



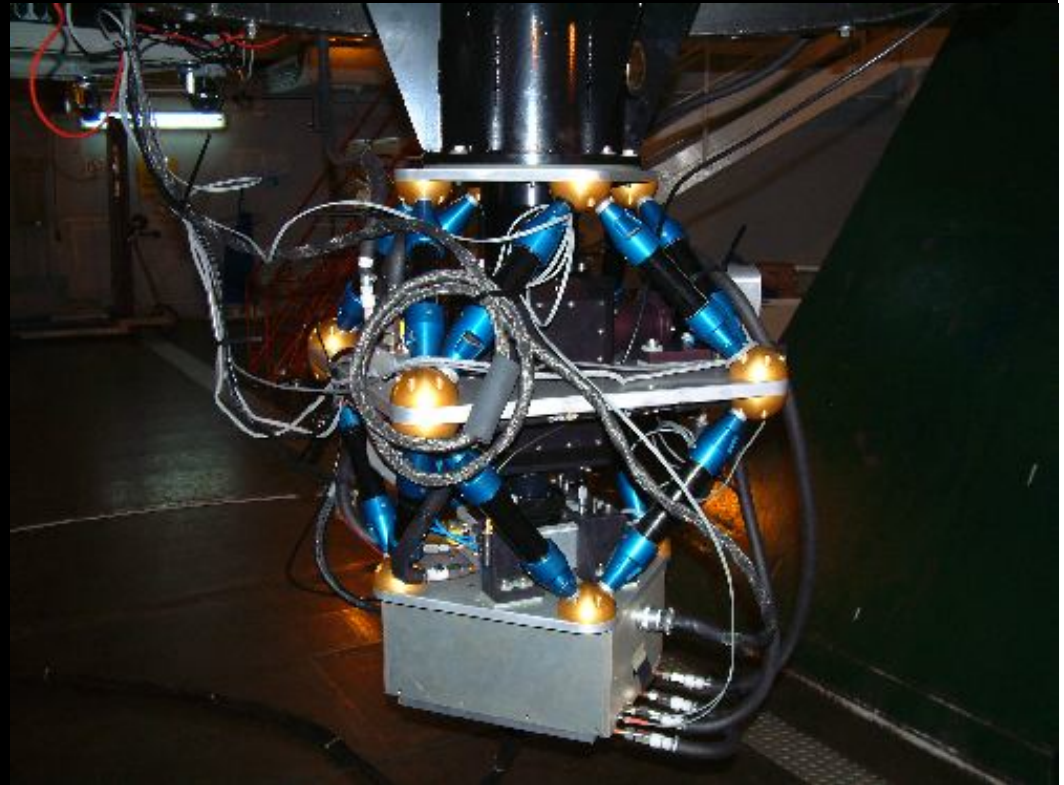
Exoplanets with ULTRACAM

Peter Wheatley

University of Warwick

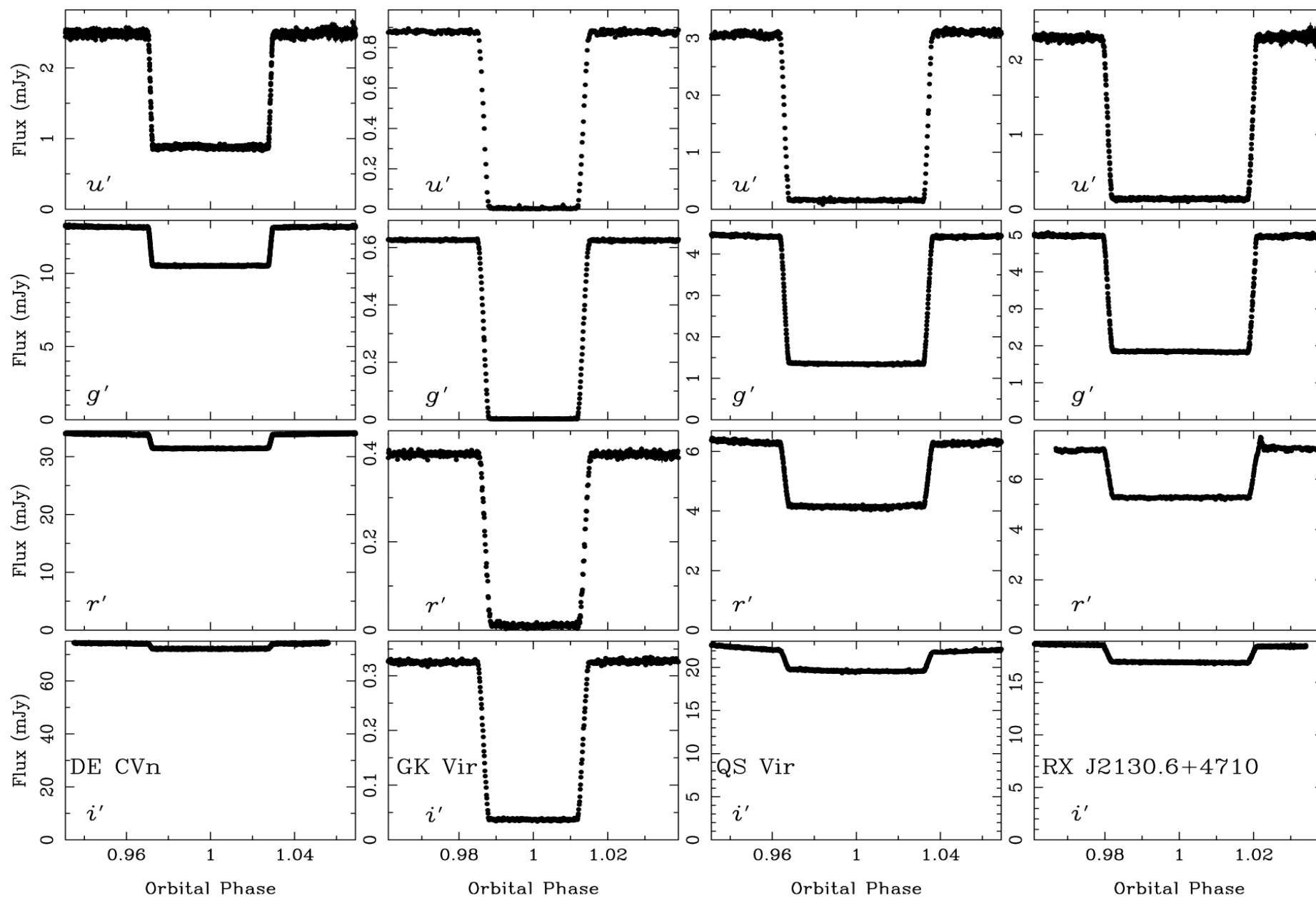
Exoplanets with ULTRACAM

- Discovery via white dwarf binary eclipse timings
- Thermal emission via planet occultations
