A search for brown dwarf companions to Hyades stars using the LOCI PSF-subtraction technique

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Facilities used: Keck NIRC-2 NGS (near-IR camera with AO)

Questions:
1. What are the magnitudes and colors of BDs at the Hyades' age?
2. What is the mass function, down to brown-dwarf masses?
3. What is the companion mass function of the Hyades?
Speckles and photon noise limit the detectability of faint companions in high-contrast AO imaging.

Speckles are subtracted using the locally-optimized combination of images (LOCI) algorithm, which finds the PSF that best minimizes the residuals when it is subtracted from the target image.

Racine et al 1999 PASP
Next: Follow-up (second epoch) observations at Lick and Keck.

Conclusions:

- LOCI algorithm used to analyze deep-imaging AO data
  - Best contrast $\Delta H \sim 12$ from 5–250 AU
- If brown dwarf is found:
  - Characterize and compare to models
- In any case:
  - Companion mass function and cluster mass function

candidate brown dwarf