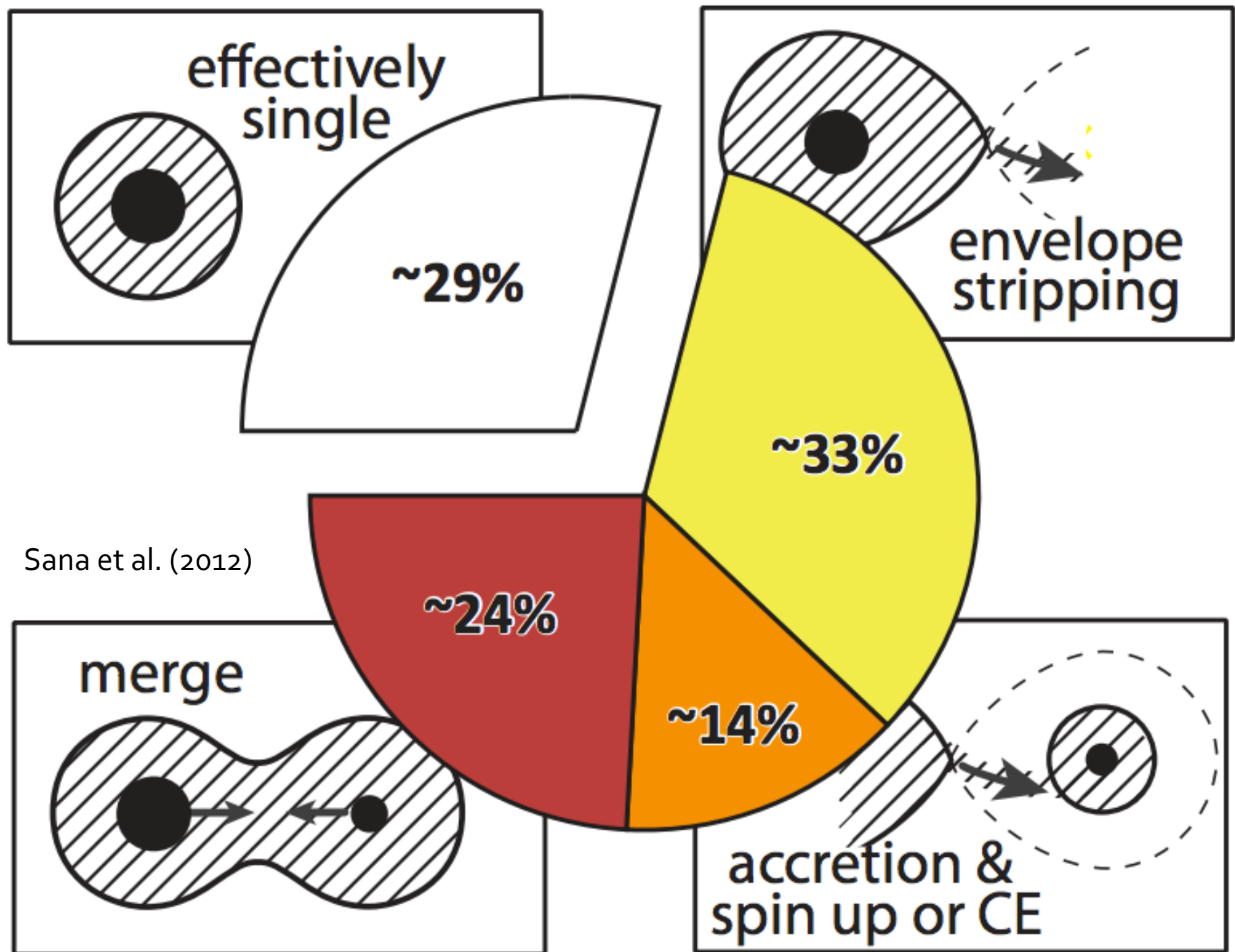
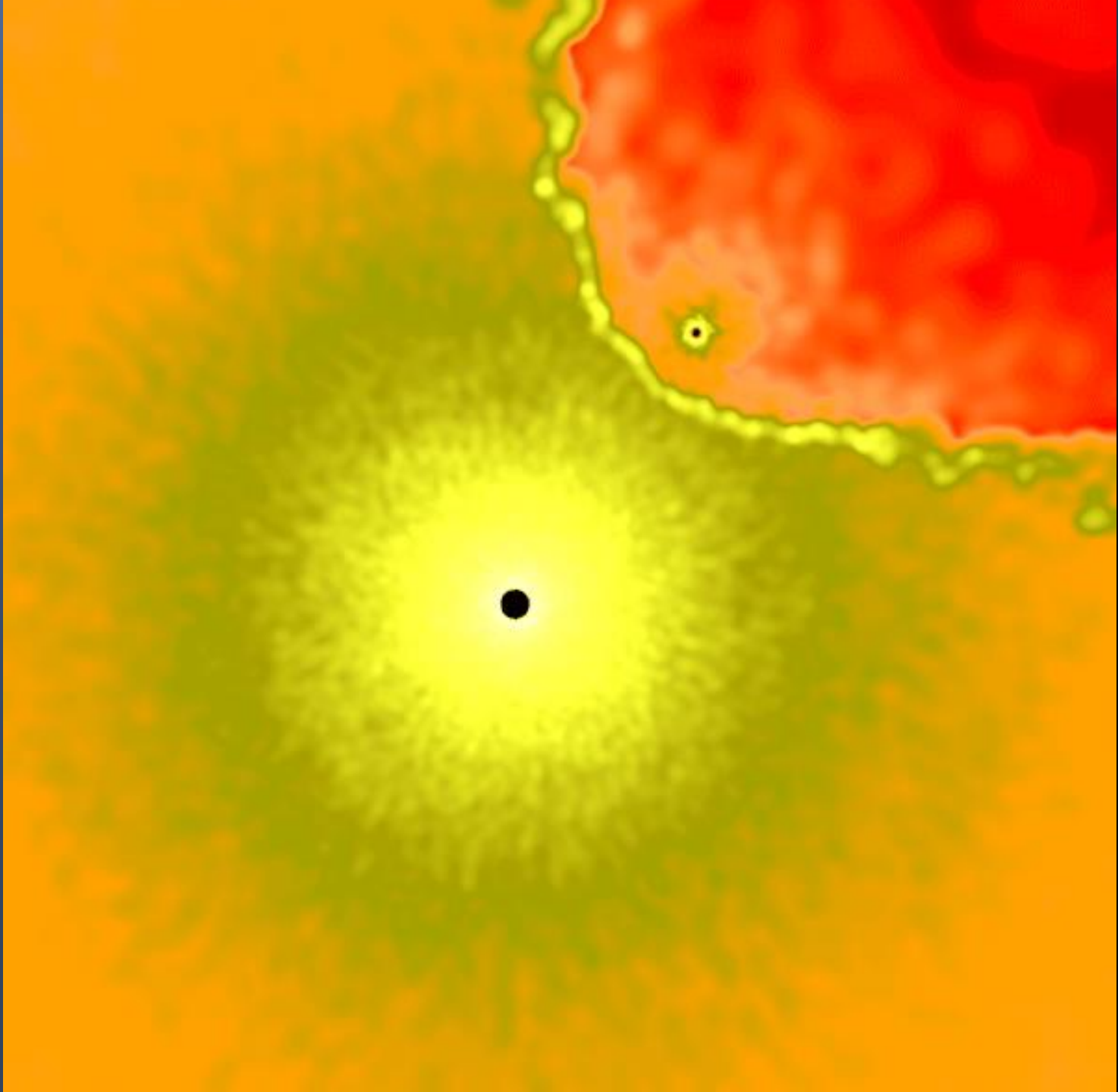


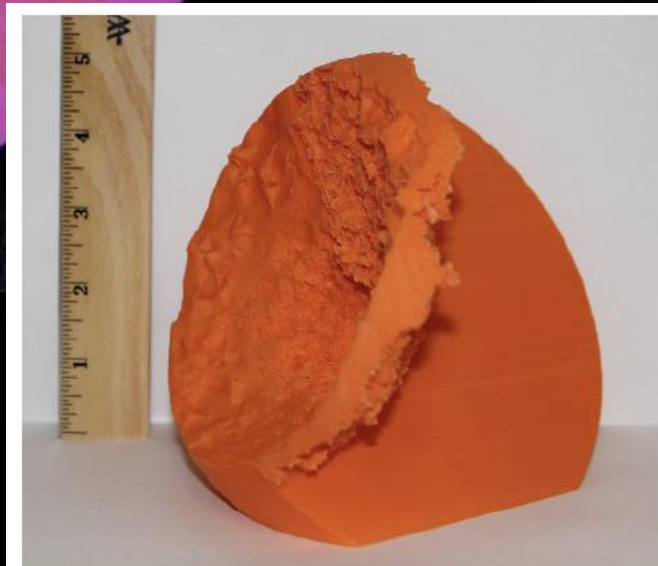
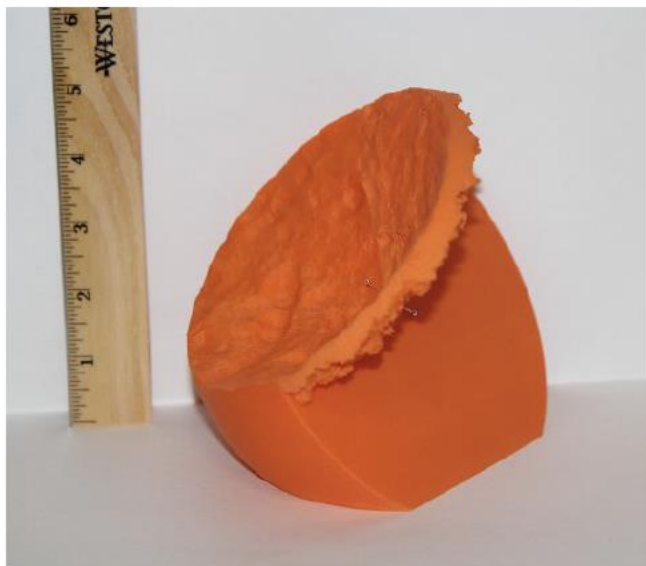
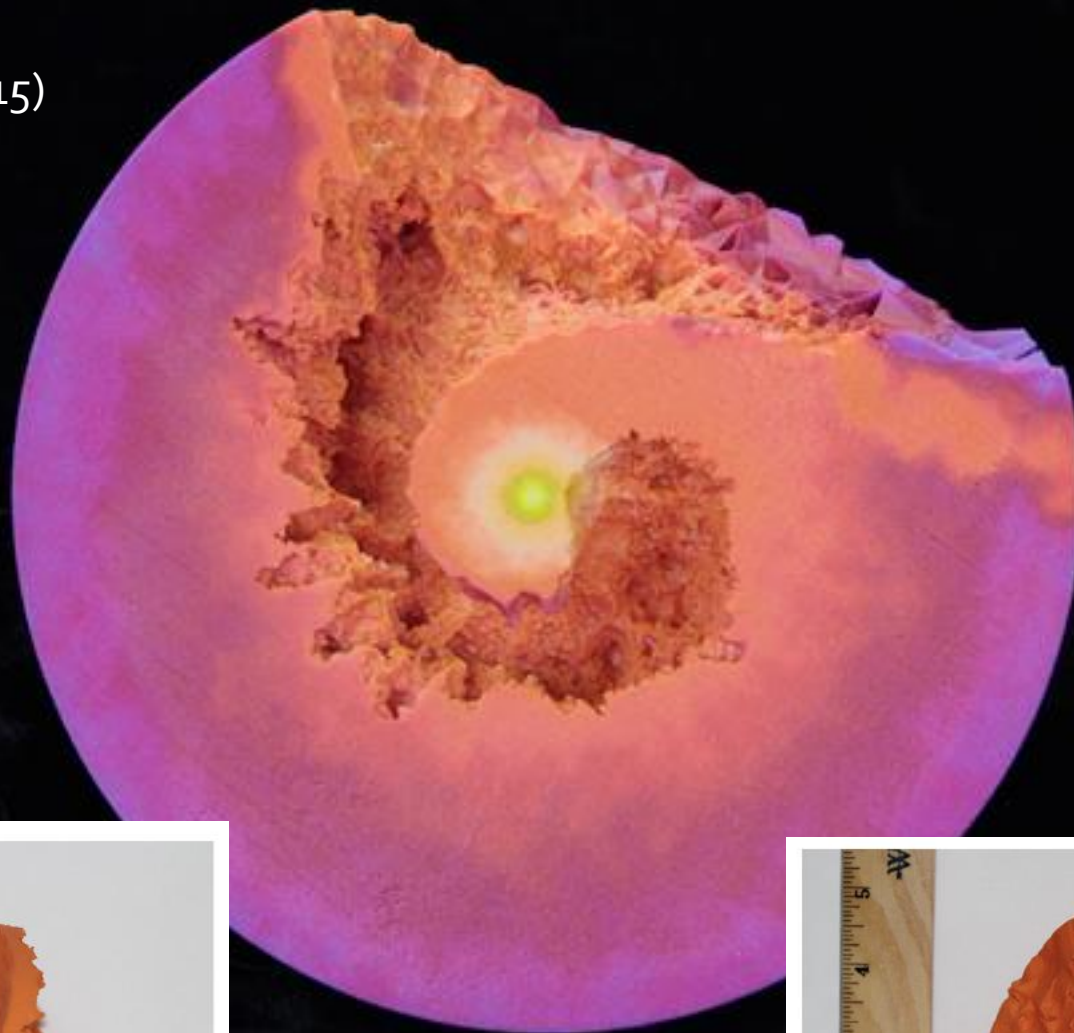
Noel Richardson  
Ritter Observatory, University of Toledo