- Atmospheric composition by transmission photometry



Eclipsing white dwarf binaries

Parsons, Marsh et al., 2010

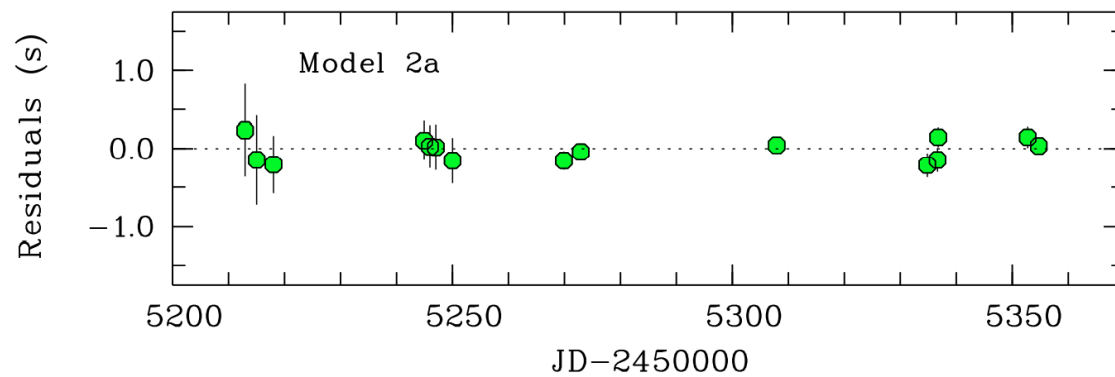
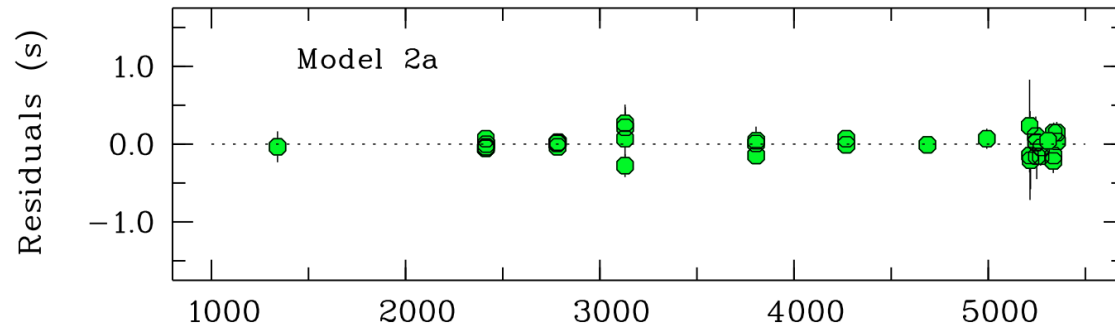
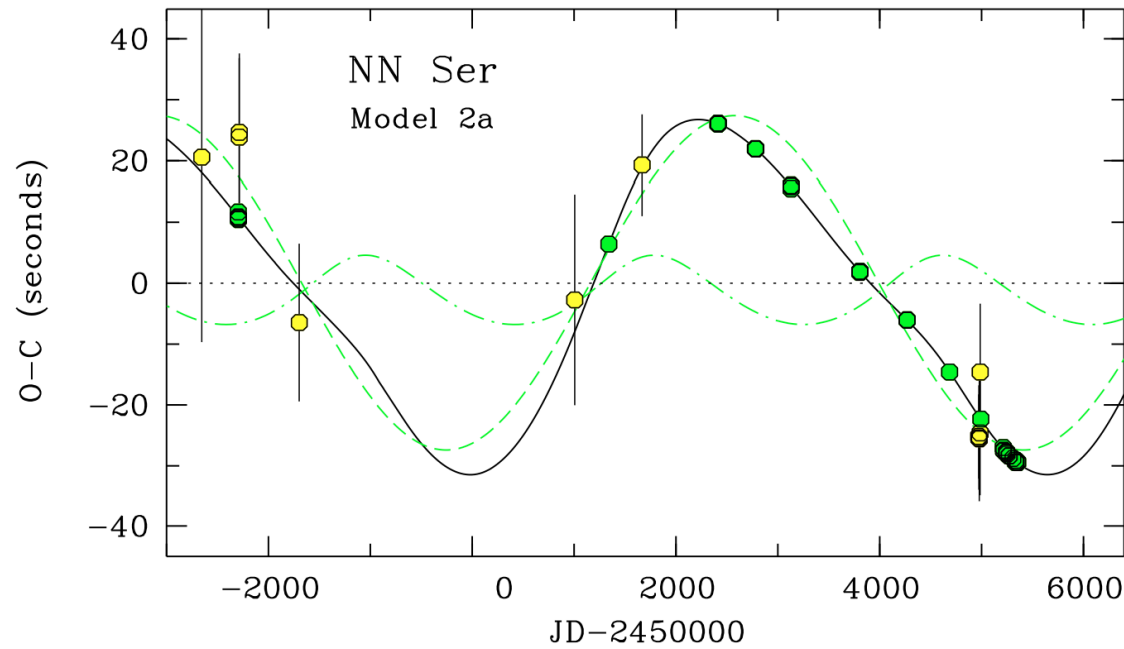


