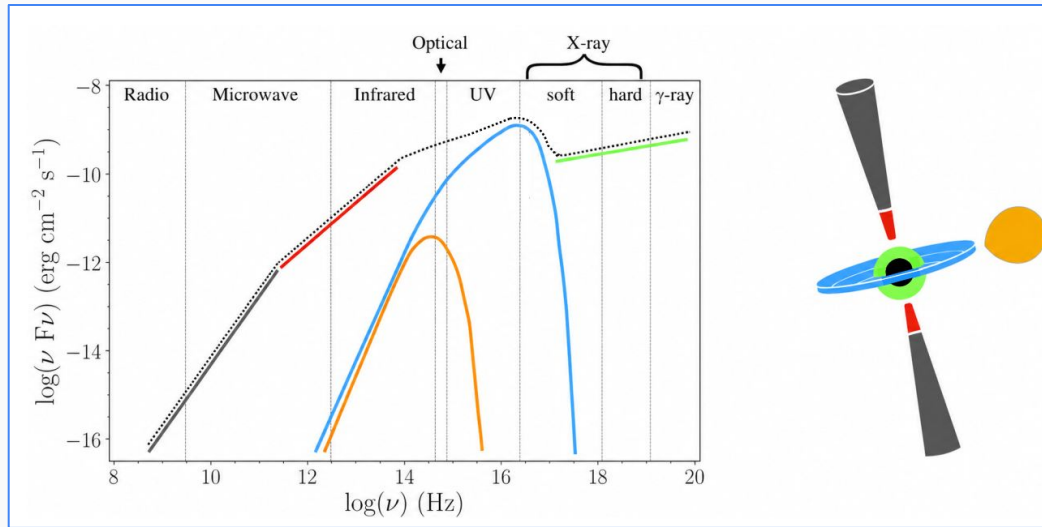
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The many tones of accretion: 07-11 Sep. 2026

Optical spectrum in outbursting X-ray binaries

- Accretion disc dominates the optical SED
- Double-peaked emission lines

Jiménez-Ibarra et al (2019)



Horne & Marsh (1986)

Accretion disc winds

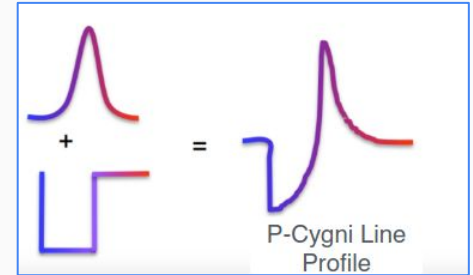
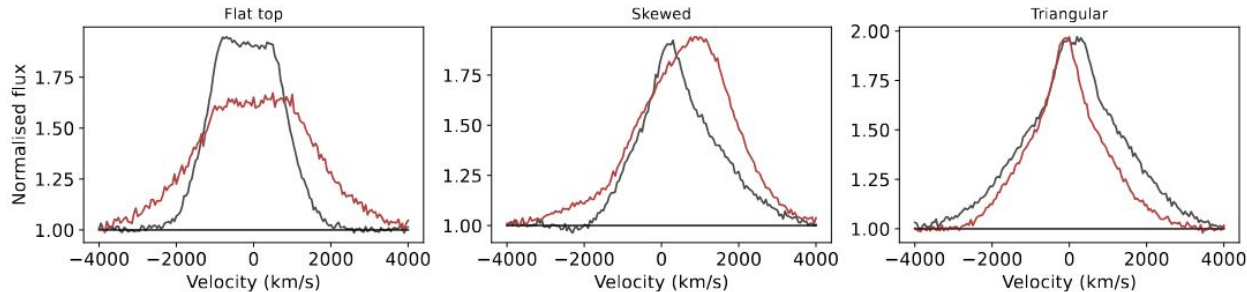
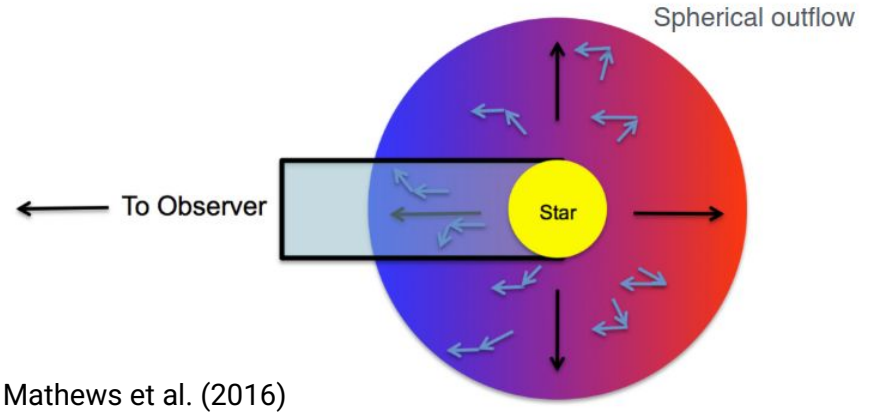
Multiwavelength:

- X-rays (1990s)
- **Optical**, NIR, and UV (2010s)

Spectroscopic features:

- P-Cygni profiles
- Flat-top, skewed profiles, broad wings

Mata Sánchez et al. (2023)



Accretion disc winds

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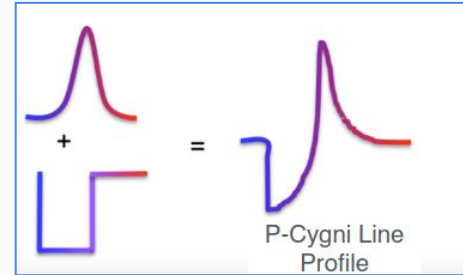
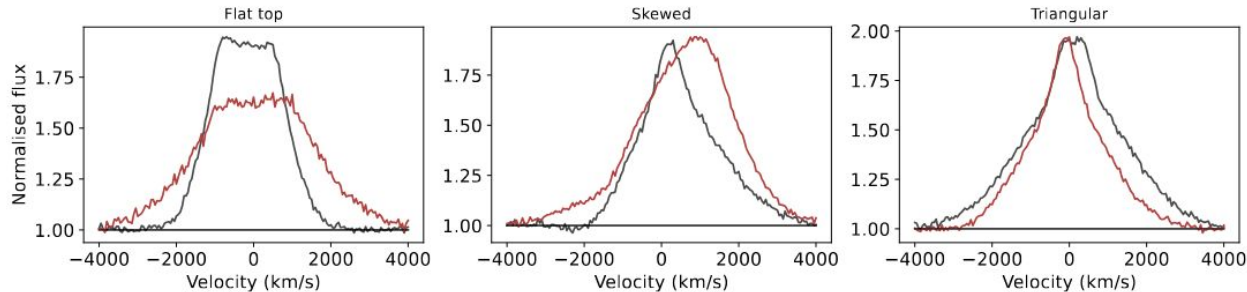
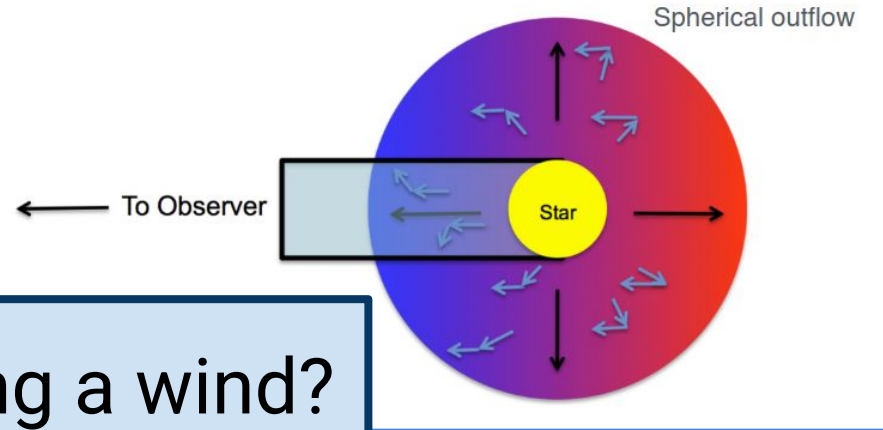
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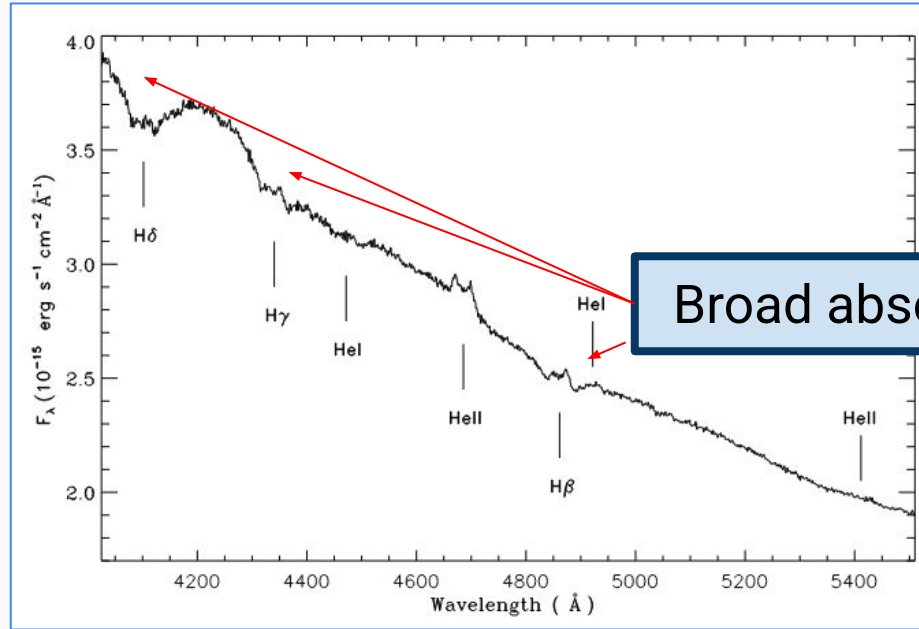
Mata Sánchez et al. (2023)

