

DO BROWN DWARFS HOST SMALL PLANETS?

INITIAL RESULTS FROM SAINT-EX PHOTOMETRIC SURVEY

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Detection of Earth-sized transiting exoplanets around brown dwarfs using transit photometry with SAINT-EX telescope.

Constraints on the formation and rotational evolution of brown dwarfs.

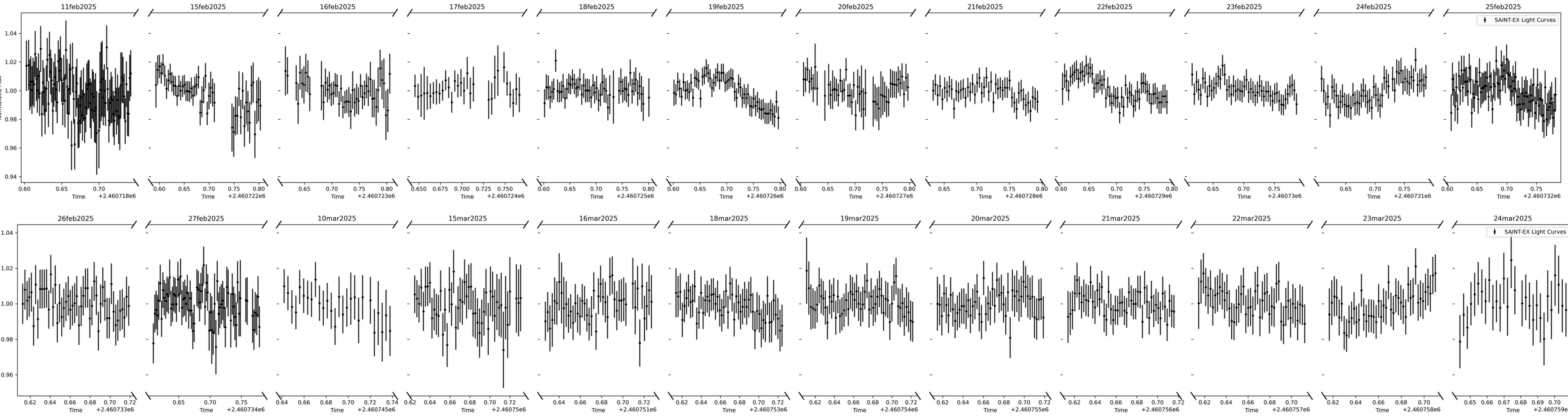


Brown Dwarfs Selection for Observations

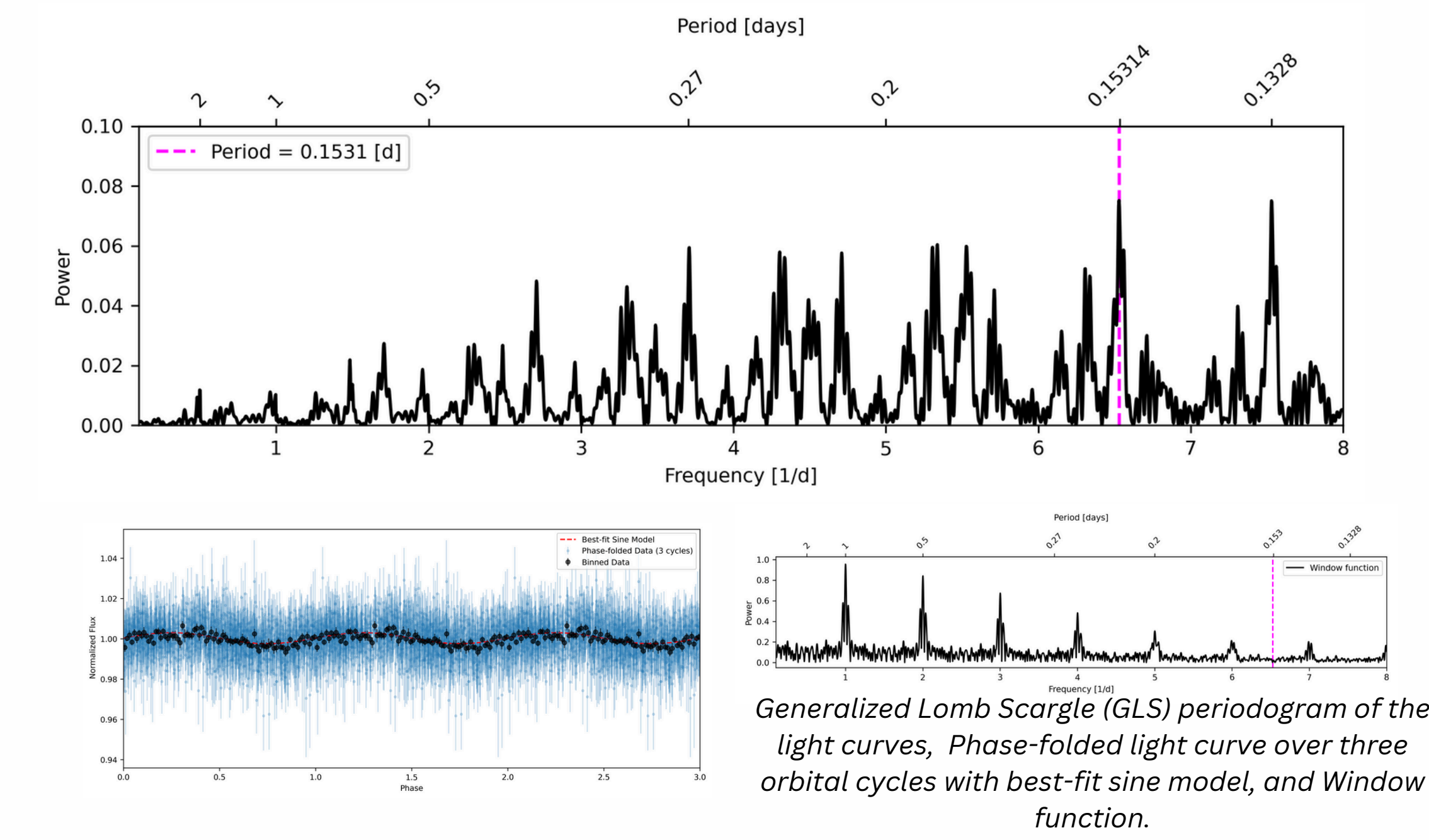
- Brown Dwarfs from Kirkpatrick et al. 2024 (the full-sky 20 pc census).
- Filtered based on their
 - Spectral type (L and T-dwarfs),
 - Temperature ($T_{\text{eff}} < 2500\text{K}$),
 - Magnitudes ($J < 15.5$),
 - Declination limits ($-35^\circ < \text{Dec} < 90^\circ$)
 - Binary flags (based on Kirkpatrick et al. 2024)
- Currently, sample of 10 Brown dwarf candidates.