NN Ser

Beuermann et al 2010

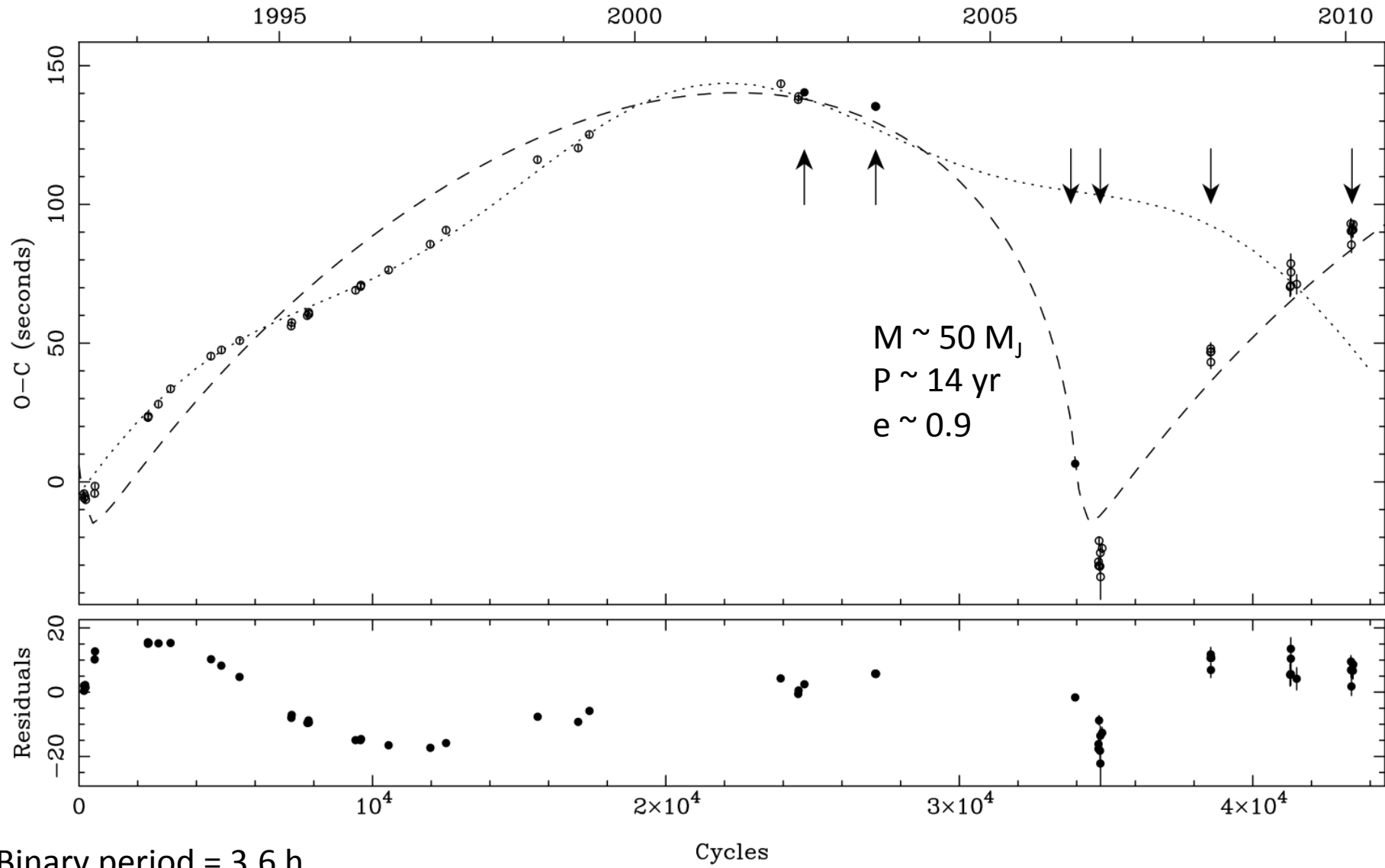
Binary period = 3.1 h

Planets:
Periods ~ 16 & 8 yr
Masses ~ 7 & $2 M_J$
 $e \sim 0$ & 0.2



