Transiting Exoplanets Subgroup

LSST Transients Working Group Workshop
March 24-25, 2016

Exoplanet Goals

- Determine planet occurrence rates for various stellar populations

    – How stellar environment impacts planet formation rates

- LSST will observe stellar populations rarely surveyed for planets

    – MLTY dwarfs

    – White dwarfs

    – Cluster stars

    – Stars in the galactic bulge

    – Stars in the LMC

Current Work

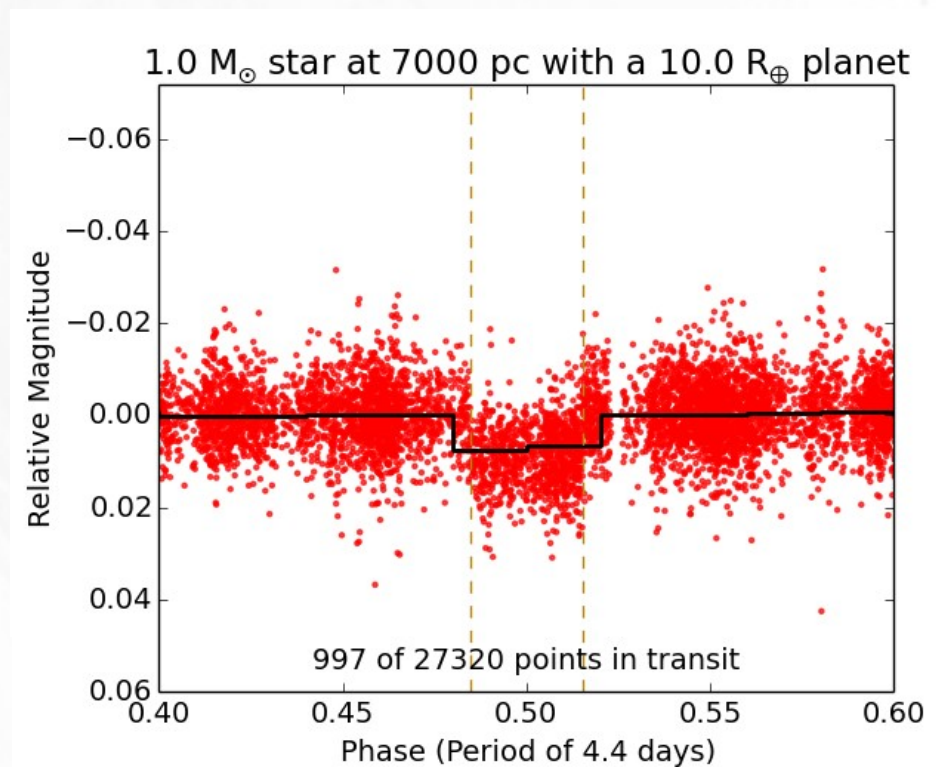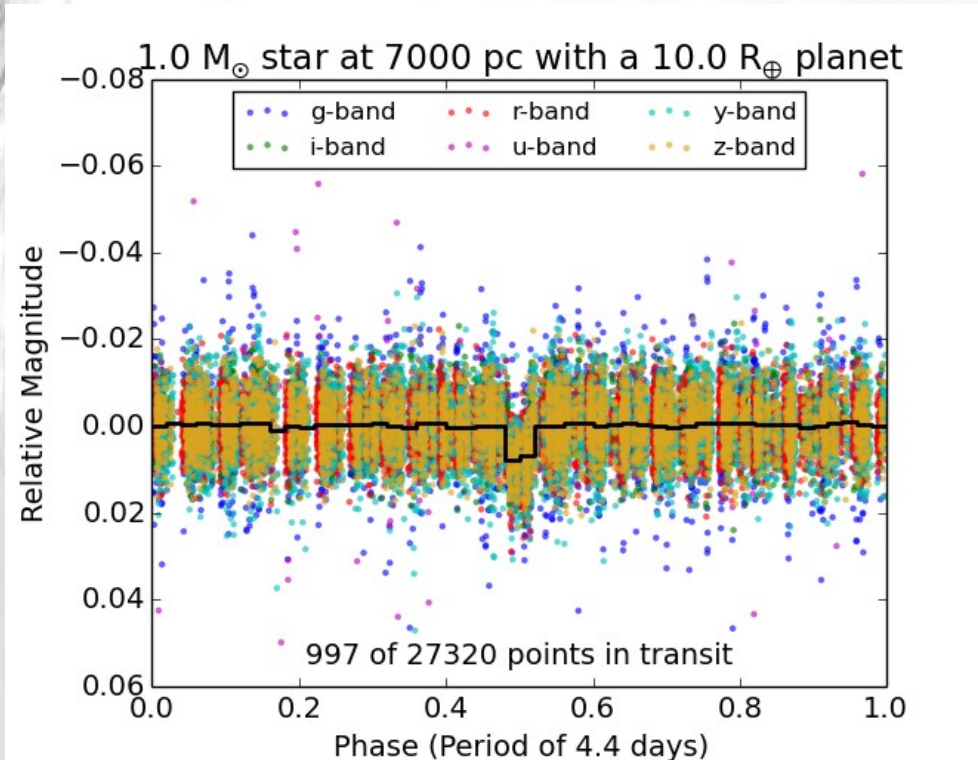- ## Three published papers, two in prep