# **CONFRONTING MODELS AND OBSERVATIONS OF COLLIDING WINDS BINARIES**





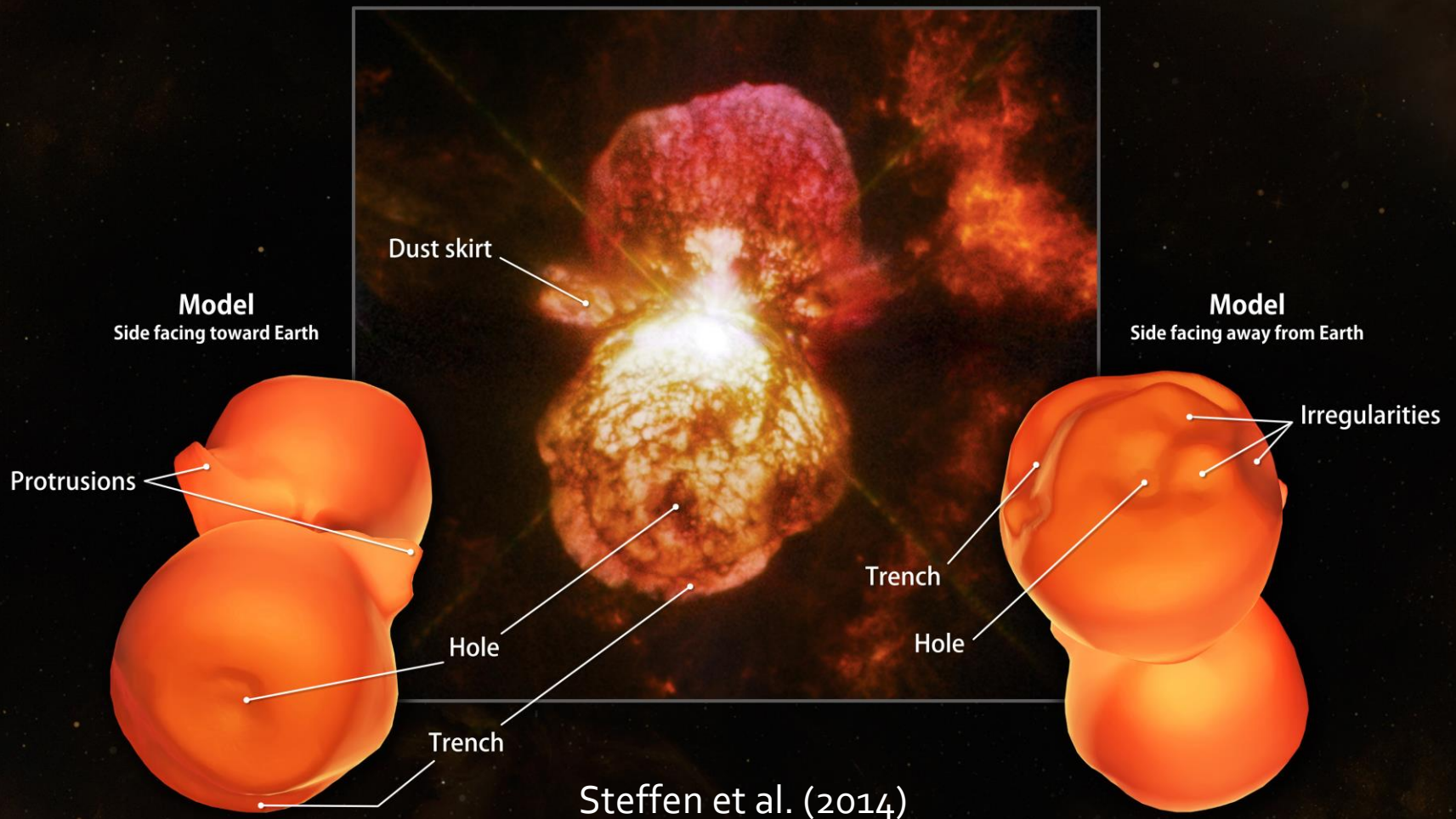
Madura et al. (2015)