Is everything a wind?

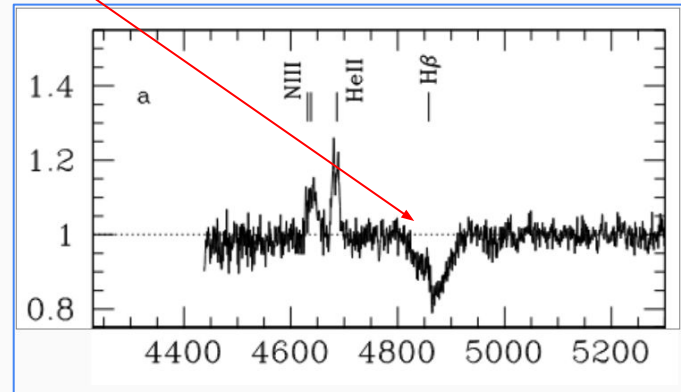
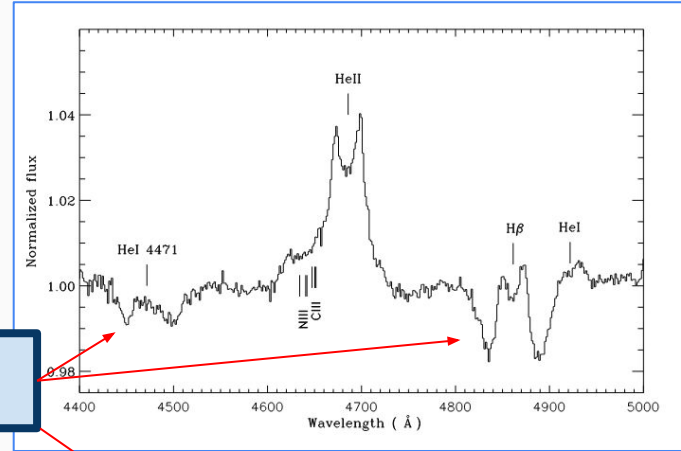


Broad absorptions

An nuisance for wind detection detection studies:



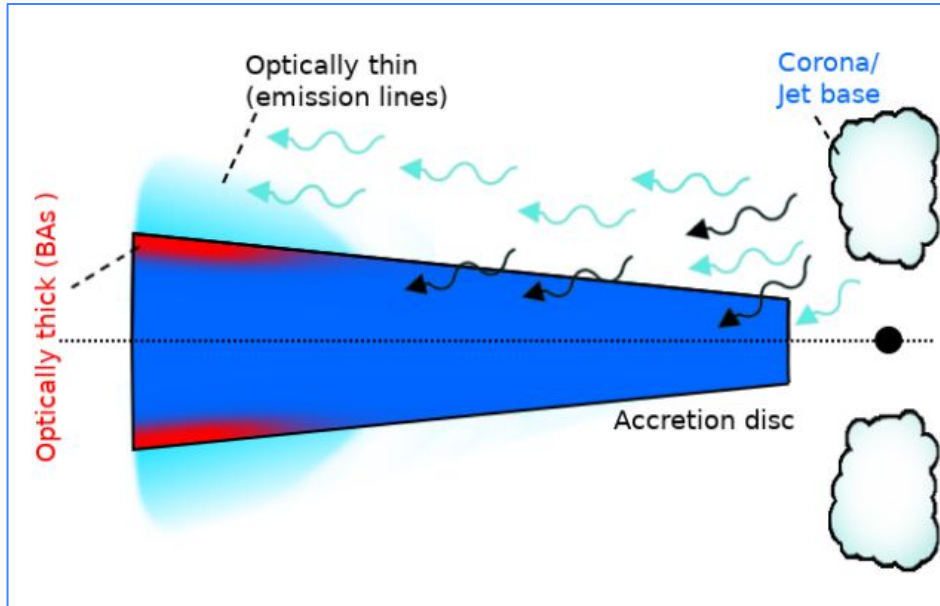
Broad absorptions



Torres et al. (2002) ; Soria et al. (2000)

