HST/WFC3 Observations of Giant Hot Exoplanets

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Detection of a transit of the super-Earth 55 Cnc e with Warm Spitzer* astro-ph/1105.0415

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Source of the difference?
- observational error?
- stellar activity?
- CO exosphere?

Deeper transit, larger planet than Winn et al. and consistent phase
Scope of our program

Grism spectroscopy of transiting giant planets

- 7 planets at eclipse (56 HST orbits)
- 13 planets at transit (59 HST orbits)

Includes bright systems in Kepler and CoRoT fields

HAT-P-7, TrES-2, CoRoT-1 and -2
Motivation…

Spitzer results imply thermal inversions - but degeneracies require near-IR data
Caution...

HST/NICMOS spectroscopy is disputed
- NICMOS has significant systematics
- Fortunately, WFC3 is known to be better
- Our large sample facilitates discrimination against systematic errors
- Only water absorbs at this wavelength, so theoretical degrees of freedom are minimized

Status of our program...
46 of 115 orbits, and 8 planets, observed
Analysis in progress...

Photometry:
Scatter about twice the photon noise, with residual instrument errors
to be observed in July, 2011

In the diagram:
- The graph shows relative flux against phase.
- The data points show a scatter about twice the photon noise.
- There is a red line indicating the instrument effect.
Spectroscopy:
Close to photon-limited, and instrument effects ratio out