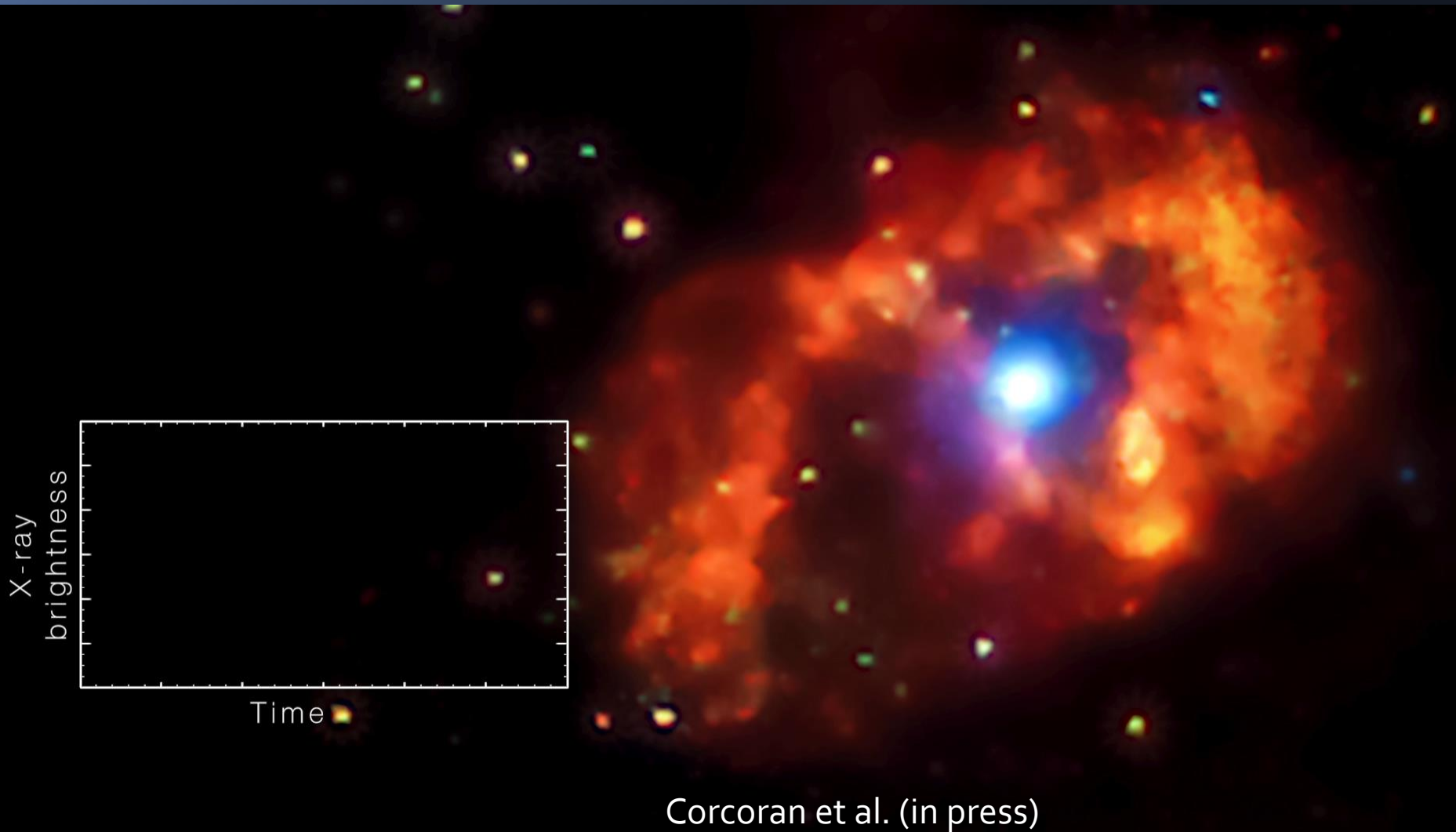


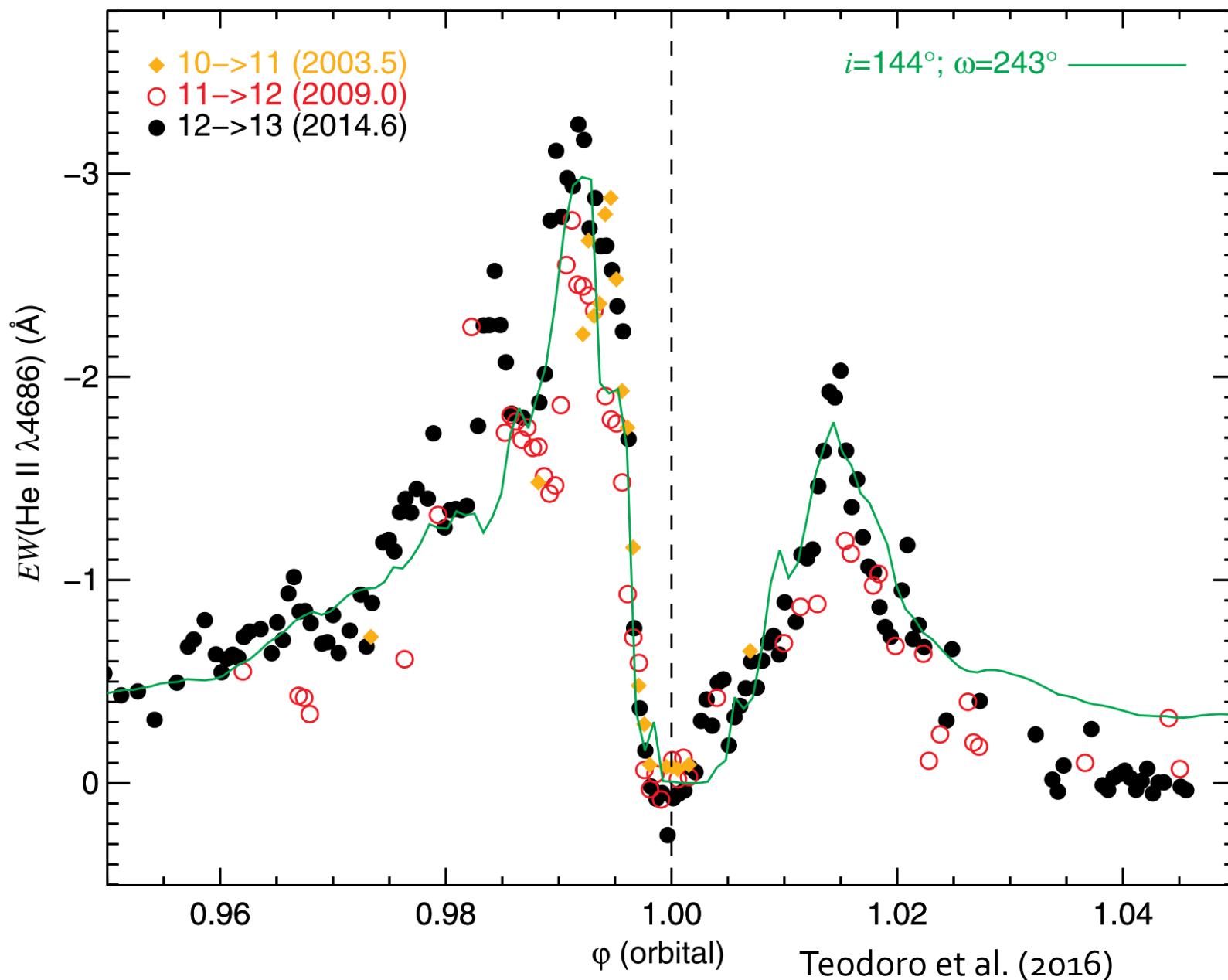
# $\eta$ Carinae

Eta Carinae Homunculus Nebula



# Multi-wavelength effects





**92 Jun**

**4910 K**

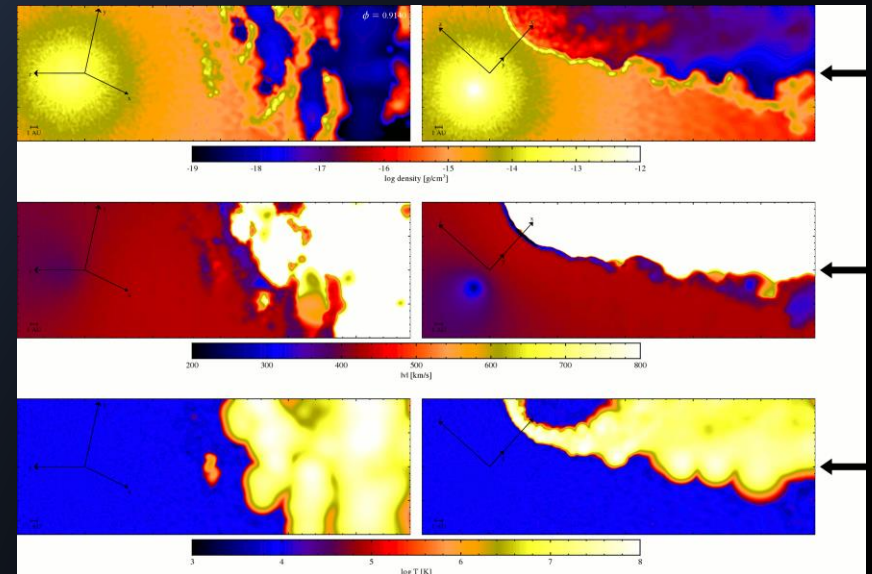
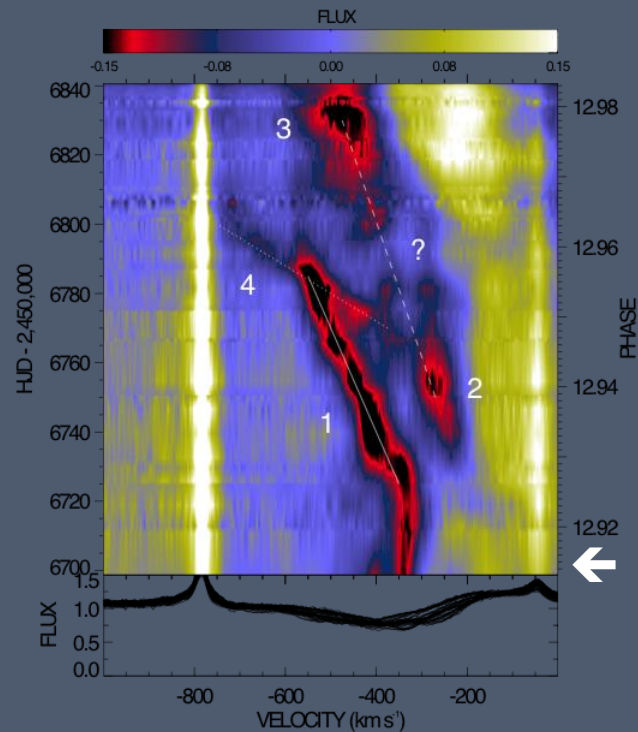
**2 asec**



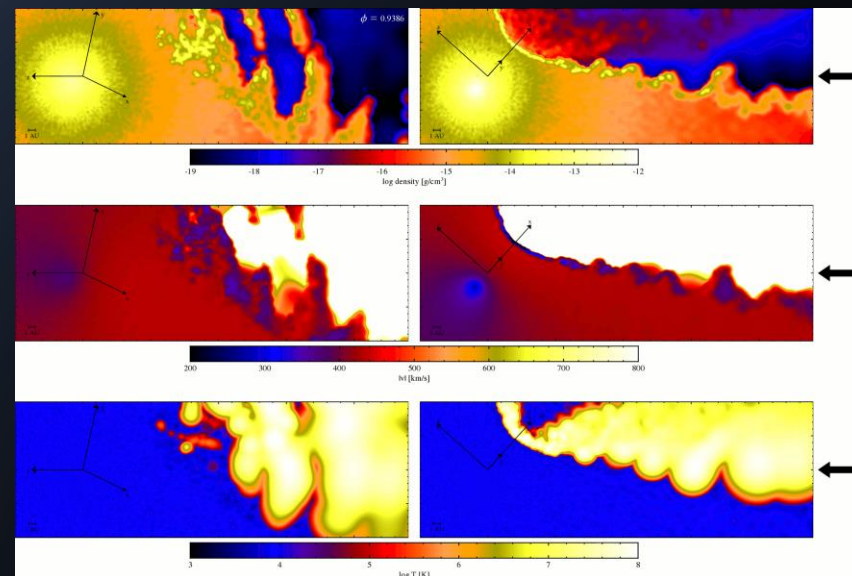
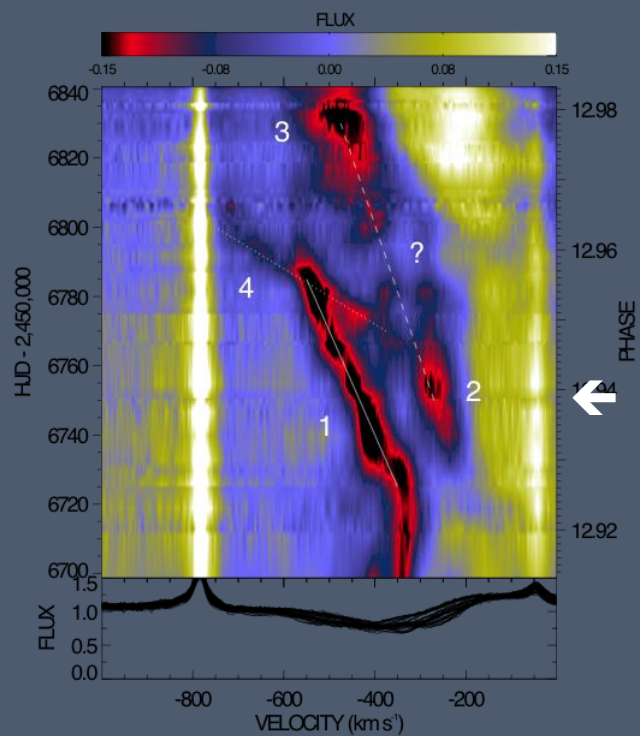
The image displays a central bright source with a complex, multi-lobed structure. The color scale ranges from dark red to bright orange/white at the center. The structure appears to be a nebula or a star with a complex envelope. The scale bar indicates a size of 2 asec.



