SkyMapper + Exoplanets

Daniel Bayliss
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Daniel Bayliss

Mt Stromlo Observatory, RSAA

Australian National University

Overview

- A SkyMapper Exoplanet Survey?

- Current/Upcoming Transit Surveys in the South.

- The Role of SkyMapper in Exoplanet Surveys

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- 5.2 square degrees + single site is not competitive with **bright-star** (V<13) transit discovery surveys (HATSouth, HATNet, WASP, KELT, K2, TESS).

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- **Conclusion = No exoplanet survey on SkyMapper.**

Current Southern Transit Surveys

Survey	V Mag Range	Pixels	Operation Years
HATSouth	V=11-16	384 MPixels	4
WASP-South	V=8-13	32 Mpixels	8
KELT-South	V=6-11	16 Mpixels	5
Kepler K2	V=12-17	95 Mpixels	0

Upcoming Southern Transit Surveys

| Survey	V Mag Range	Pixels	Operation Start
NGTS (2014)	V=11-16	~400 MPixels	2014
TESS (2017)	V=4-12	64 Mpixels	2019
PLATO (2024)	V=6-11	128 Mpixels	2024

The Role of SkyMapper

1. Ground-based surveys need optical colours for detecting false candidates

2. Space-based missions need above **PLUS** colours for target select (only ~5% of pixels can readout).

3. SkyMapper shallow survey is well matched to mag. limits of transit surveys.
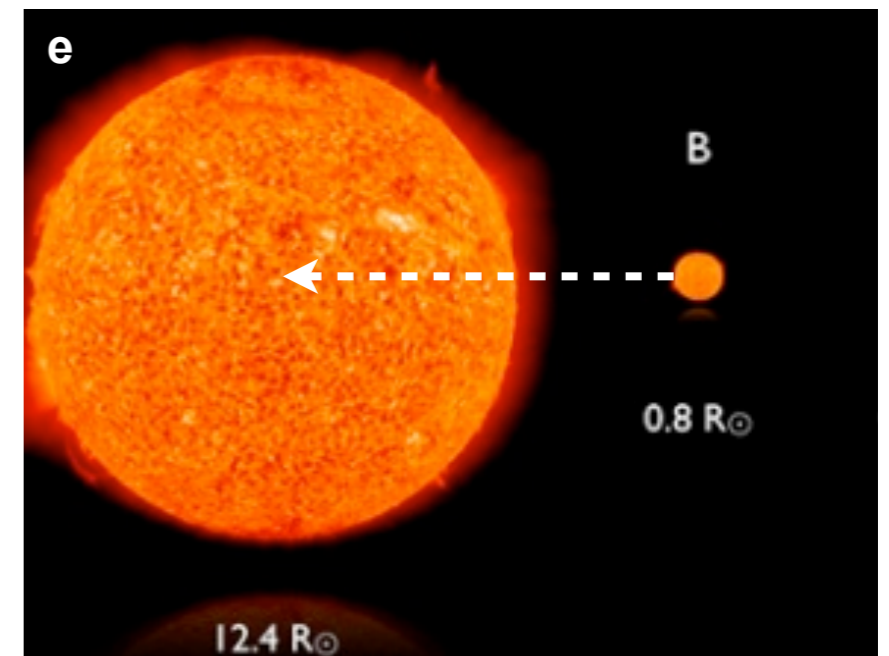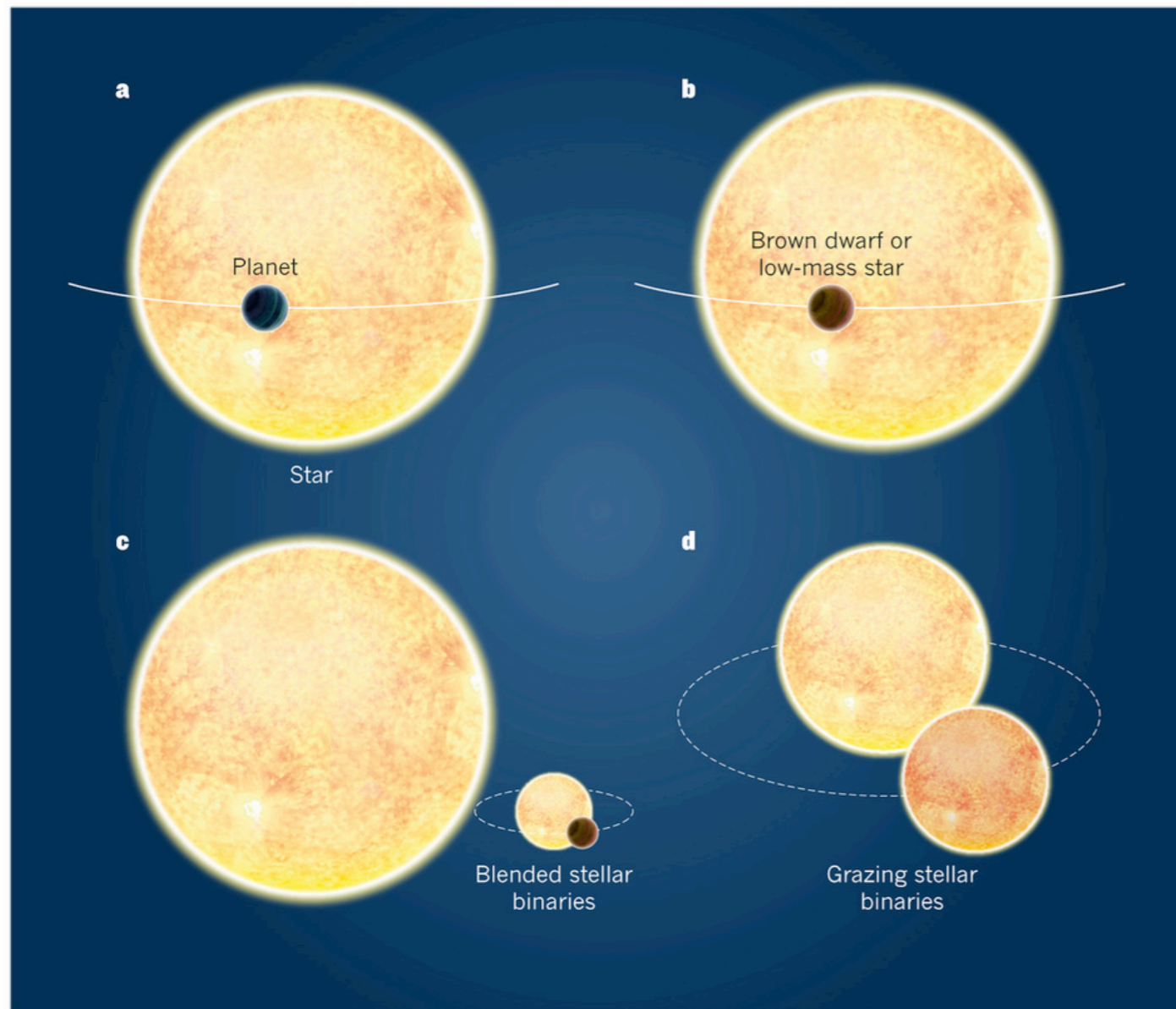
Discovery of a candidate
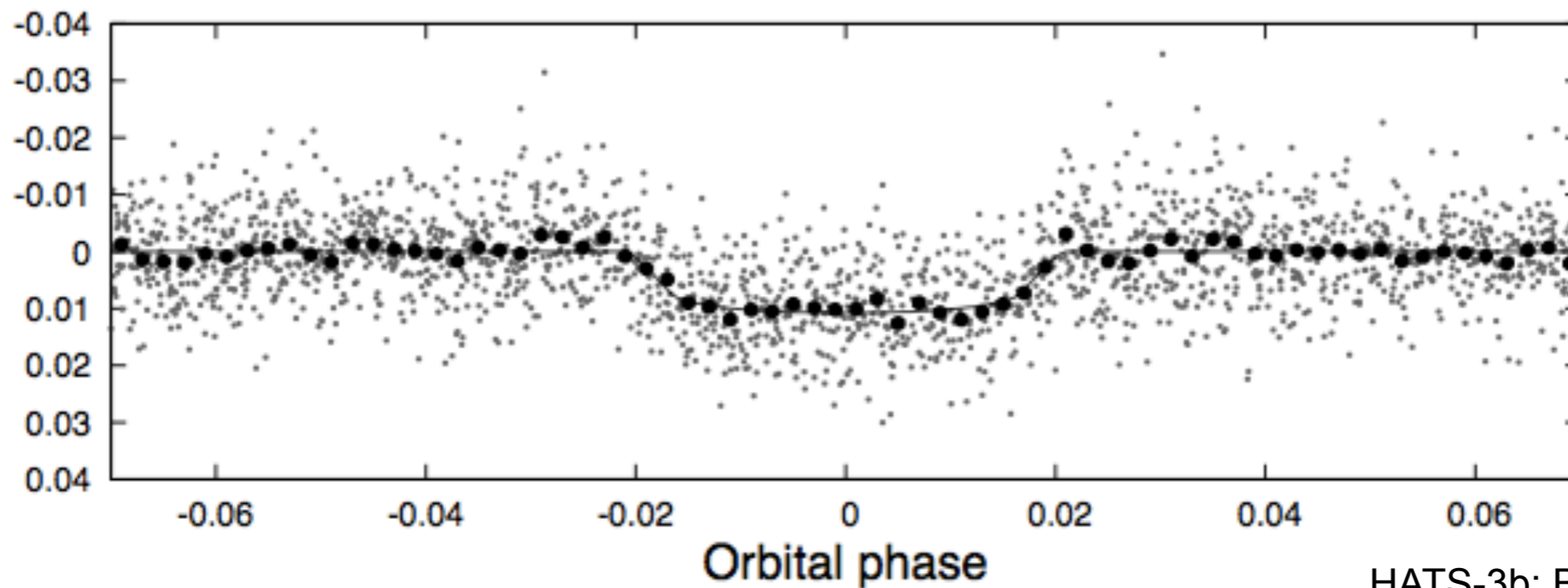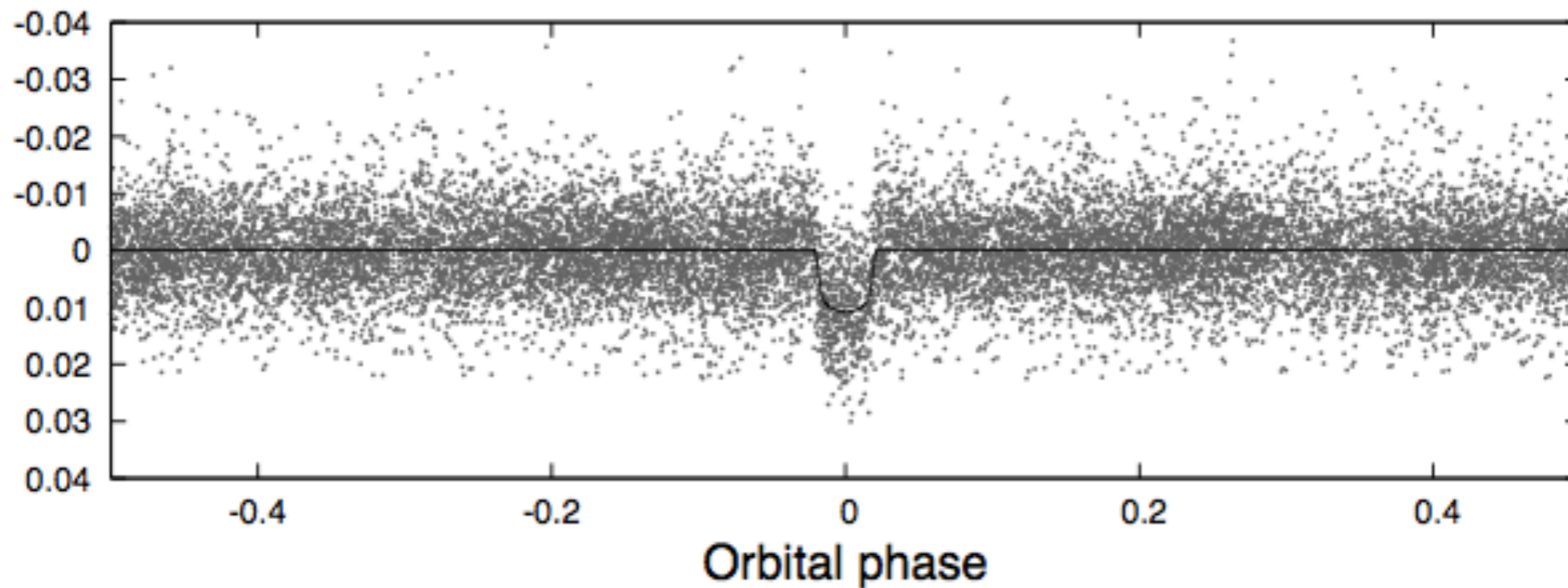
HATS-3b; Bayliss et al., 2013