QS Vir

Parsons, Marsh et al., 2010



Transiting exoplanets

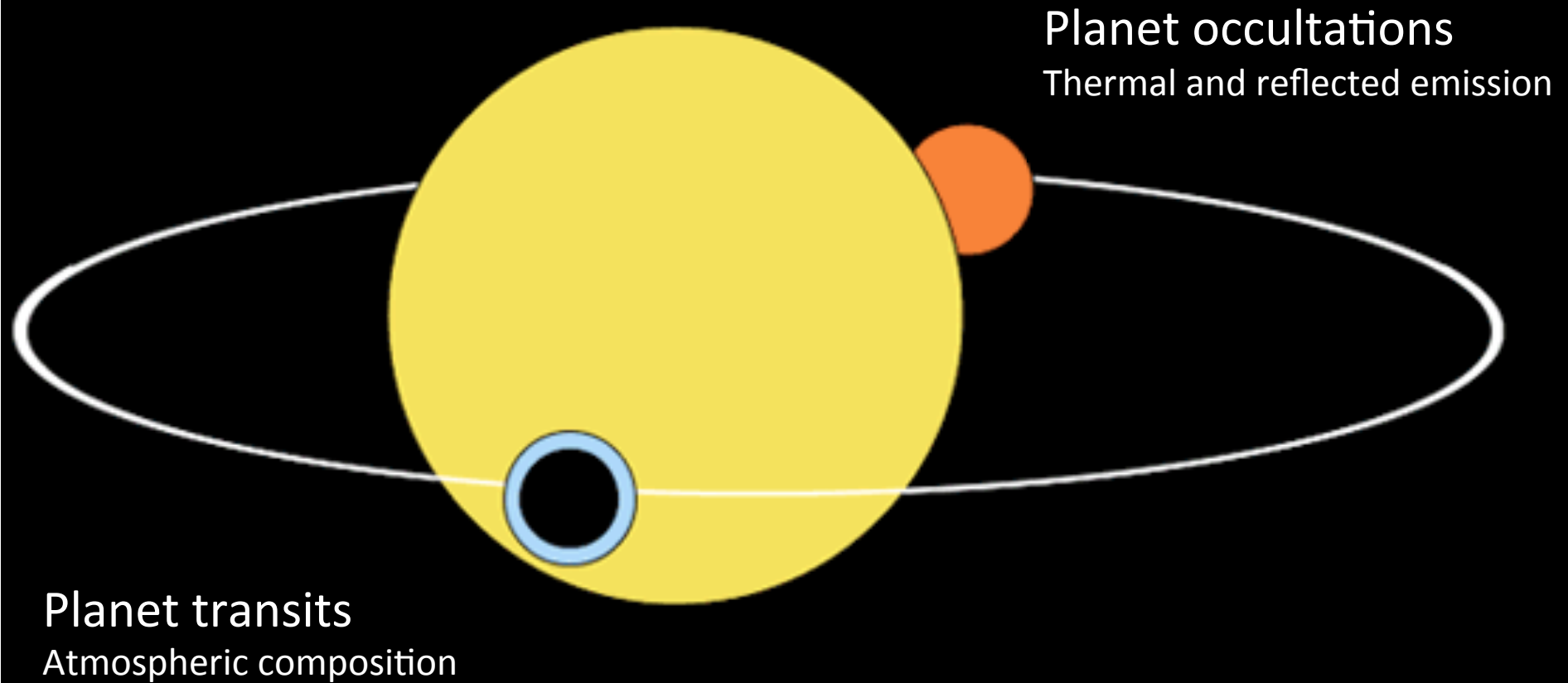
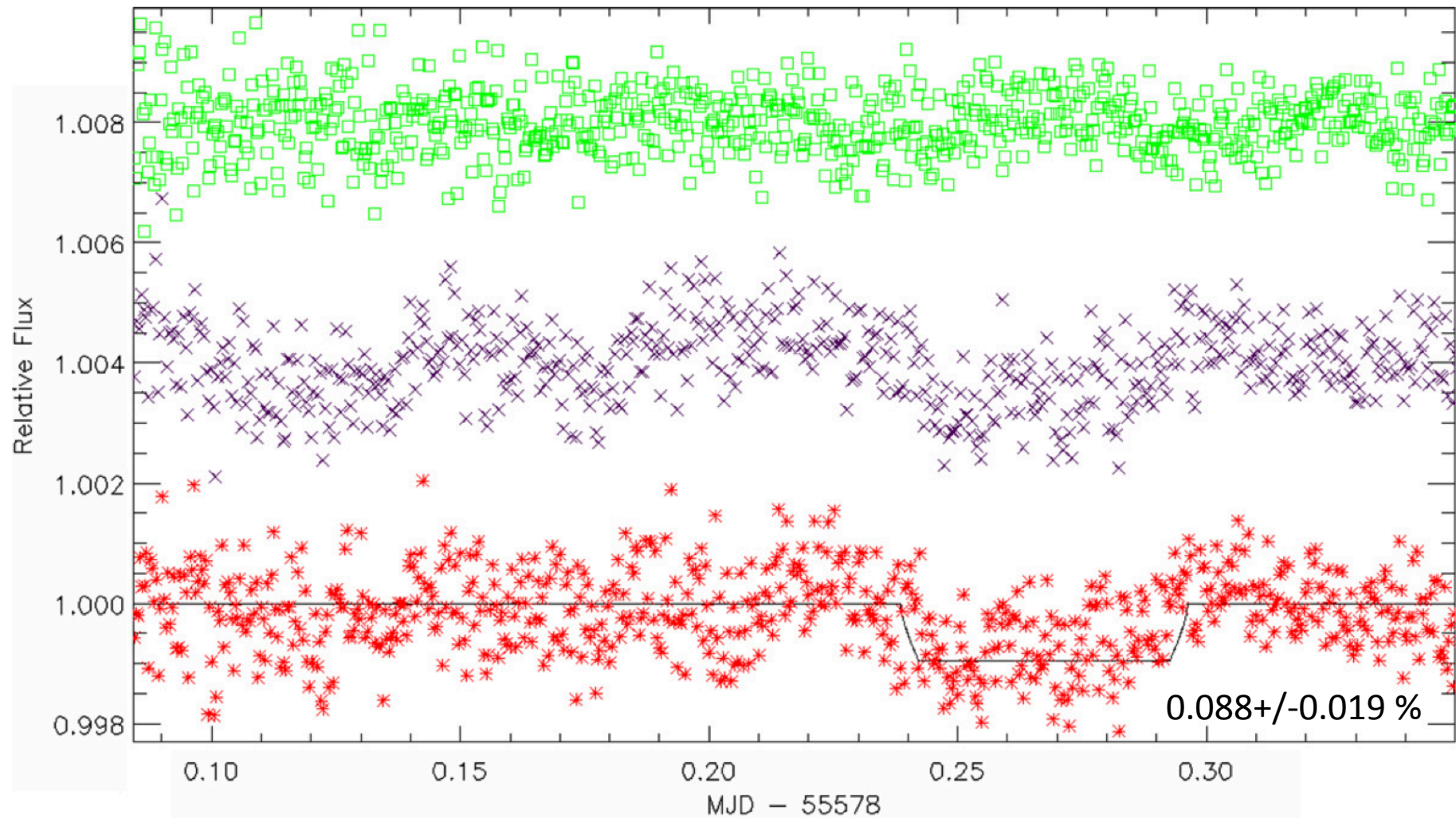