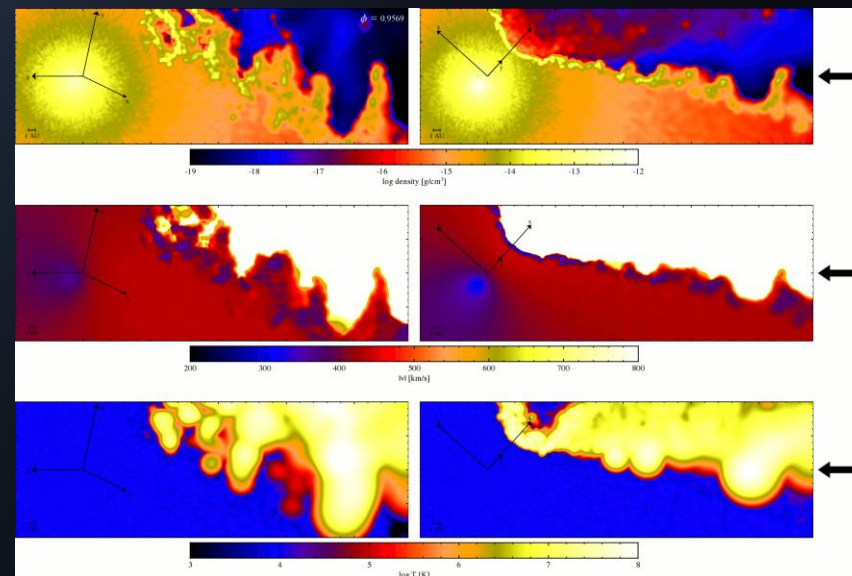
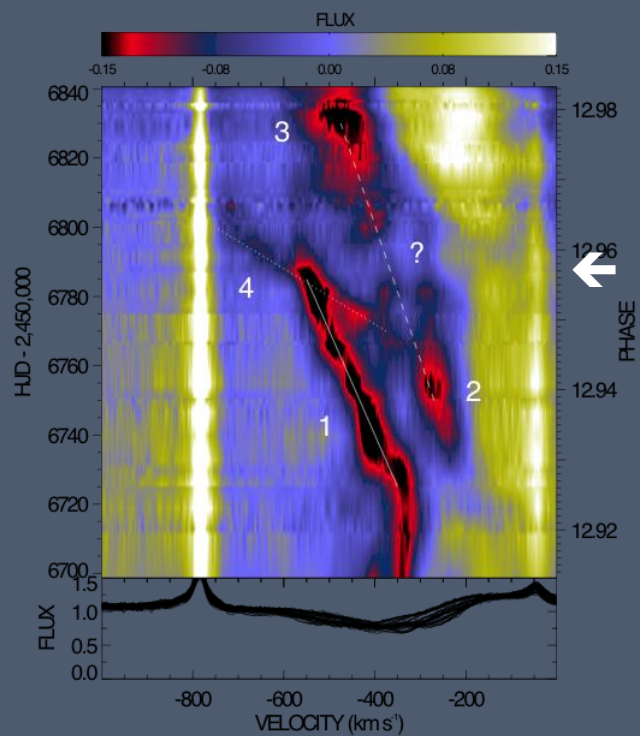
# Models describe qualitative features in the spectra...



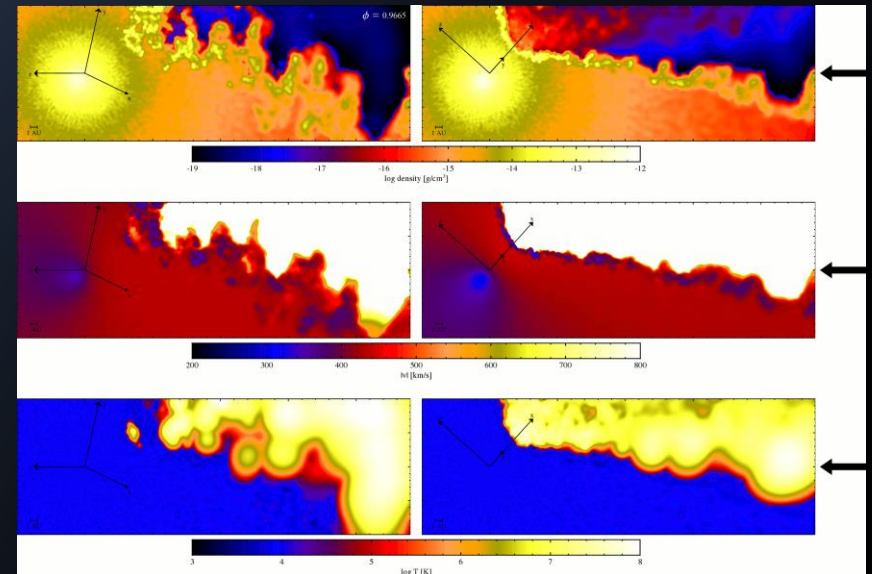
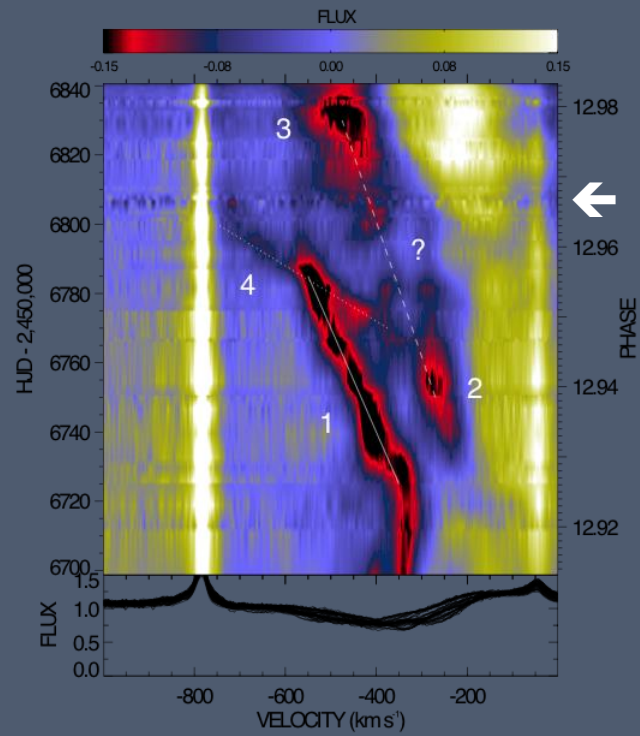
Richardson et al. (2016)



Richardson et al. (2016)



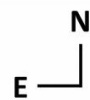
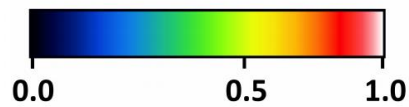
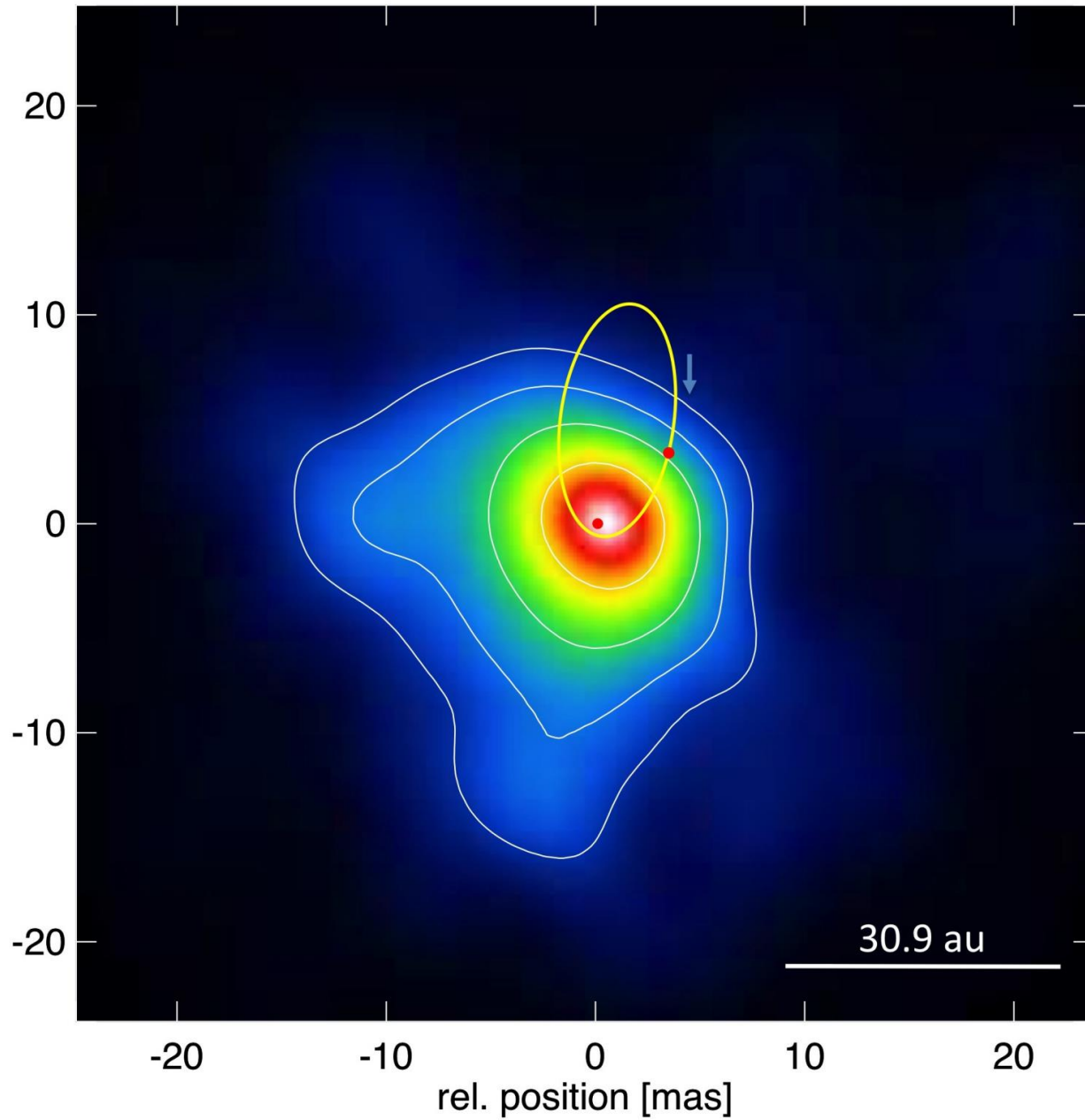
Richardson et al. (2016)



Richardson et al. (2016)

