# The Search for Brown Dwarfs among Exoplanet Candidates

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Scientific Motivation

- Learn more about exoplanets and their environments
  - Radial velocities give **a** and **Msini**
  - 209 Candidates found
  - 6% chance 1 object (with Msini $<1M_J$) has $M>13M_J$
  - Use VLTI to determine the photometric properties
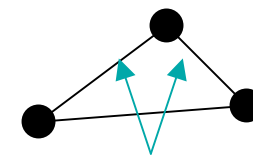- Search for E.T.
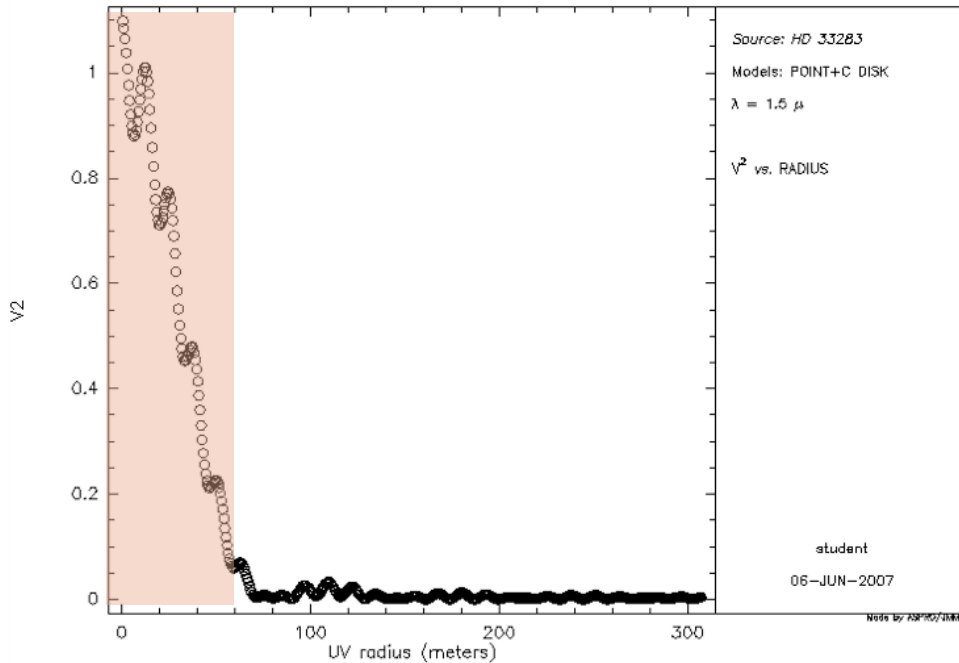
Observational requirements:
- Short baselines
- Close to source rise/set
  $\Delta_{bsl}/\Delta_{time} \sim 1.2m/exptime$
  for typical separation (ideal)
- Low contrast
  (errors on visibility set contrast limit of <1% for one observation)

Plot assumptions:
stellar diameter ~5mas
median separation ~24mas
dec = -26°
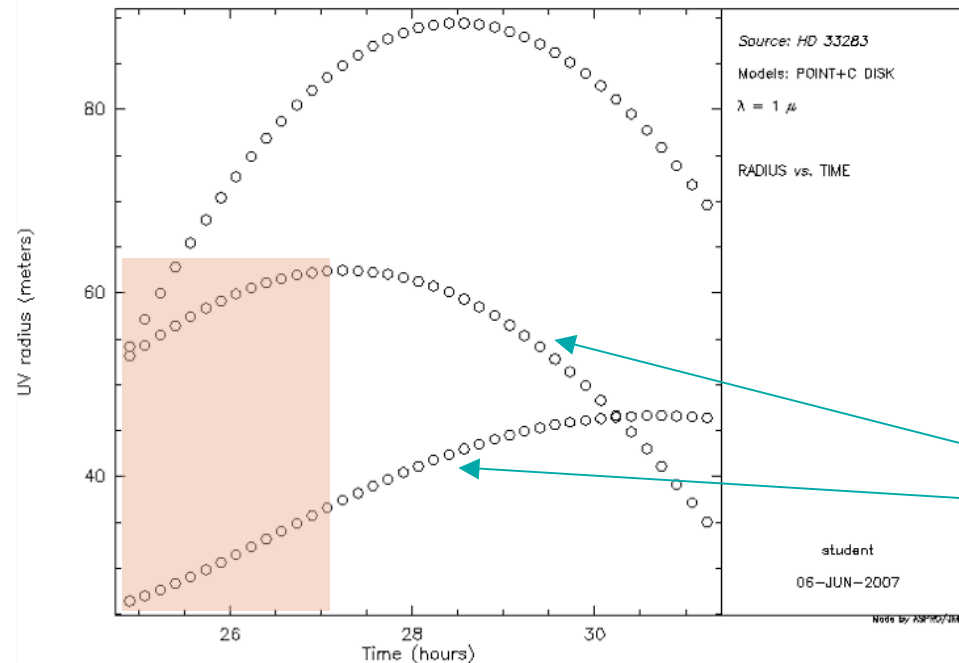
Instrument: AMBER
With UT 2, 3, 4