Figure: Sarah Seager

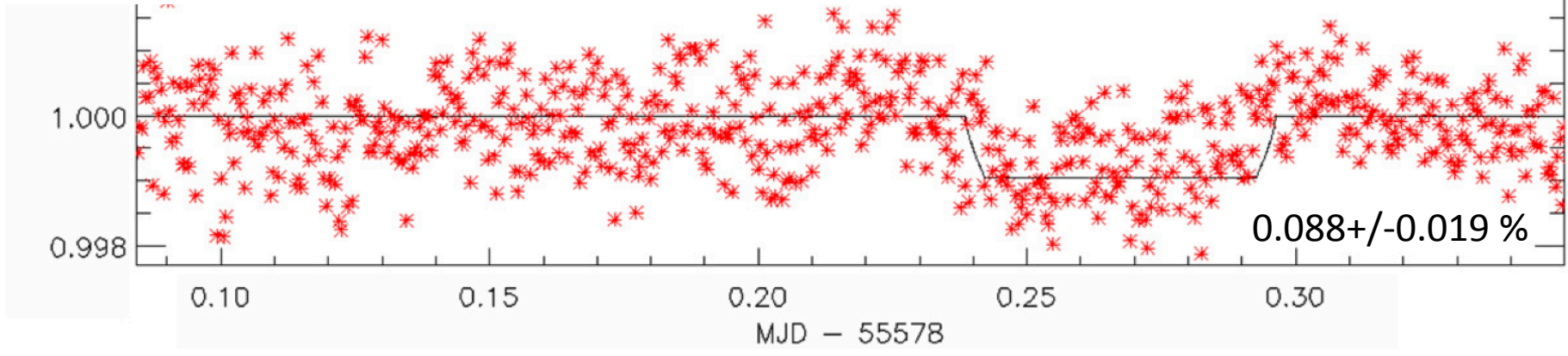
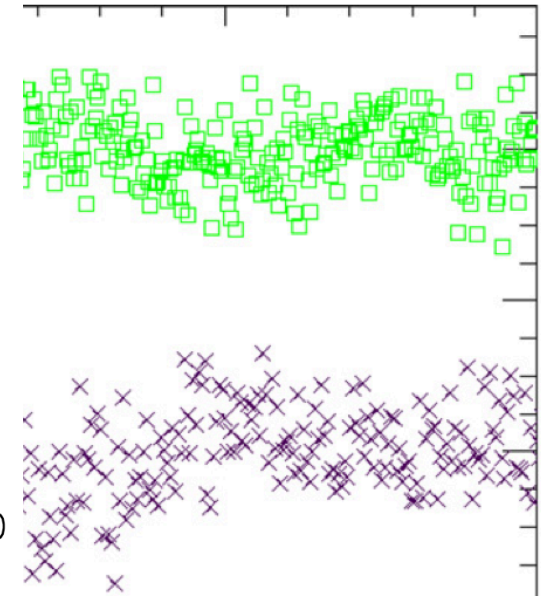
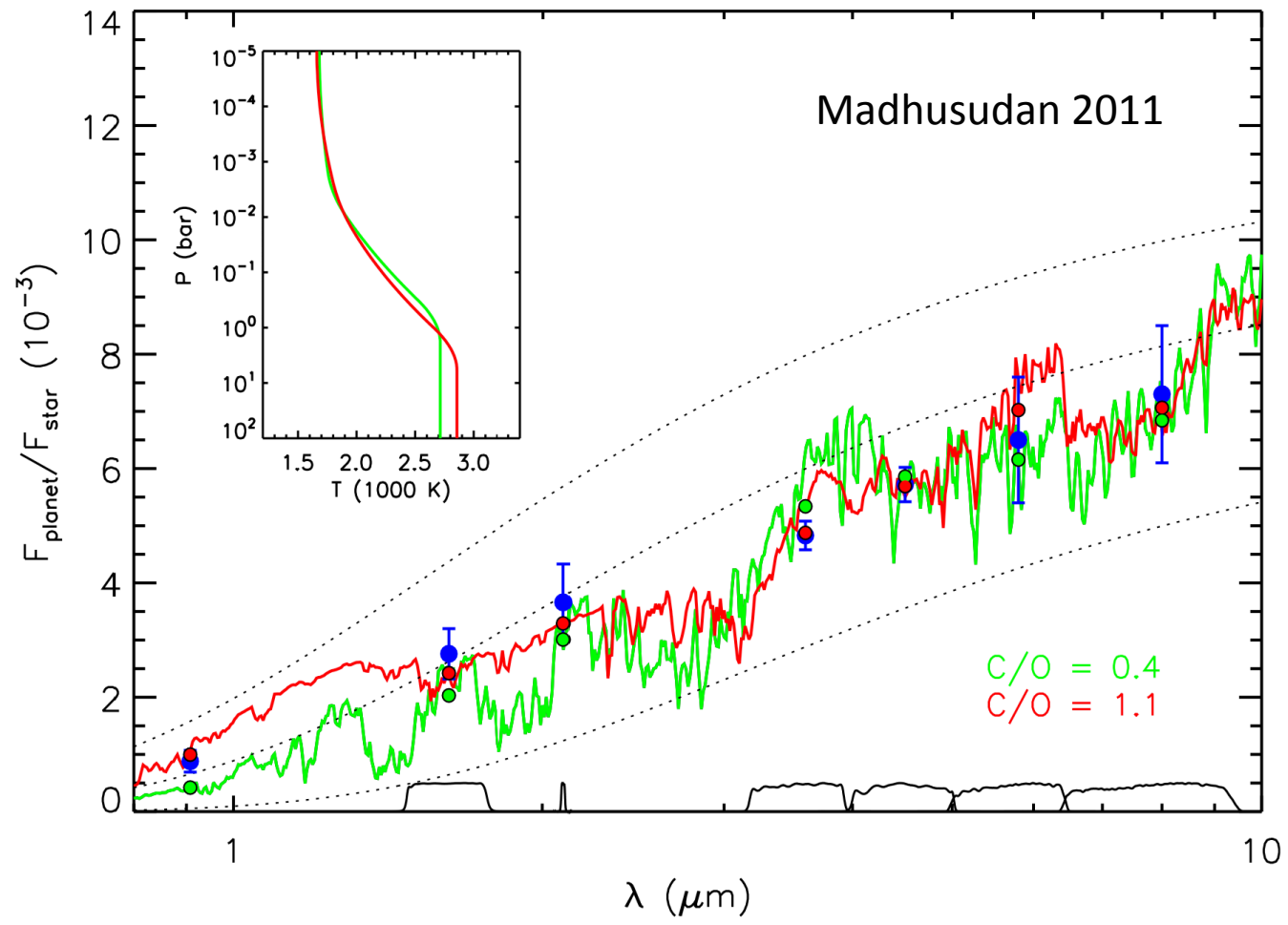
WASP-19b z-band occultation