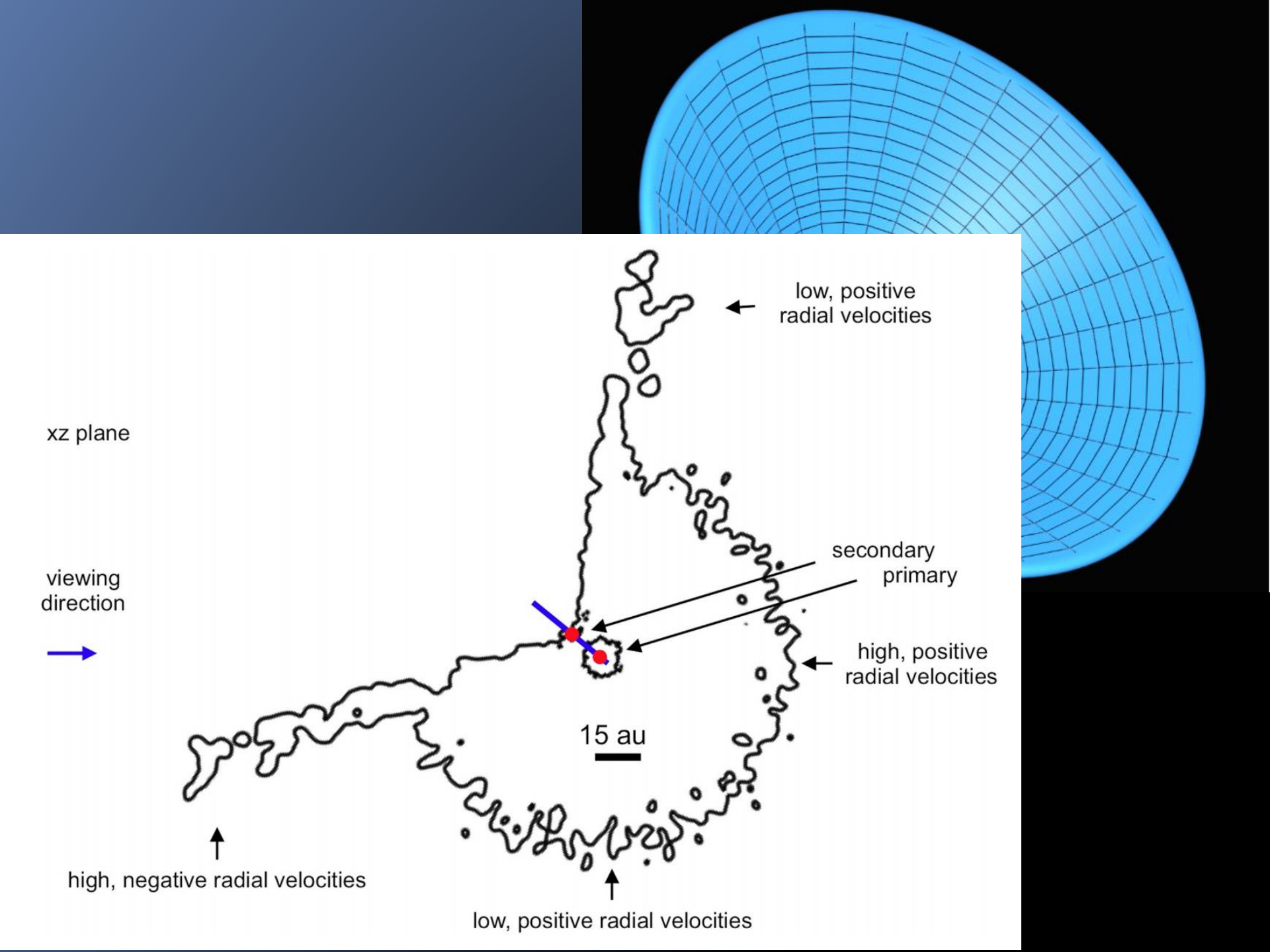


rel. position [mas]

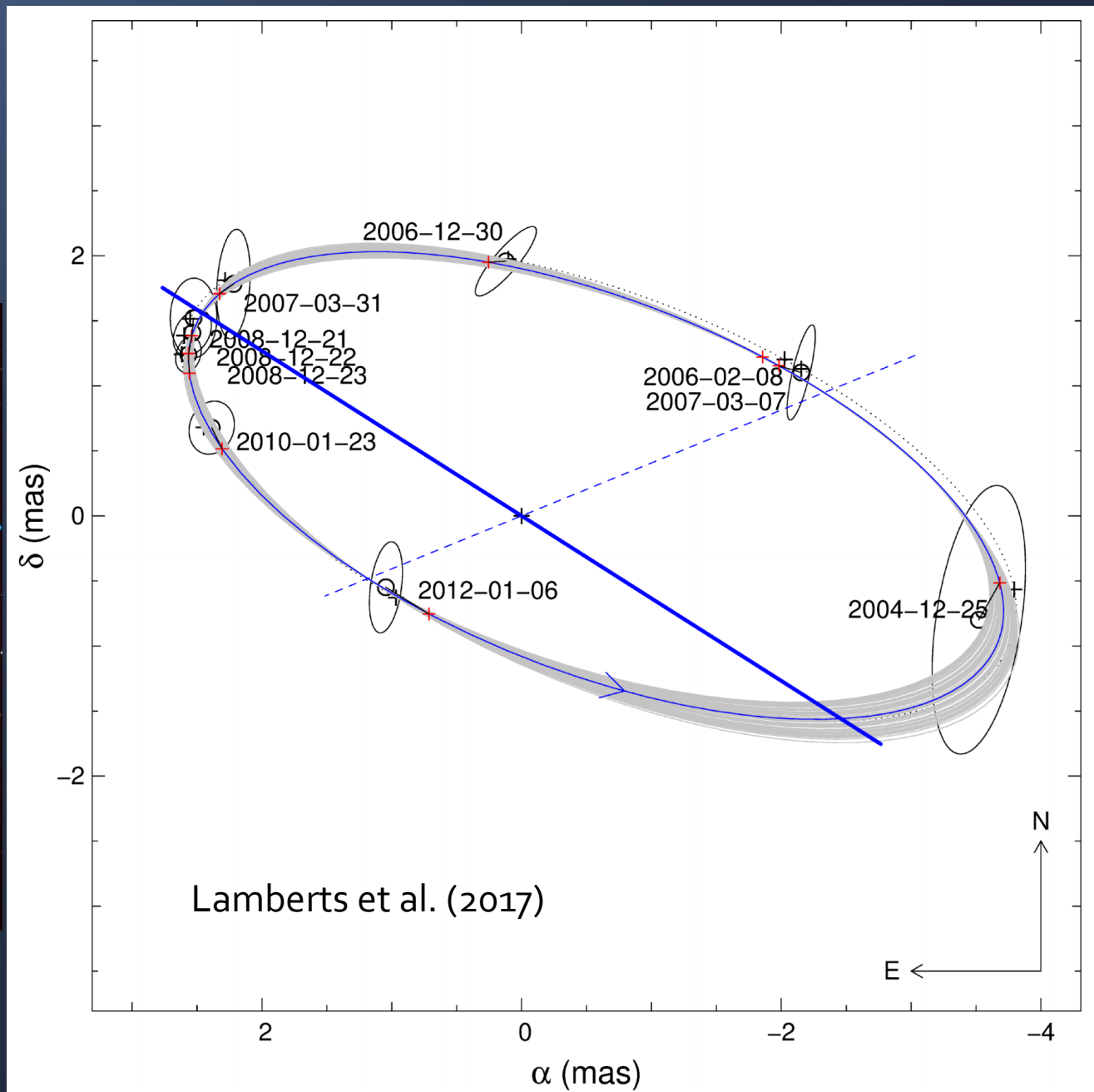


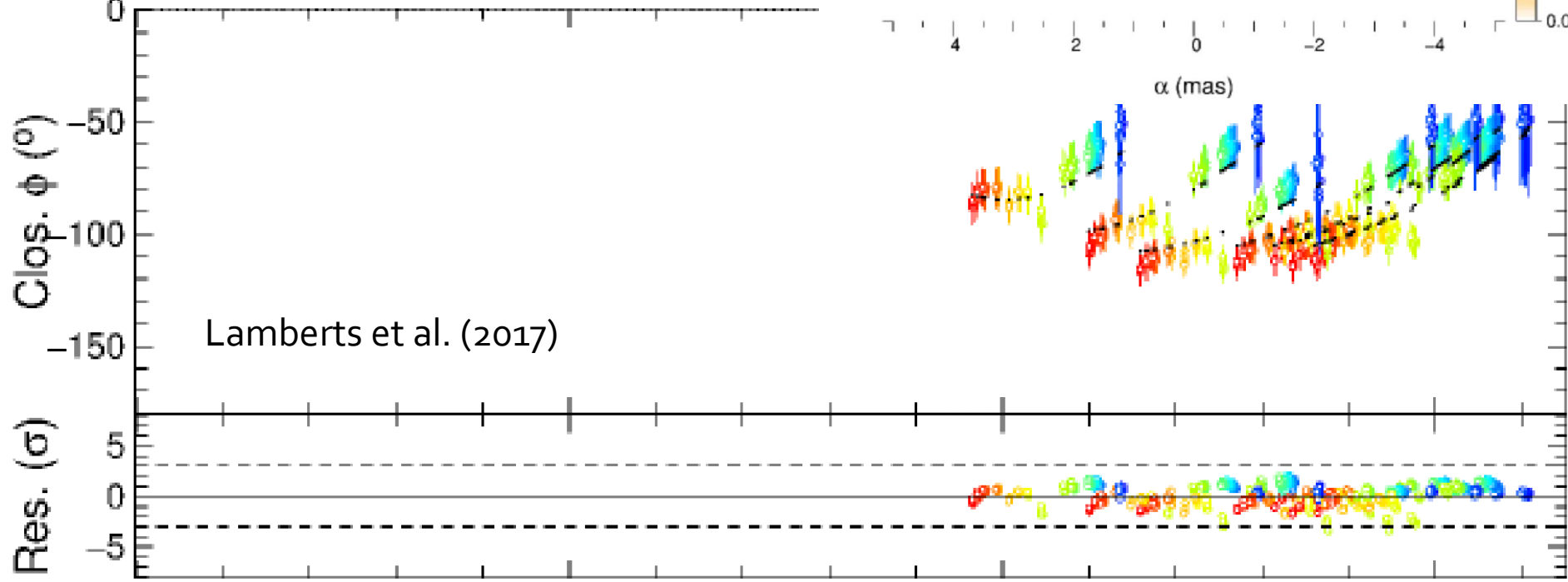
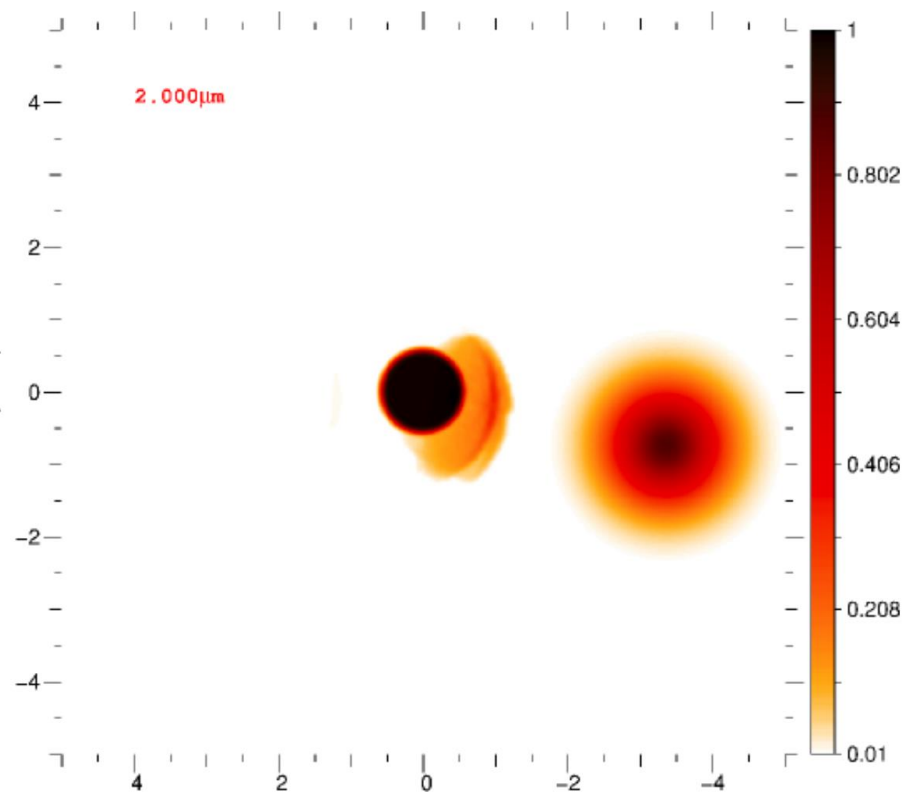
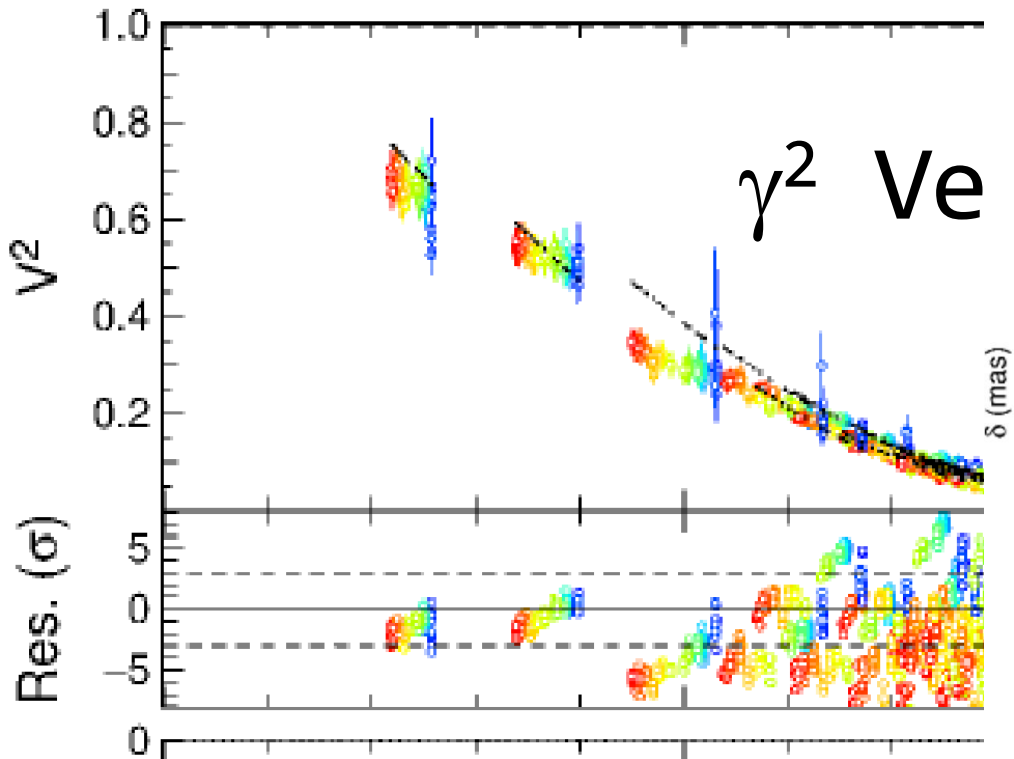
Weigelt et al. (2016)



