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Title: Robotic Kepler follow-up: LGS-AO imaging of every KOI Star
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Abstract: Corrections Co-authors: Tim Morton, Christoph Baranec, Reed

Riddle

The Robo-AO Kepler survey is designed to observe every KOI star with LGS-AO imaging to search for blended nearby stars, which may be physically associated companions and/or responsible for transit false positives. Up to now, it has been extremely resource-intensive to obtain adaptive optics images of the thousands of candidates generated by Kepler because of the faintness of the targets and the excessive observing time required. The Robo-AO LGS-AO system, newly commissioned on the Palomar 60-inch telescope, is the first system capable of rapidly observing these thousands of faint targets at high resolution. We have taken LGS-AO images of more than 1700 KOI hosts and performed multicolor photometry and common-proper-motion follow-up on more than 100 candidate companions.

Robo-AO, the world's first robotic laser guide star adaptive optics system, routinely images 20+ targets per hour completely autonomously, with overheads of less than 90 seconds per target. The system operates in the visible, producing 0.1" FWHM images in the 600-900nm range, covering a large fraction of the Kepler passband. We typically achieve 4-5 magnitudes contrast at 0.5" radius from the targets, and perform careful PSF subtraction and false positive rejection using the dozens of similar Kepler targets observed each night.

We will present the first results from the Robo-AO KOI survey: more than 100 new close companions; a comprehensive assessment of companion populations as a function of planetary and stellar host properties; and the first tentative evidence for a difference in stellar companion rates between Kepler single and multiple planet systems.