



# The POKEMON Speckle Survey of Nearby M-Dwarfs

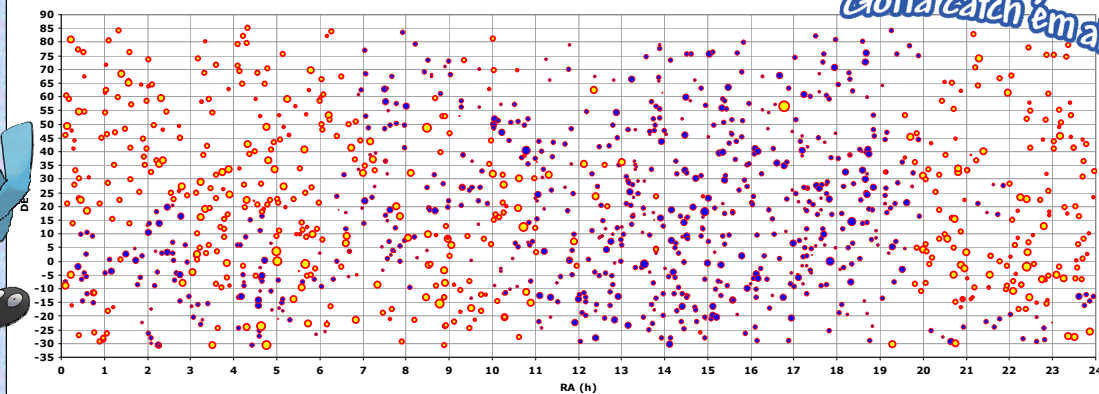
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The POKEMON (Pervasive Overview of Kompanions of Every M-dwarf in Our Neighborhood) survey of nearby M-Dwarfs intends to inspect, at diffraction-limited resolution, every low-mass star out to 15pc, along with selected additional objects to 25pc. The primary emphasis of the survey is detection of low-mass companions to these M-dwarfs for refinement of the low-mass star multiplicity rate. The resultant catalog of M-dwarf companions will also guide immediate refinement of transit planet detection results from surveys such as TESS. POKEMON is using Lowell Observatory's 4.3-m Discovery Channel Telescope (DCT) with the Differential Speckle Survey Instrument (DSSI) speckle camera, along with the NN-Explore Exoplanet Stellar Speckle Imager (NESSI) speckle imager on 3.5-m WIYN; the survey takes advantage of the extremely rapid observing cadence rates possible with WIYN and (especially) DCT. The current status and preliminary results are from the first 20+ nights of observing.

Gotta catch 'em all!



Current status of the survey: Purple symbols indicate an observed target, yellow indicates targets in need of observation; size of symbol indicates target faintness (larger = fainter). 757 targets have been observed as of December 1<sup>st</sup>, 2017. 495 target have yet to be observed at least once.



**The Discovery Channel Telescope:** Lowell Observatory's DCT is a 4.3m telescope located roughly 1 hour southeast of Flagstaff, AZ. Lowell operates the DCT in partnership with Boston U., NAU, U. Maryland, U. Toledo, and Yale U.



## HIGHLIGHTS OF THE SURVEY

### New insights into M-dwarf multiplicity

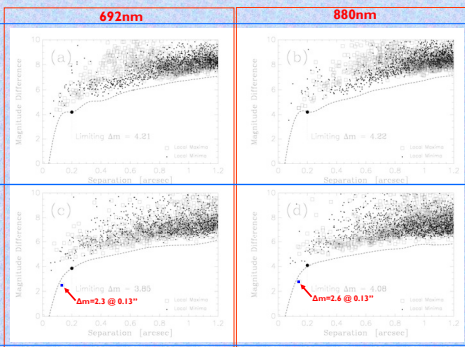
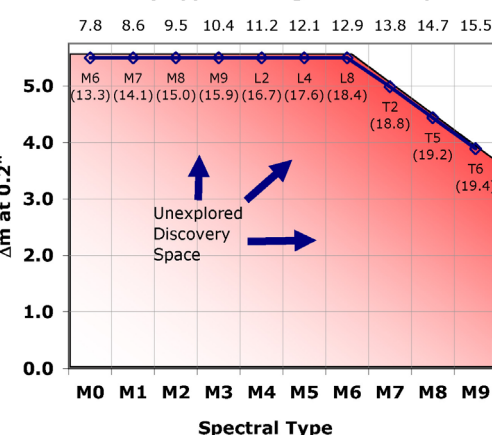
- Designed to be volume-limited to 15pc for spectral types as late as M9V
- Previous surveys have been limited to M4V because of limited aperture
- Also includes additional bright targets to 25pc
- A comprehensive atlas of low-mass multiples
- Sufficient statistics for determination of M-dwarf multiplicity as a function of subtype

### Unique capabilities of Lowell's DCT

- Large amounts of time reserved for Lowell staff
- Large, sustained surveys possible
- Impressive target cadence enabled by superior pointing
- As rapid as 2 minutes target-to-target time (including data cube collection)



## Primary Apparent Magnitude at 15pc

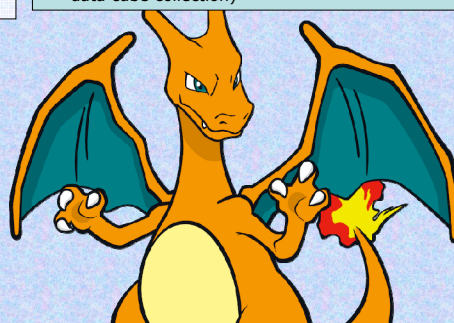
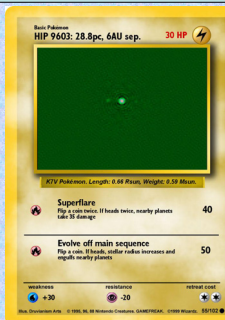
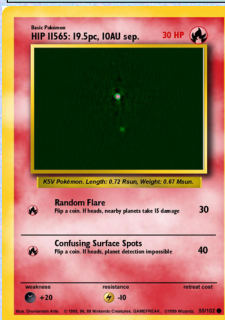


Example companion limits on non-detection (top) and detection (bottom) for HIP 77986 and 113690, respectively, from Horch & van Belle et al. (2015)

## EXAMPLE BINARY DETECTIONS FROM K-KIDS

### Sub-arcsecond resolving power of DSSI @ DCT

- From K-KIDS survey (E. Horch & T. Henry et al.)
- HIP 11565: K5V primary, 10AU separation
- HIP 9603: K7V primary, 6AU separation



## ONLINE RESOURCES

Like this poster? Get it!  
<http://www2.lowell.edu/users/gerard/PTIGiants/>

- Additional paper links, references, images
- Upcoming release of raw data



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New discovery space of the POKEMON survey, highlighted in red shading: later M-subtypes, fainter companions. Top row: expected R-magnitude for primaries at 15pc. Expected companion detection limit is  $\Delta m = 4$ .