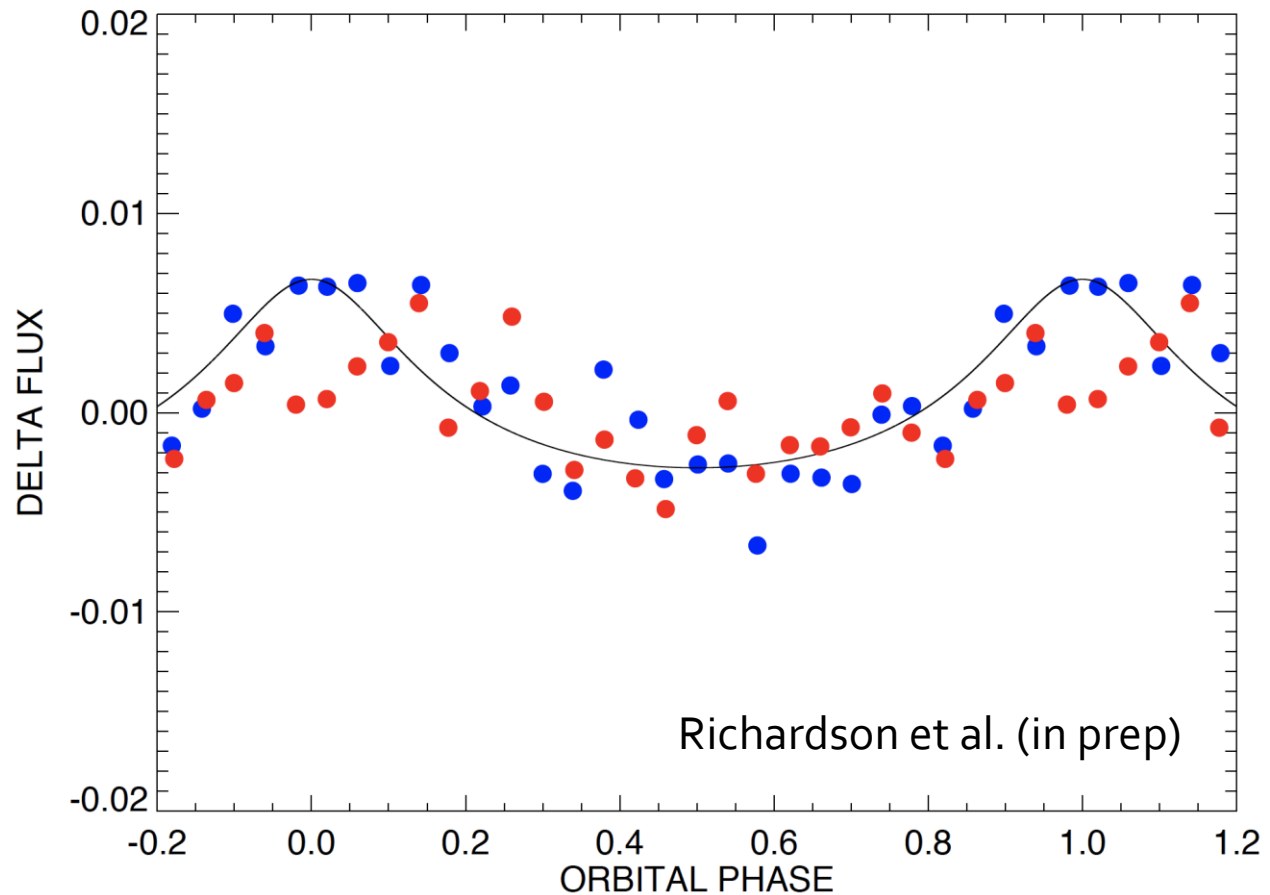
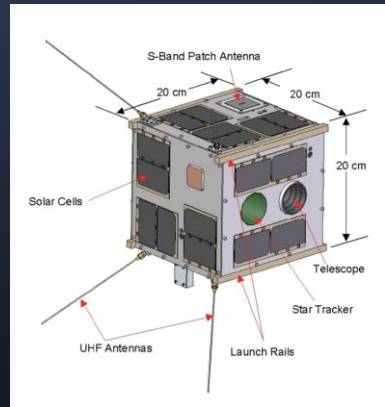