Burton, Watson et al. 2012

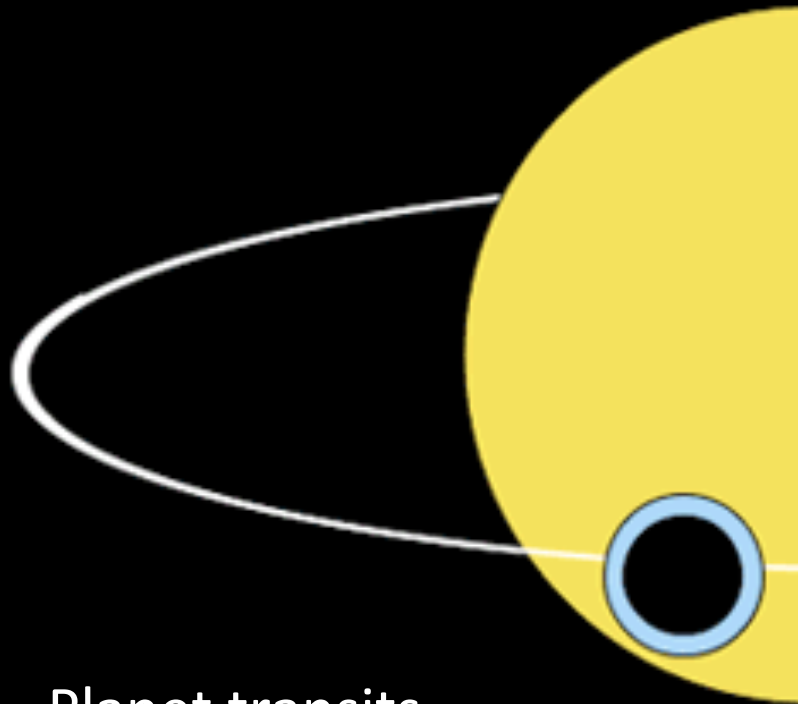


WASP-19b z-band occultation

Burton, Watson et al. 2012



Transiting exoplanets



Planet transits
Atmospheric composition

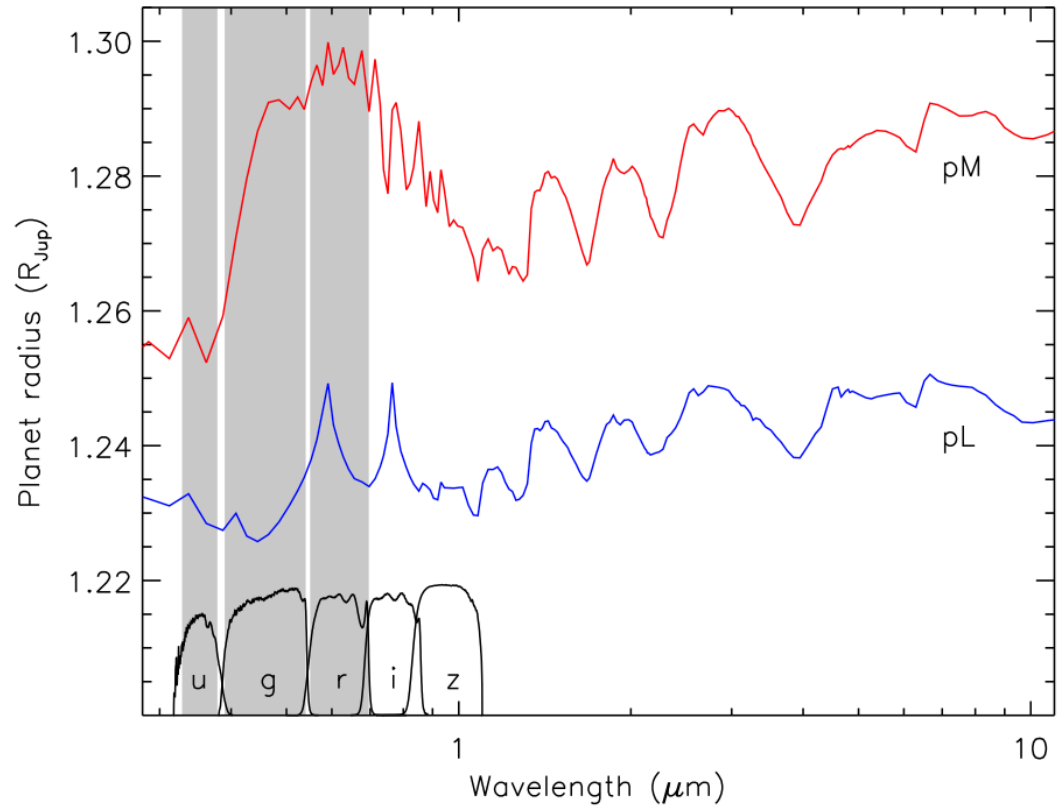
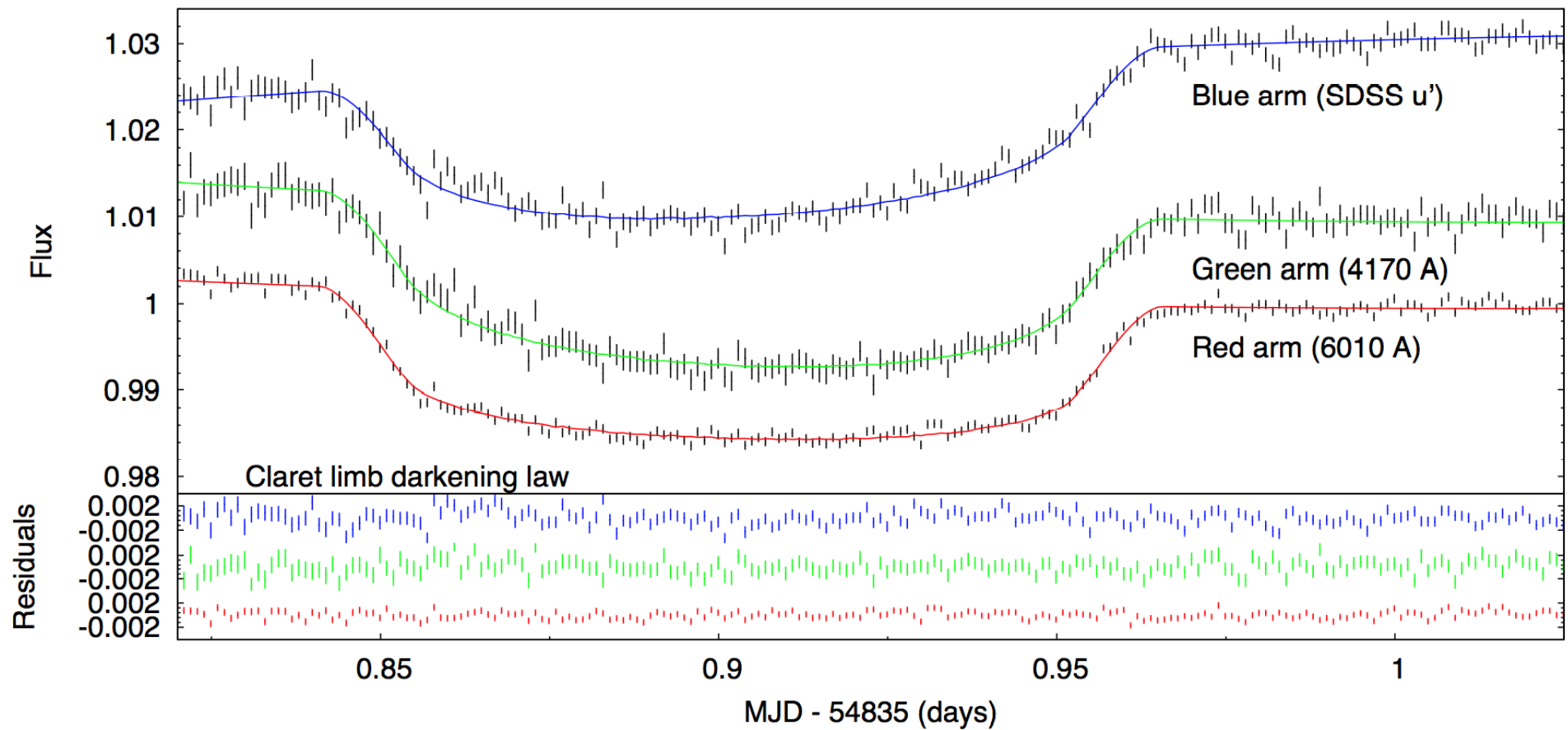
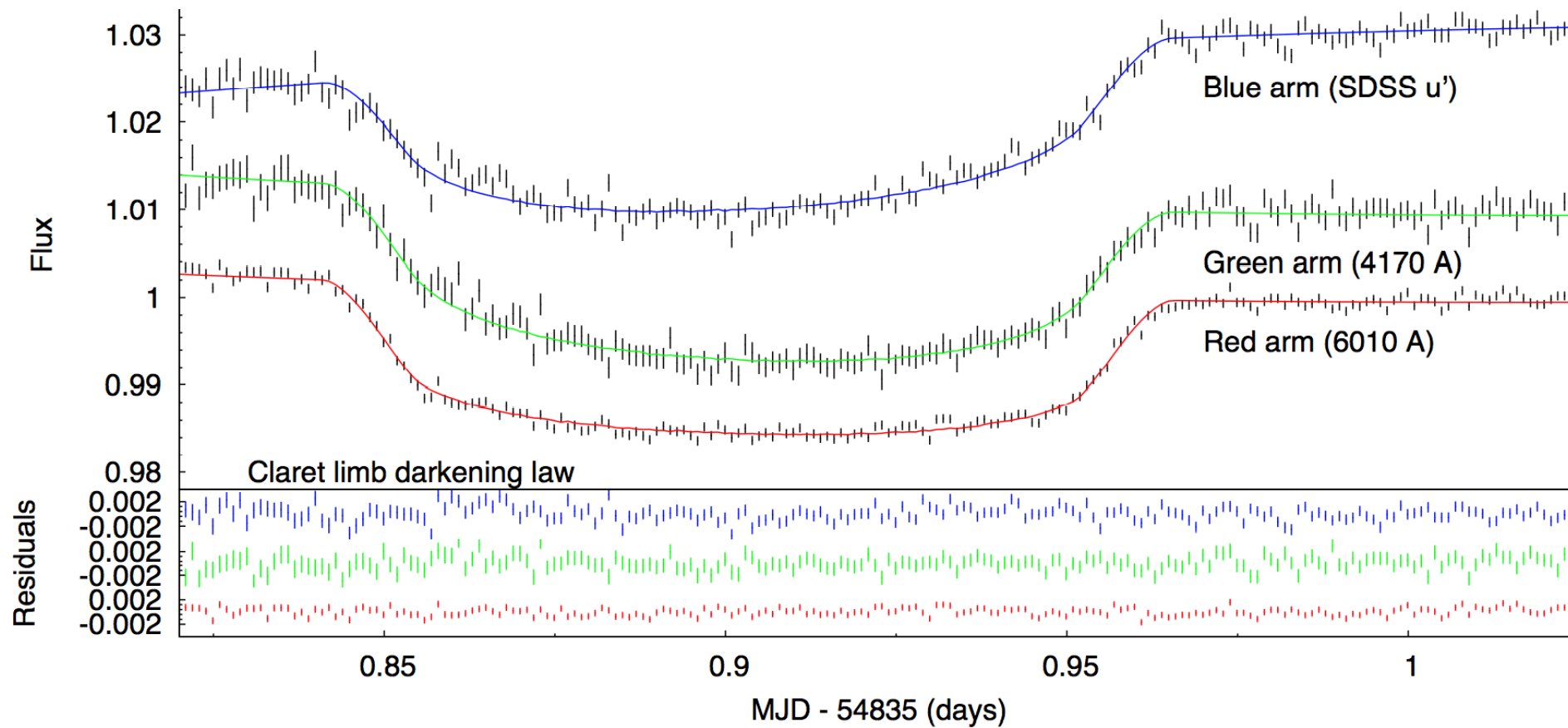