Perpendicular baselines

Minimum Detectable Flux Ratio Drives Target List
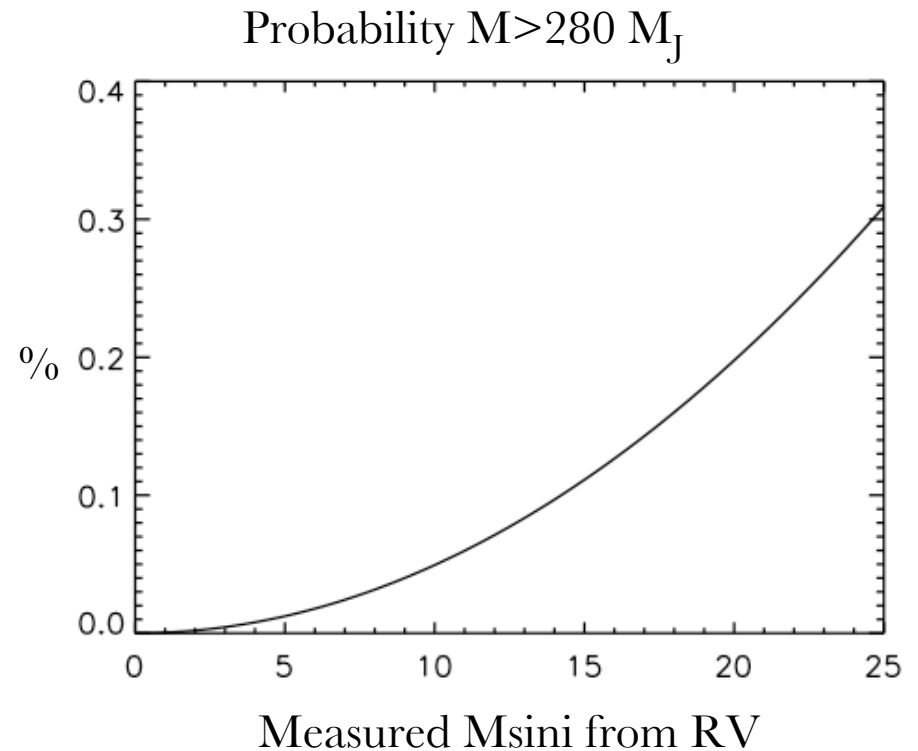
-median J-mag of Host Stars ~6.5
  -VLTI gives ~1% V^2 errors
  -1/100 min flux ratio

$$\frac{1}{100} = \frac{M_{bd}^{3.5}}{M_*^{3.5}}$$

-Assume Solar Mass Host Star
  -Minimum Detectable Target Mass:

280 M_J!!!

(M Dwarf)

Probability M>280 M_J

Measured Msini from RV

Only Msini>5M_J have chance of being resolved

~30 such objects

3% chance one 280M_J will be detected!

Compare χ^2 for V^2 and what do we expect to find?

M dwarfs

Brown dwarfs

(White dwarfs?)