

Requirements for Exoplanet Science

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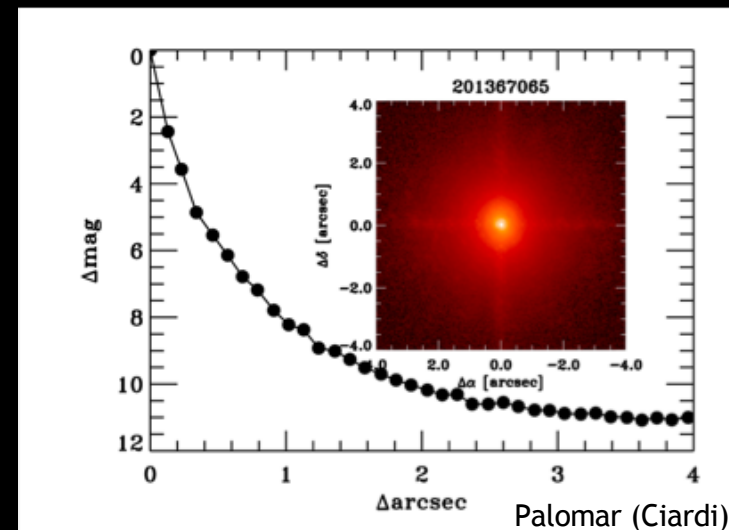
NOAO 2020 Decadal Survey Community Planning Workshop

Bright Universe Breakout Session

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Observations Required for Vetting Candidate Planets

- **Seeing-limited imaging**
 - Identify wide stellar companions
- **High-contrast imaging**
 - Identify close stellar companions
- **Speckle imaging**
 - Identify close stellar companions
- **Reconnaissance spectroscopy**
 - Stellar characterization
 - Identification of eclipsing binaries



Desired Exoplanet Observations

- **Photometry**
 - Transits
 - Secondary eclipses
 - Phase curves
- **High-resolution optical & near-infrared spectroscopy**
 - Radial velocity mass measurement
 - Orbital alignment (Rossiter-McLaughlin effect)
 - Combined high-contrast imaging + high-resolution spectroscopy
 - Atmospheric characterization
 - During transits & eclipses
 - In out-of-transit data

Timing of Observations is Important

- **Transit observations**
 - Capture ingress, egress, and out-of-transit baseline
- **Radial velocity observations**
 - Cover full phase curve
 - Untangle between stellar & planetary signals
 - Distinguish between eccentric orbits & additional planets
 - Accurately determine window for secondary eclipses

*Queue/cadence scheduling
is efficient & advantageous*

Interrupts & Targets of Opportunity

- **Rapid confirmation** of potential candidates
- Catch “**unusual**” **objects** like evaporating planets
- Observe **simultaneous transits** of multiple planets