1. Rejecting False Candidates
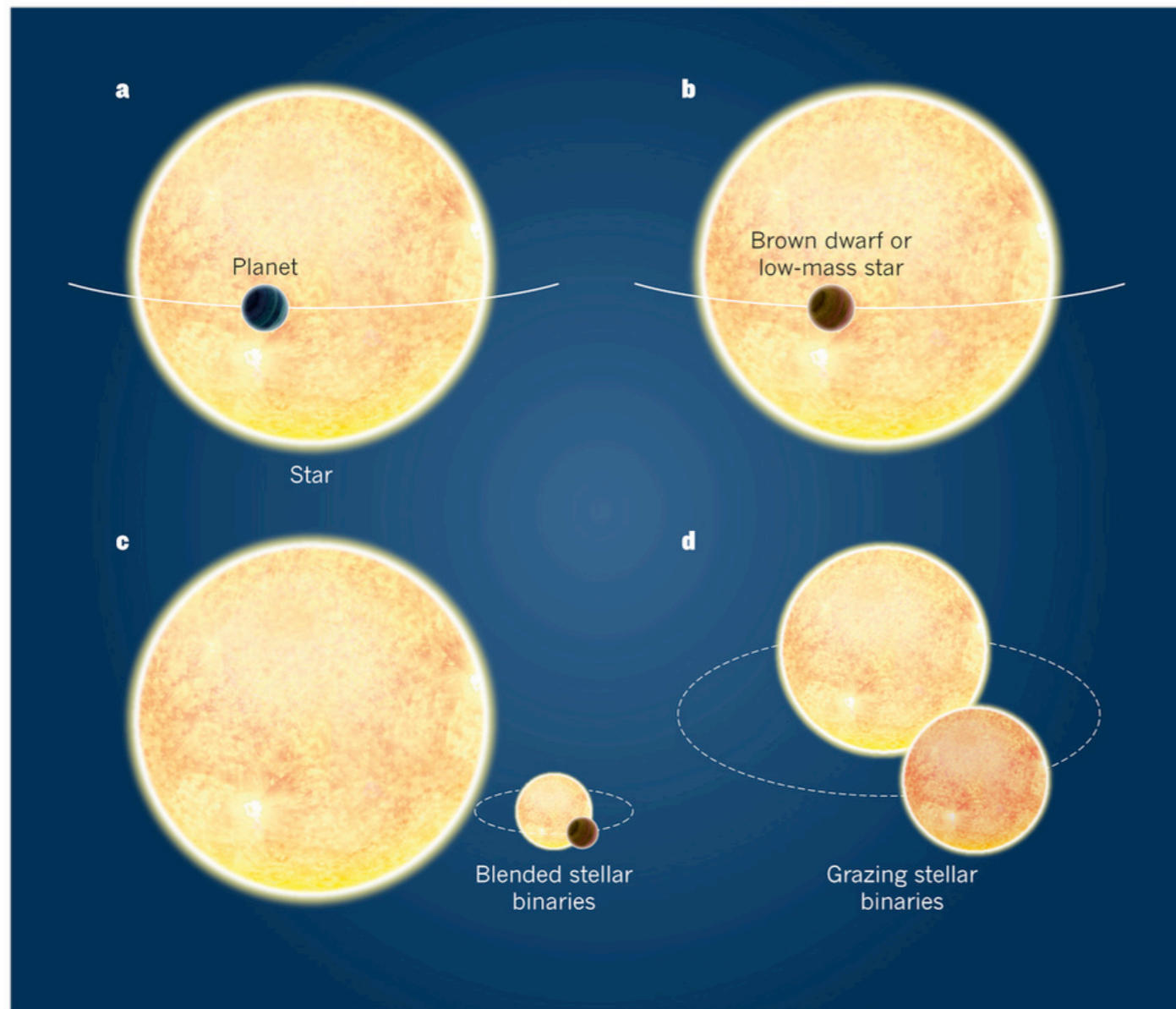
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Colours help us rule out candidates

Case study: HATS569-001

- Follow-up V-shaped transit together with the depth and transit duration indicate a stellar density of 0.66 gm/cc.

- This would be much too low given (J-K)=0.773 => Teff=4750K.

- A SkyMapper log(g) will be invaluable.

Target selection for space-based missions.

- In the same way, possible targets with log(g) values indicating a giant will be taken off target list.

- This is much more of an issue for bright star survey than it was for Kepler.

- Importantly transit surveys *want* m-dwarfs, so its not enough to reject "red" stars.

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- Most valuable parameter will be log(g) determination, which will help reject candidates and select targets for space missions.
- Timing - Possibly in time for later K2 fields. TESS may be served by GAIA and/or Funnelweb.