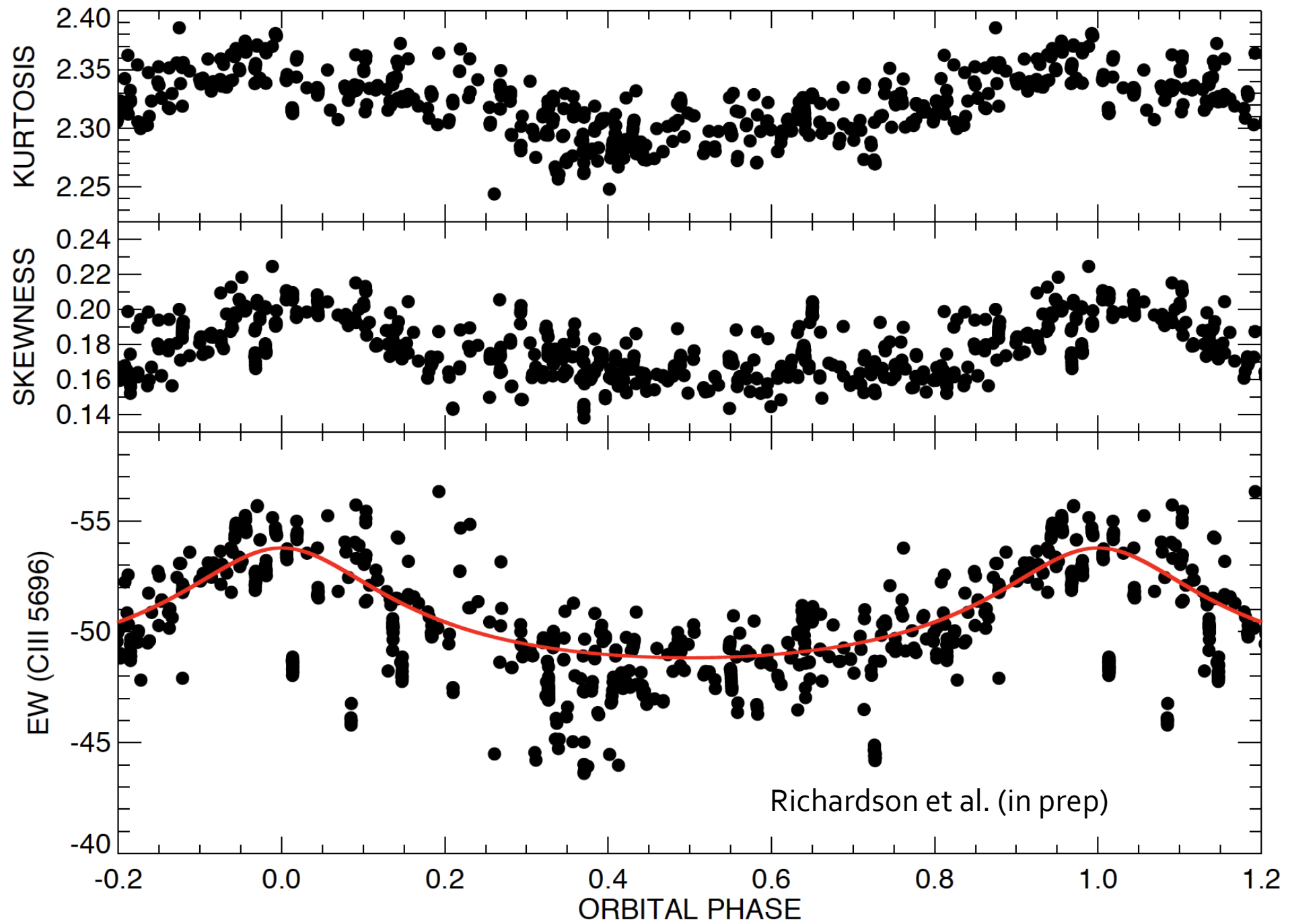
$\gamma^2$  Vel



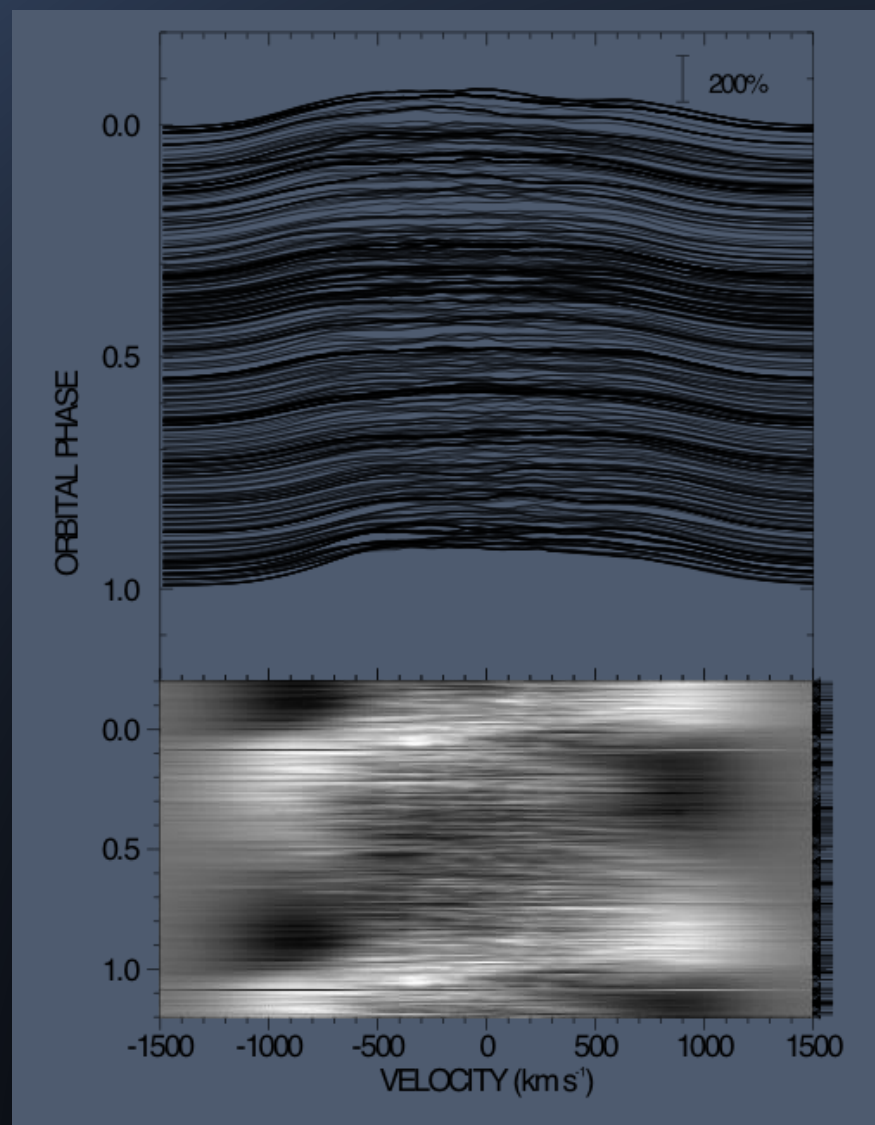
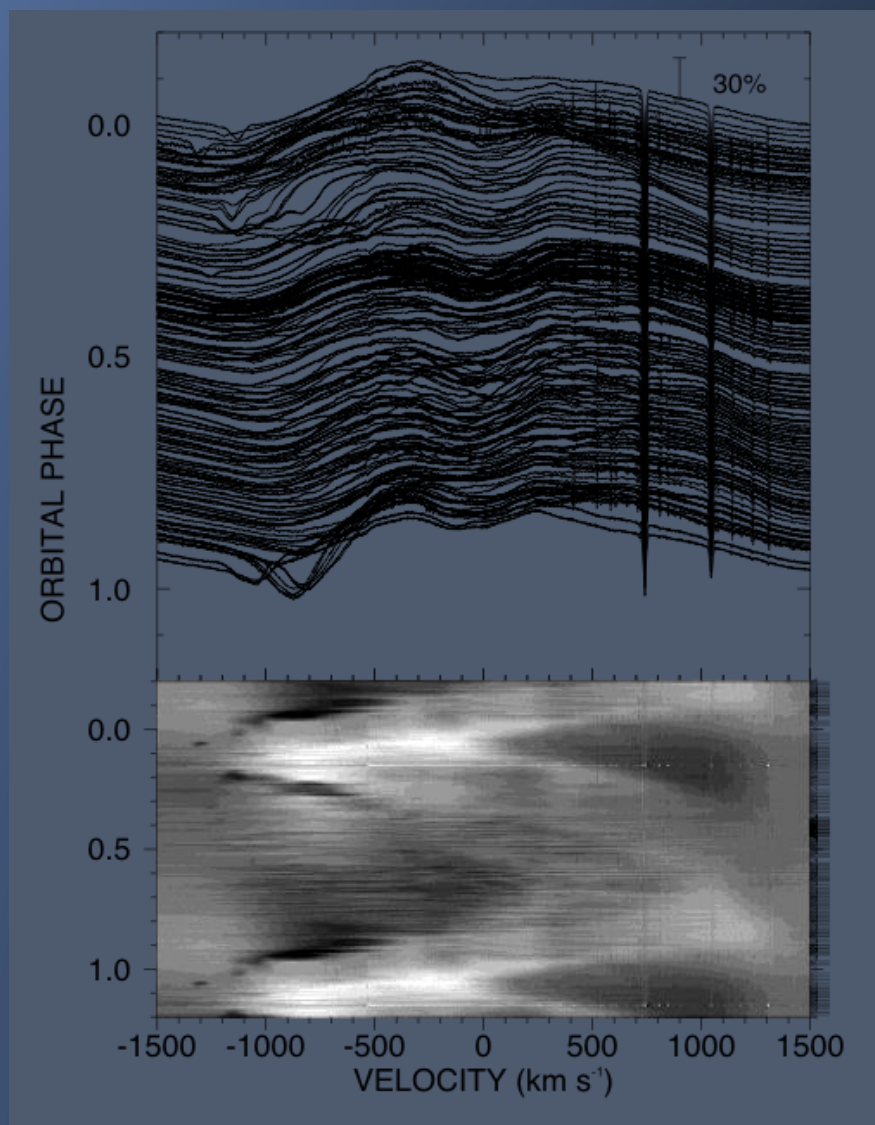


# *BRITE* photometry



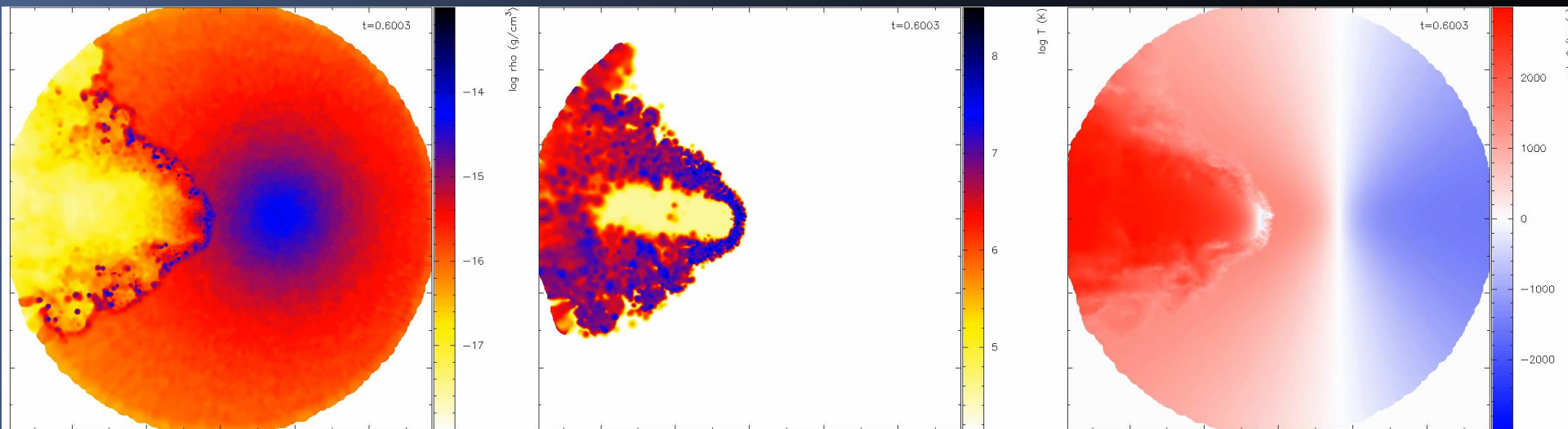




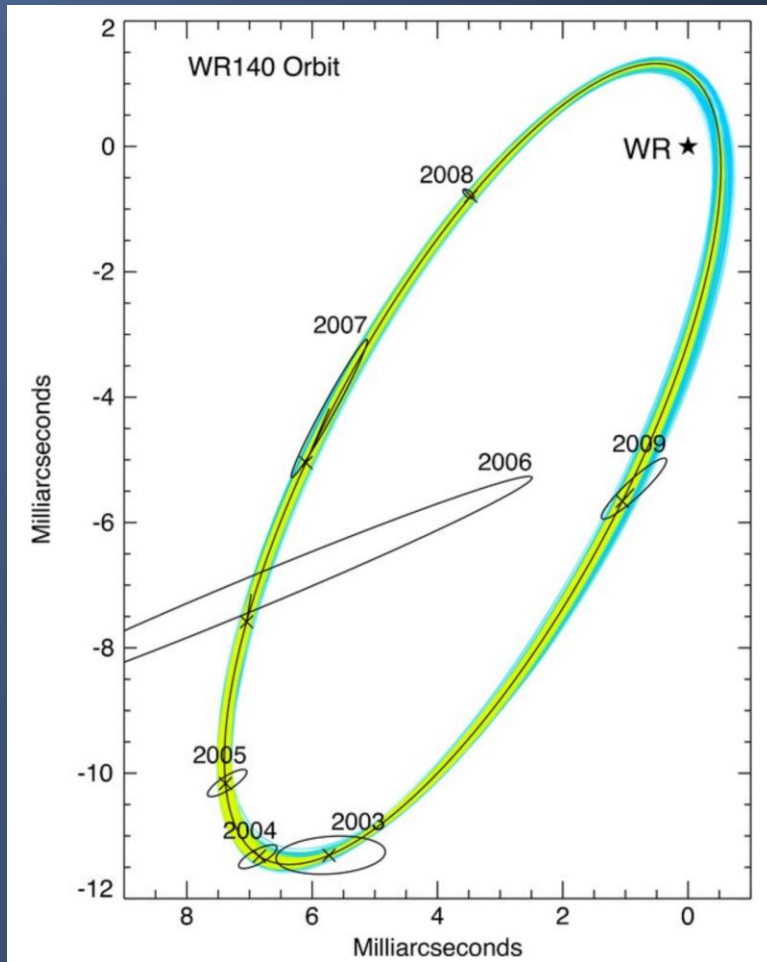


Richardson et al. (in prep)