  Jacklin, S. R., Lund, M. B., Pepper, J., et al. (2015). Transiting Planets with LSST II. Period Detection of Planets Orbiting 1 Solar Mass Hosts. AJ, 150(1):34.
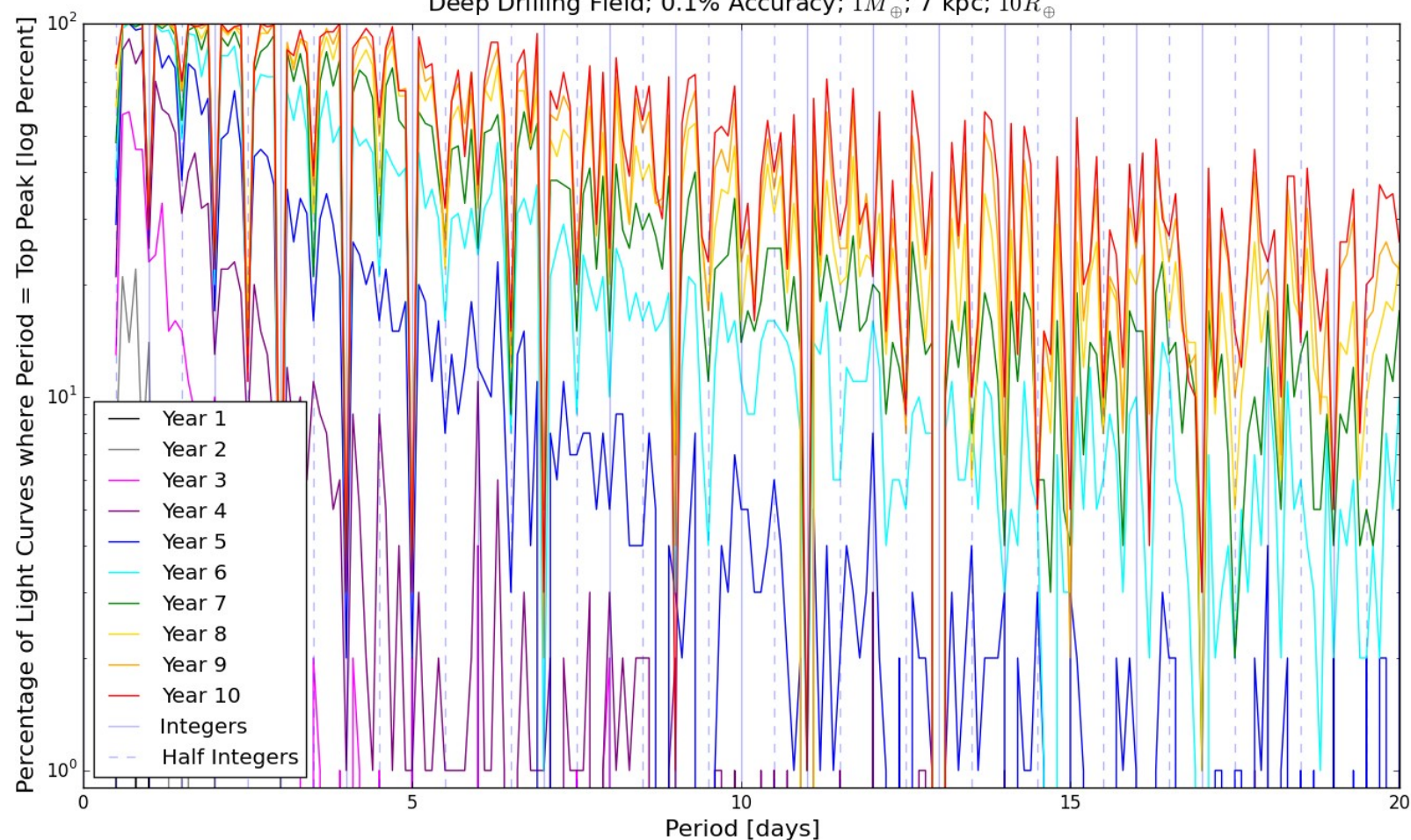
  Lund, M. B., Pepper, J., and Stassun, K. G. (2015). Transiting Planets With Lsst. I. Potential for Lsst Exoplanet Detection. AJ, 149(1):16.

  Lund, M. B., Siverd, R. J., Pepper, J. A., et al. (2016). Metrics for Optimization of Large Synoptic Survey Telescope Observations of Stellar Variables and Transients. PASP, 128(960):025002

- ## Examination of period recoverability and detection of transiting planets and creation of metrics to apply to periodic sources

  - Both deep-drilling and regular cadence

Sample deep-drilling field light curves

Yearly transit detection (deep drilling)

Top Peak = Correct Period Returned with Power Threshold:

Deep Drilling Field; 0.1% Accuracy; $1M_\oplus$; 7 kpc; $10R_\oplus$

Group Connections

- Keivan Stassun: TVS – Classification lead

- David Ciardi: MW – Variable stars lead

- Membership overlap with other TVS groups

    - Microlensing

    - Interacting Binaries

    - Magnetically Active Stars

Workshop Goals

- Subgroups to work with
  - Classification/Characterization
  - Interacting Binaries
  - Best group for eclipsing binaries?
  - Microlensing
    - Deep-drilling fields for transiting planets
  - MW: Variable Stars

Workshop Goals - Questions

- How can we characterize LSST bright end (~16th mag) and can data be extracted from partially saturated stars?

- Can OpSim results provide a better simulation of deep-drilling field cadences?

  - Currently 6 deep drilling fields, not 10