

# NASA / LBTI Exozodi Survey

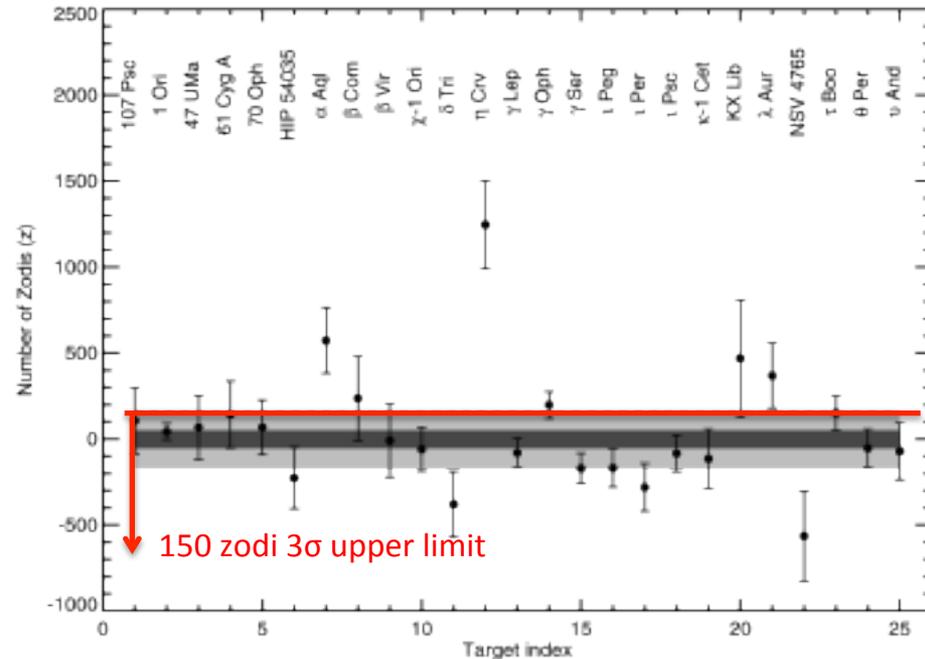
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Decadal Survey ASTRO2010:

“... need to characterize the level of zodiacal light present so as to determine, in a statistical sense if not for individual prime targets, at what level starlight scattered from dust will hamper planet detection”.

# Present Status of ExoZodi Knowledge in the Habitable Zone

- Spitzer/IRS (8-12 $\mu$ m):
  - 209 stars, most FGK .
  - 1% detection rate.
  - 1 $\sigma$  limits range: 200-1000 zodi.
  - Average 1 $\sigma$  limit: 300 zodi.
  - Limited by ability to subtract stellar photosphere.
  - Beichman et al. 2006, Lawler et al. 2009.
- MMT/BLINC (N-band,  $\lambda_{\text{eff}} = 11 \mu\text{m}$ ):
  - 6 stars, most early spectral types.
  - Average 1 $\sigma$  limit: 70-200 zodi.
  - Liu et al. 2009, Stock et al. 2010.
- KI/Nuller (N-band,  $\lambda_{\text{eff}} = 8.5 \mu\text{m}$ ):
  - 43 stars.
  - First results published (Serabyn survey, Millan-Gabet et al. 2011)
    - 25 stars, most FGK.
    - 1 $\sigma$  limits range: 50-250 zodi.
    - Average 1 $\sigma$  limit: 150 zodi.
    - Mean for the class:  $0 \pm 50$  zodi.
  - Limited by complex night-to-night null calibration non-repeatability at the 0.2% level.
  - See also detailed  $\beta$  Leo study of Stock et al. 2010.



Need to push the sensitivity down by > 1 order of magnitude.

# THE NASA / LBTI Survey

- PI: Phil Hinz, University of Arizona.
- 60 nights → estimate 80 stars.
- 5 years, starting after commissioning is completed (nominally Fall 2012).
- Data archiving and public distribution at NExSci.
- NASA will fund an effort to form a PI-led Science Team including 3-4 external investigators which will contribute critical expertise needed for the optimum execution of the key science exozodi survey (target selection, observing strategies, data analysis, and interpretation).
- Expect the call in late January 2012, to be announced via a ROSES amendment:
  - AO at <http://nexsci.caltech.edu/>

# Possible components of the LBTI survey

- A. Shallow survey of nearby FGKM stars, say  $\sim 15$  stars of each spectral type:  $\sim 60$  stars.
- B. Small survey of well known high-dust systems for detailed zodi cloud characterization and high-impact science:  $\sim 10$  stars.
- C. Deep survey at absolute best performance of top-TPF candidate stars:  $\sim 5-10$  stars, each taking  $\times 4-9$  longer to go  $\times 2-3$  deeper