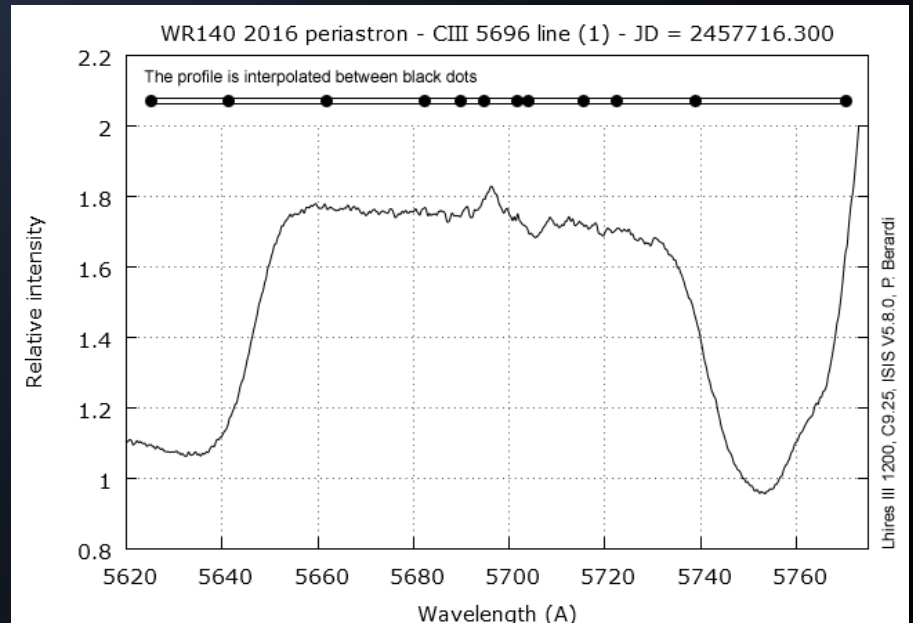
# Preliminary modeling



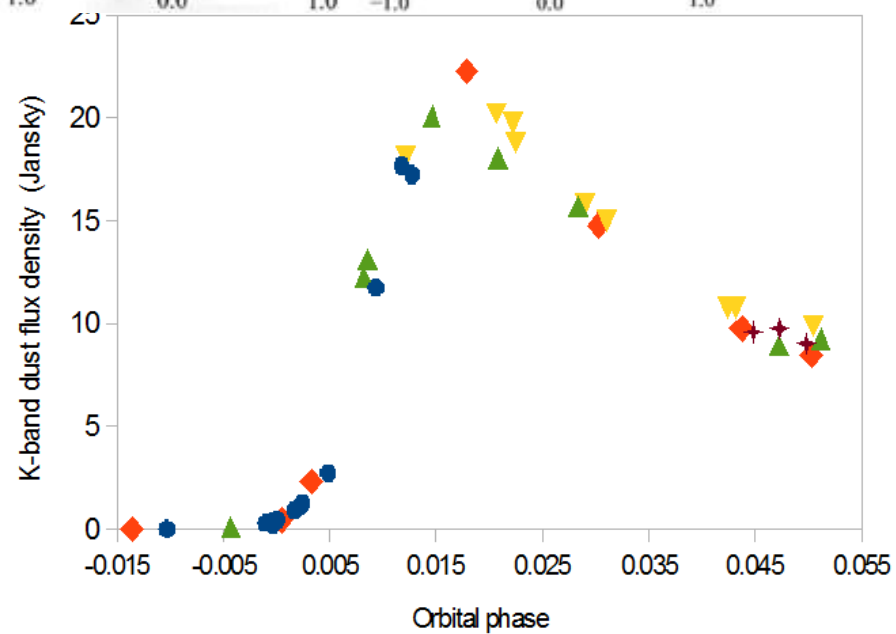
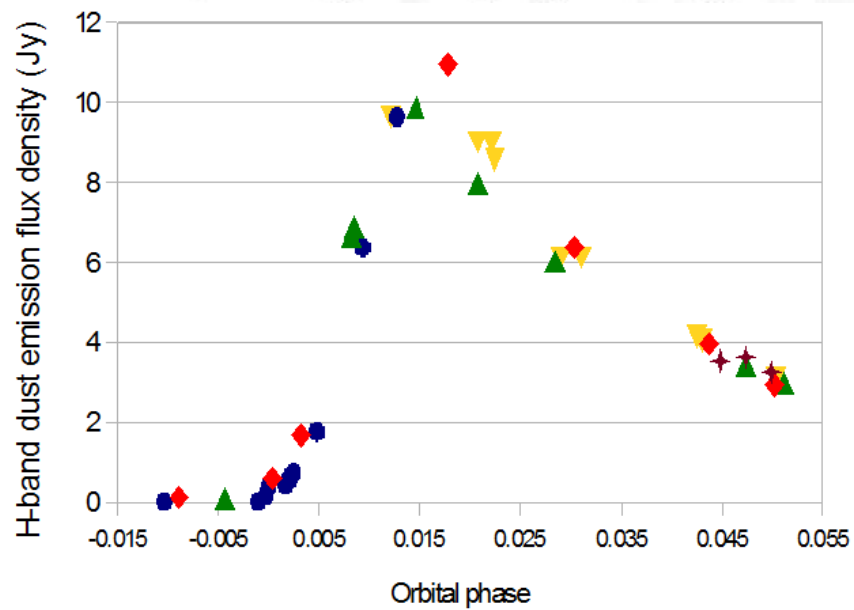
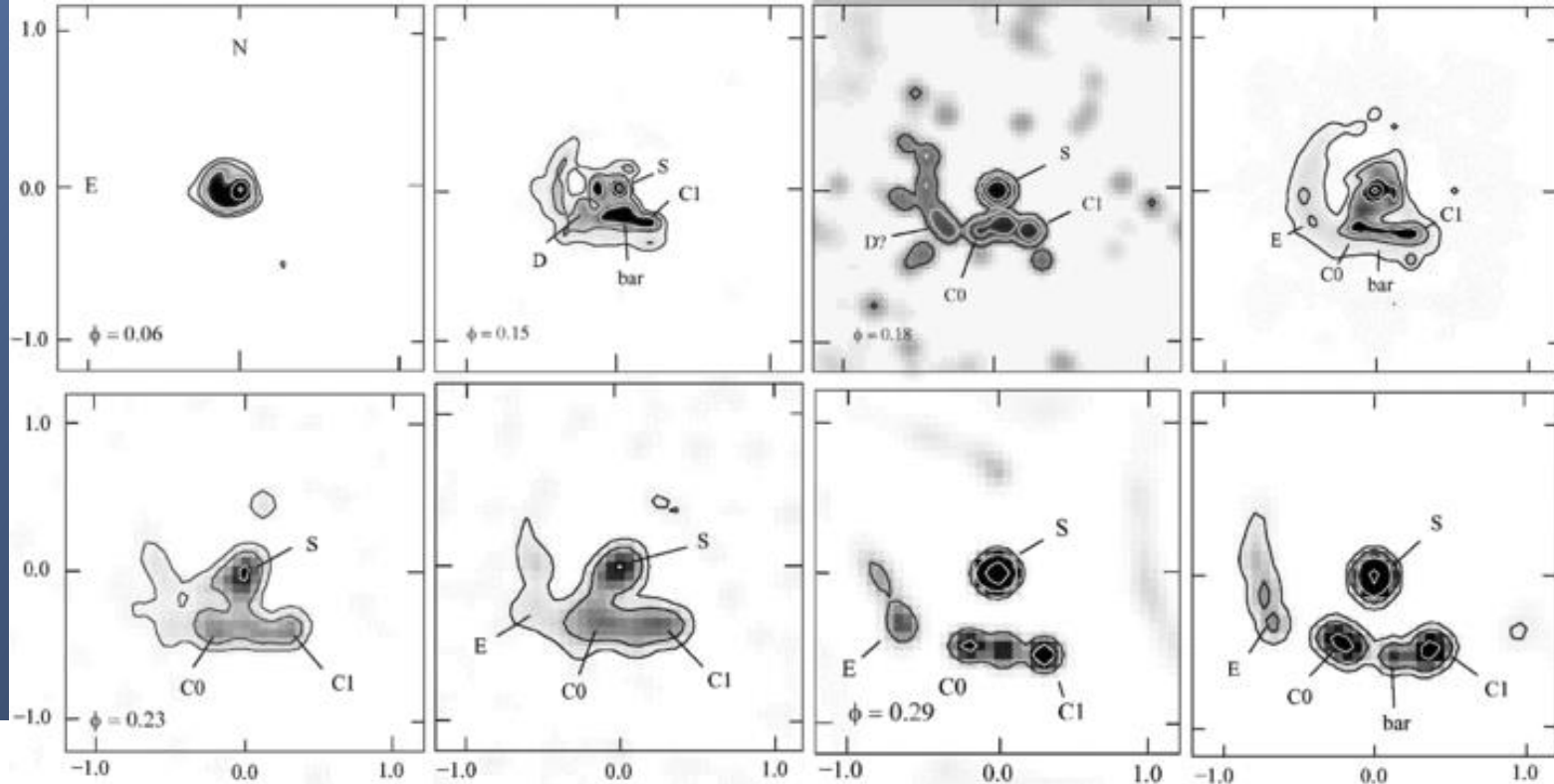
# Next to be done with CHARA: WR 140 (weather permitting)



Monnier et al. (2011)



2016.9 periastron passage





# Collaboration with Ritter Observatory – open to all



- 1-m telescope
- echelle spectrograph ( $R \sim 26,000$ )
- spectropolarimeter (resolution  $\sim 7\text{\AA}$ )
- operates every clear night with large observing team ( $\sim 5$  grad students,  $\sim 20$  undergrads)
- observations can be scheduled as soon as the night requested



Thank you!