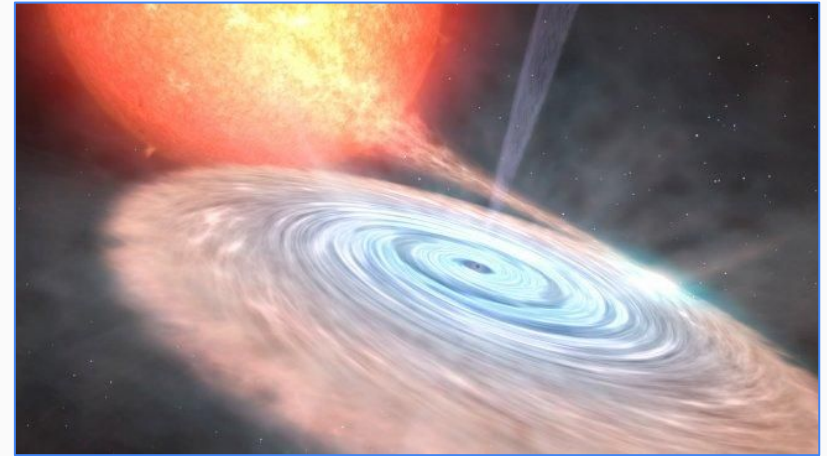
The origin of BAs

Disc (CV-like)?



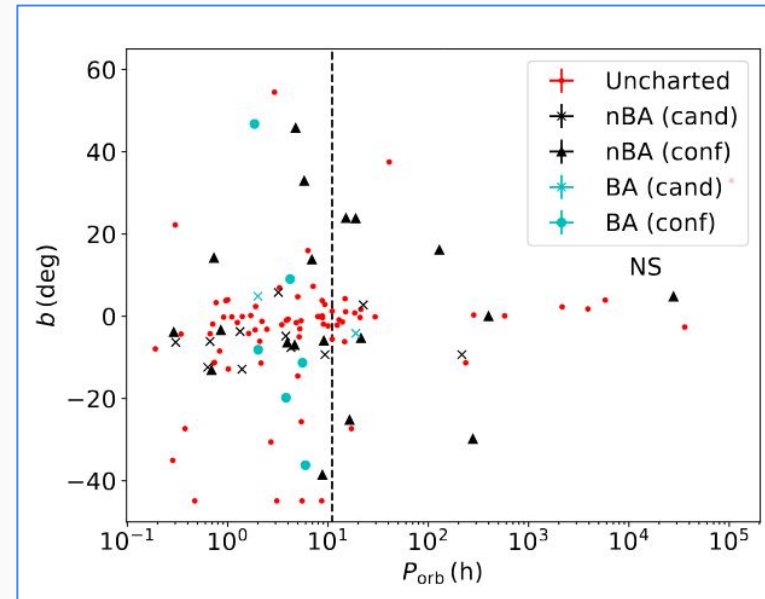
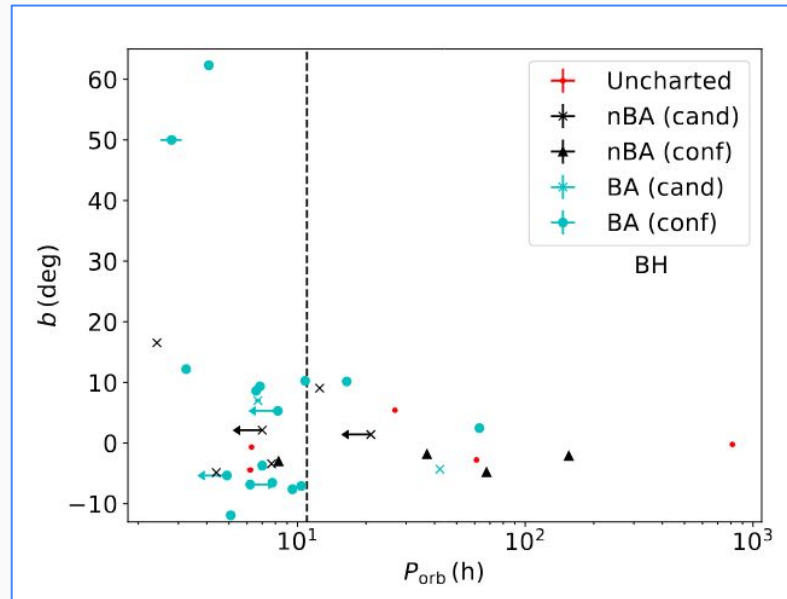
CVs: Szkody et al. (1990); LMXBs: Dubus et al. (2001)

Winds?