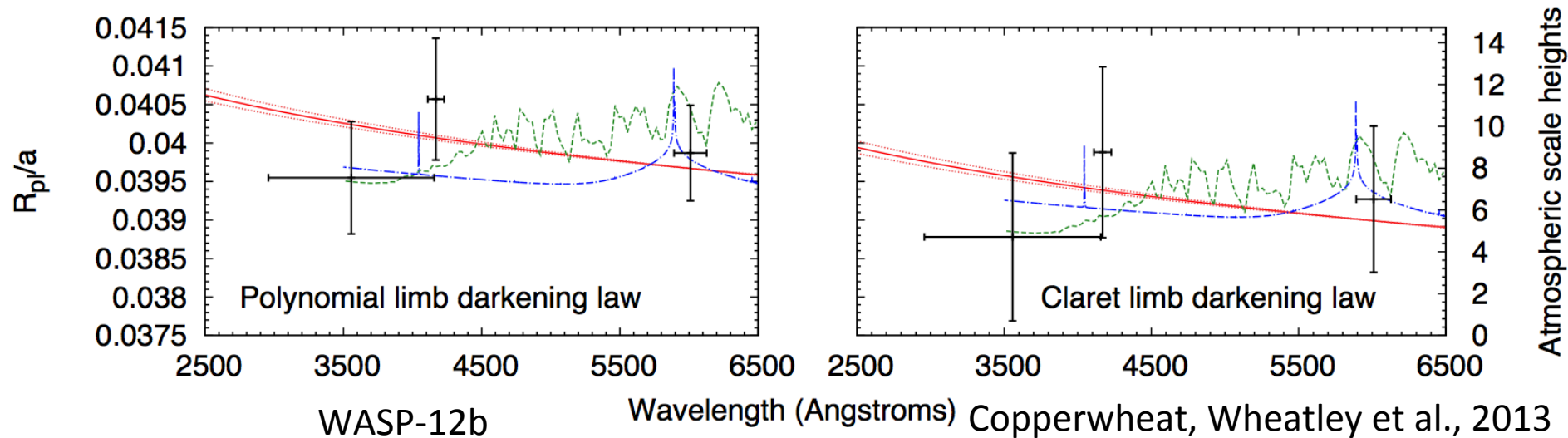


Figure: Sarah Seager

WASP-12b transmission photometry

Copperwheat, Wheatley et al., 2013





Summary

- High speed photometry with ULTRACAM is revealing a new class of planet around post common envelope binaries
 - How do they form and evolve?
- High speed observations also allow efficient high precision observations of planet transits and occultations
- z-band occultations with ULTRACAM can distinguish between carbon and oxygen rich planets
- Simultaneous 3-band transits with ULTRACAM probe higher-altitude atmospheric composition and clouds / hazes.