INITIAL RESULTS ON FIRST BROWN DWARF OBSERVATIONS

SAINT-EX Light Curves: Observed from Feb 11, 2025 to Mar 24, 2025 (~24 nights), Precision: ~10 ppt.

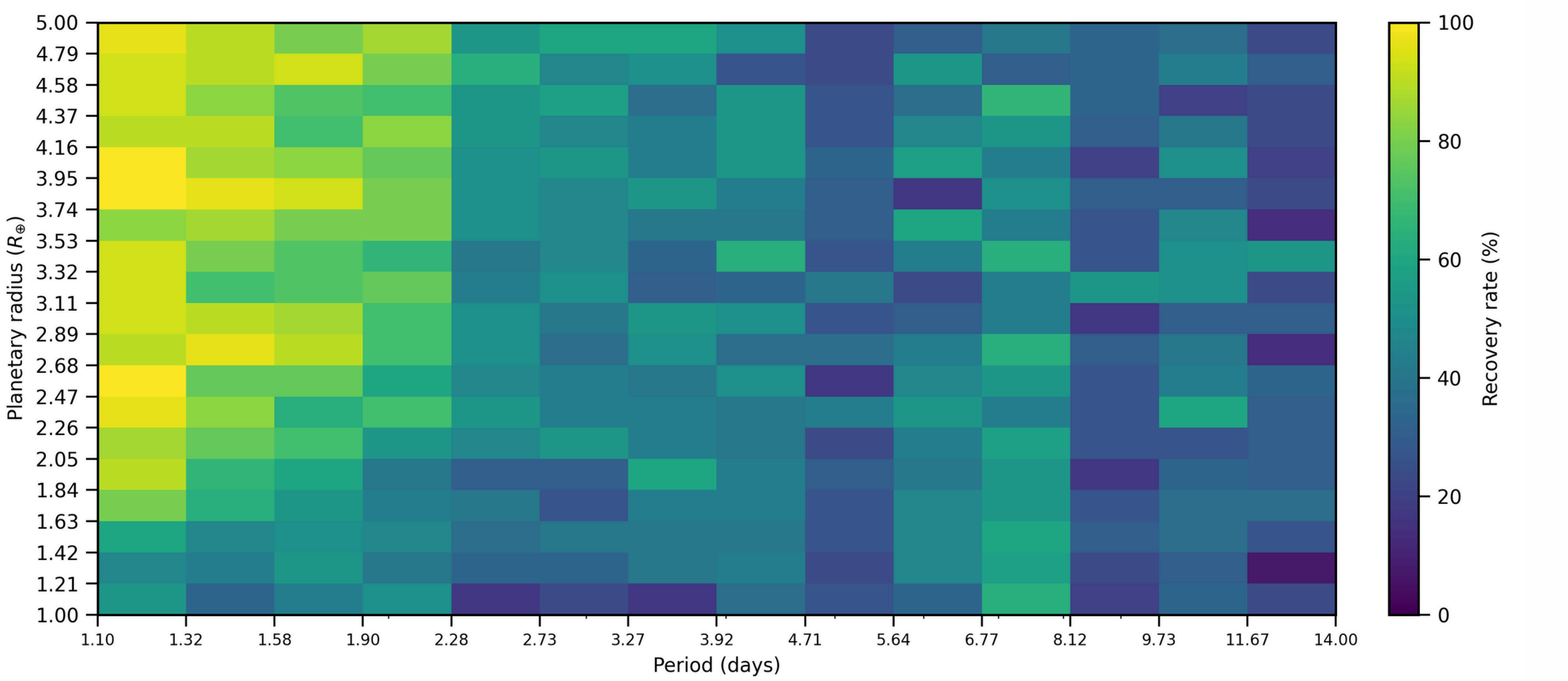


Rotational Modulation at a Period of ~0.15 days



- Kirkpatrick et al. 2024, *ApJS*, 271, 55
- Gómez Maqueo Chew, Y. et al. 2023 *RMxAA* CS, 55
- Zechmeister, M., & Kürster, M. 2009, *A&A*, 496, 577
- Hippke, M., & Heller, R. 2019, *A&A*, 623, A39

~7900 Injection Tests Reveal Limited Sensitivity to transiting Planets Under $2R_{\oplus}$



SUMMARY & CONCLUSIONS

- Shortlisted 10 brown dwarfs candidates for observations.
- Observed first brown dwarf for ~24 nights in I+z filter and detected rotational modulation at a period of 0.15 days.
- No Earth-like planetary transits detected in current dataset.
- Transit injection and recovery tests show sensitivity limits at $2R_{\oplus}$.



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