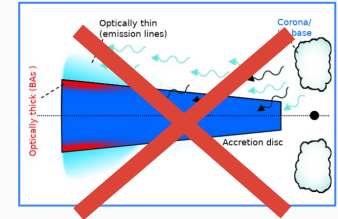
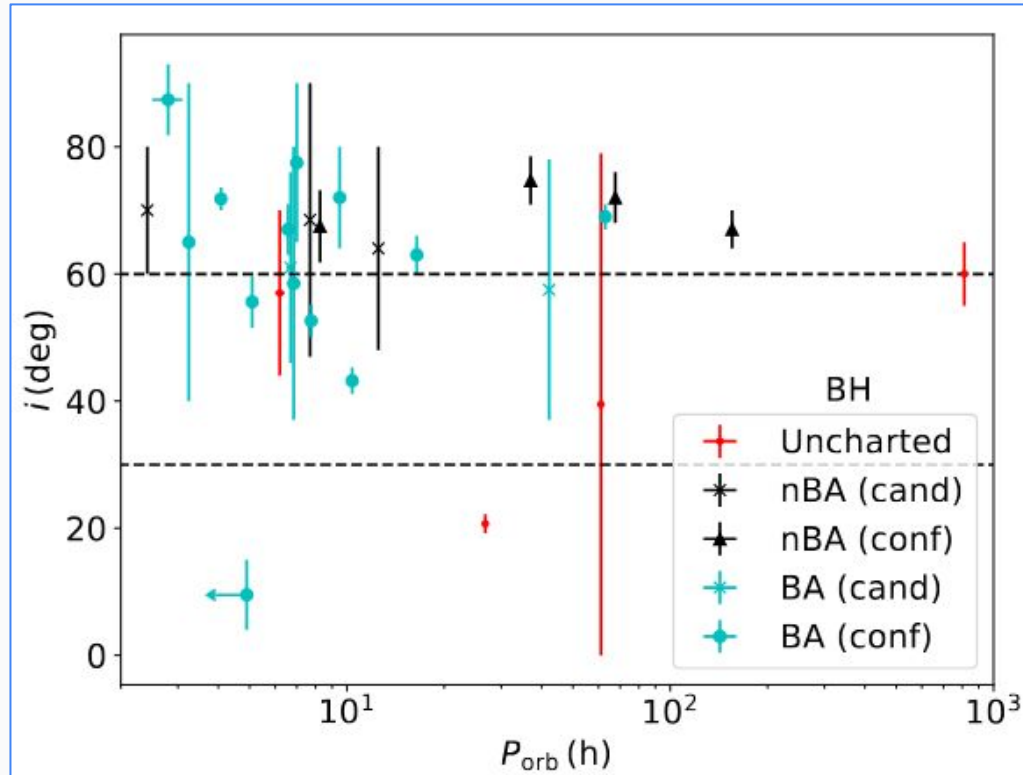


Population database

CO	BA	Non-BA	Uncharted	Total
BH	17(+2)	5(+10)	39	73
NS	7(+2)	20(+18)	238	285



Population database

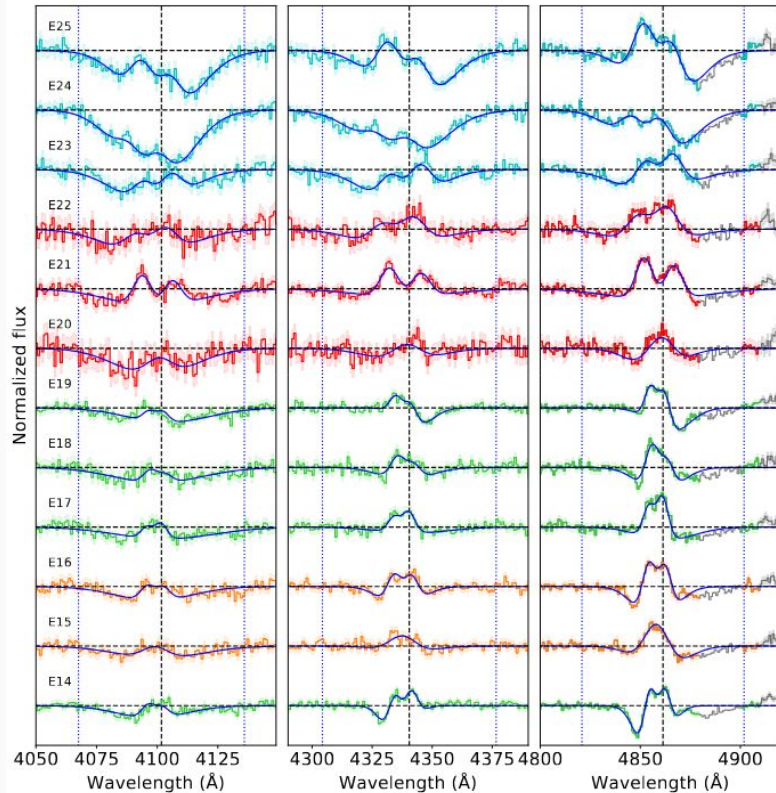


Conclusions:

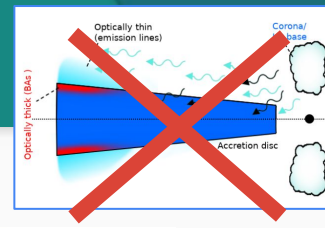
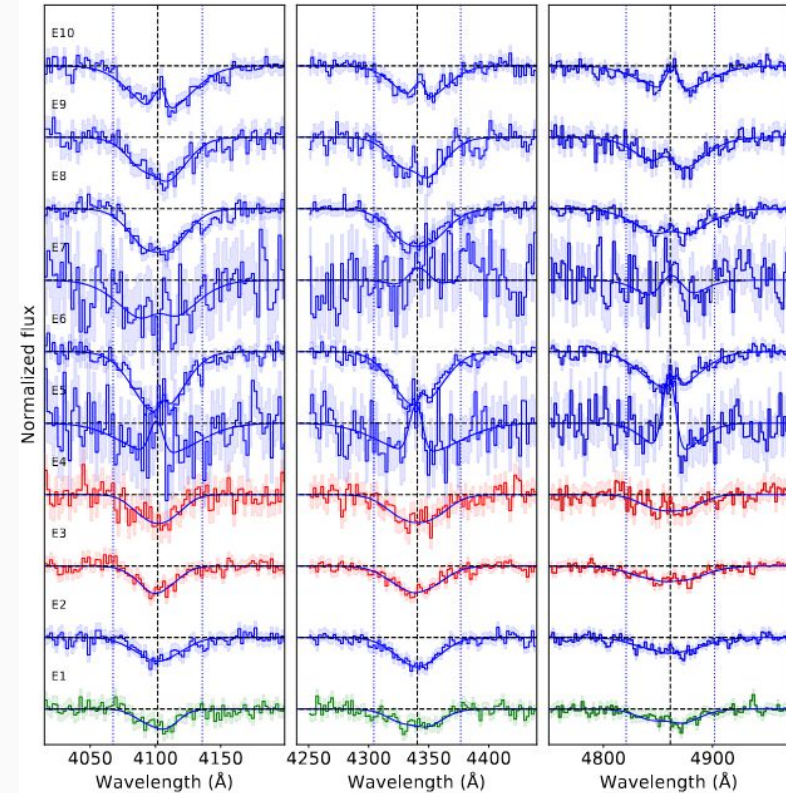
- **Ubiquity:** 78% (29%) of BHs (NSs) with at least 3 epochs of optical spectroscopy
- **Frequent at short periods** ($P_{\text{orb}} < 11$ h) for both BH and NS systems alike.
- BAs occur **at all orbital inclinations**, as well as for BHs and NSs alike
- Only seen in outburst, and predominantly shown in the **H Balmer series**

Spectroscopic database

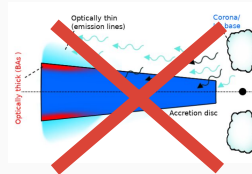
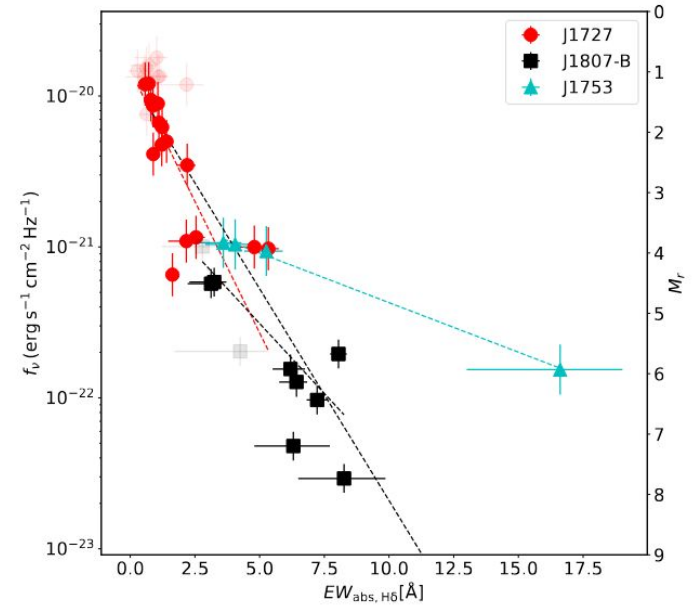
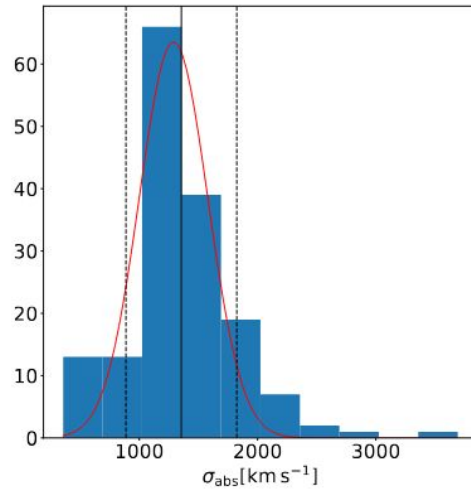
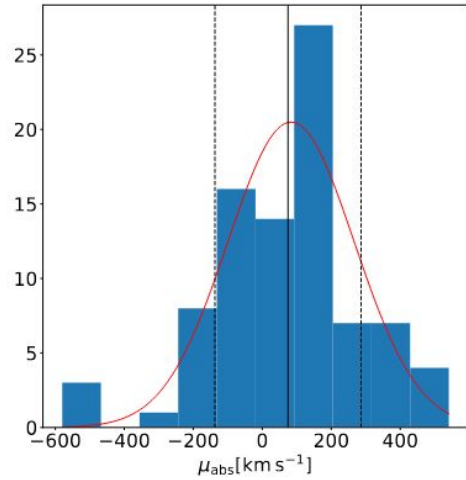
Swift J1727.8 - 1613



MAXI J1807+132



Spectroscopic database

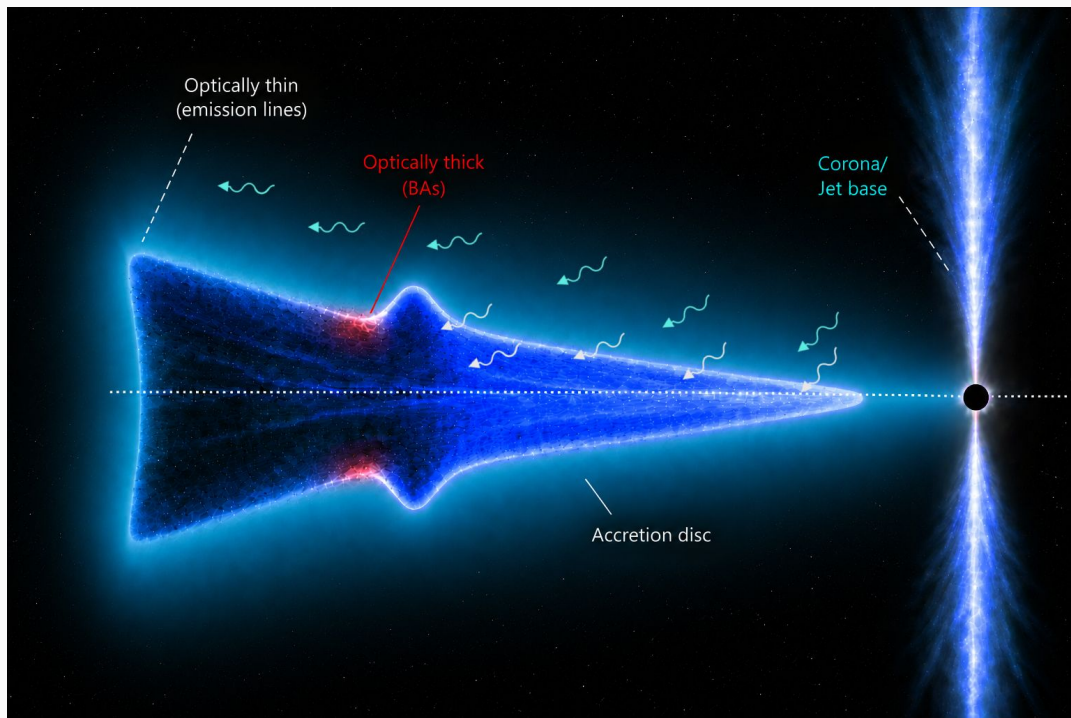


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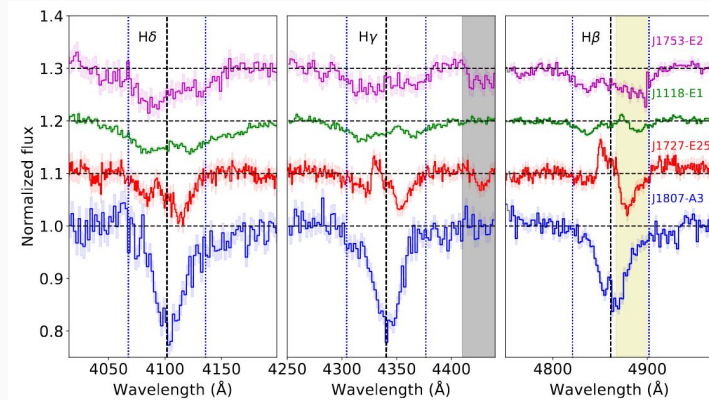
- **Deeper in fainter epochs**, and otherwise independent of the X-ray state
- Centroid velocities consistent with the systemic velocity
- Slow profile evolution during outburst and across systems ($\sigma_{\text{abs}} = 1400 \pm 500 \text{ km s}^{-1}$).
- **Deeper features at shorter wavelengths**

The origin of BAs

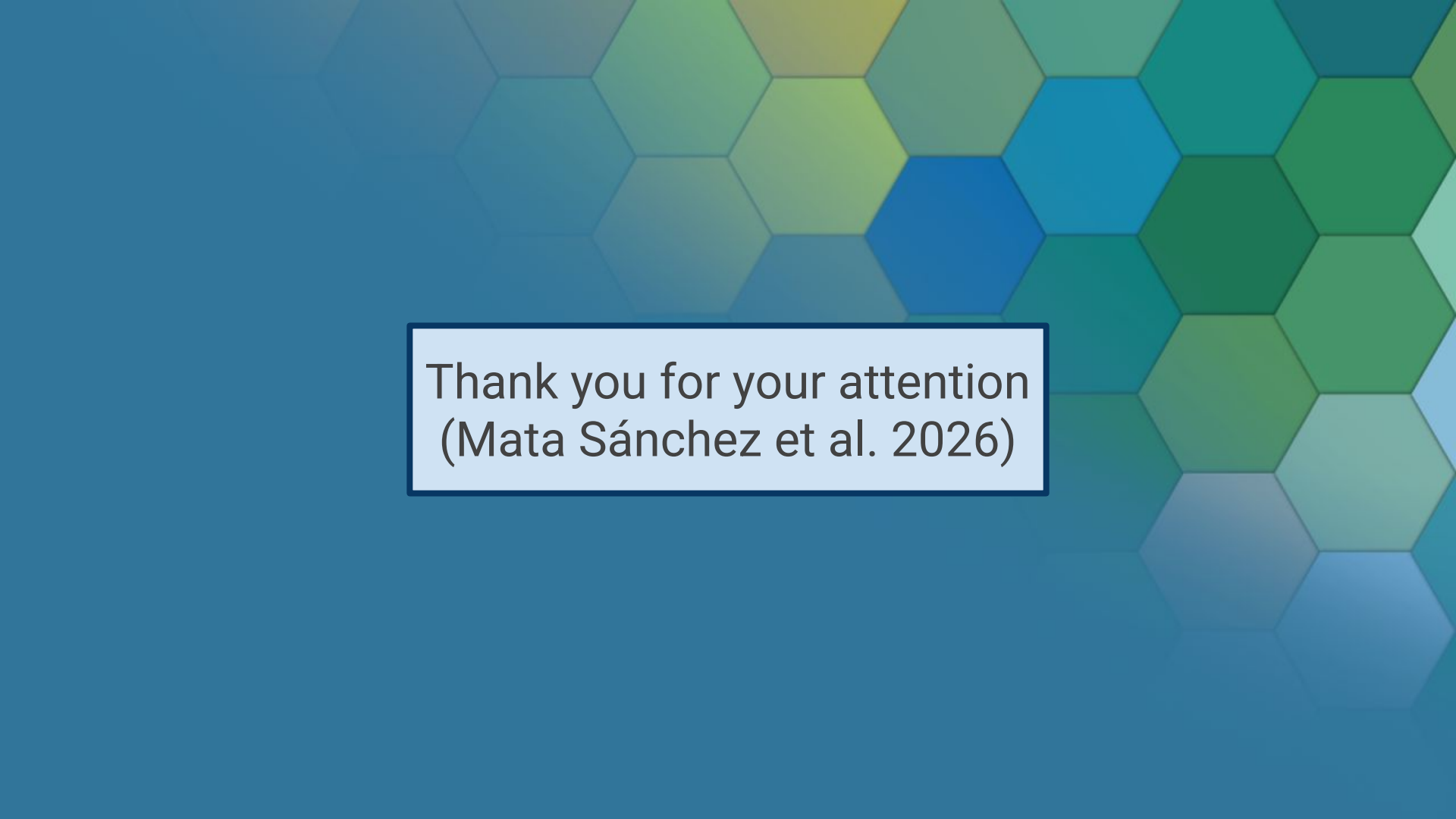
Temperature stratification inversion: shielding?



Motta et al. (2017)
Armas-Padilla et al. (2026)



Take away message:
Not everything is a wind!



Thank you for your attention
(Mata Sánchez et al. 2026)