

# Orbital Architectures of M Dwarf Systems: Building the $P$ vs. $e$ Diagram

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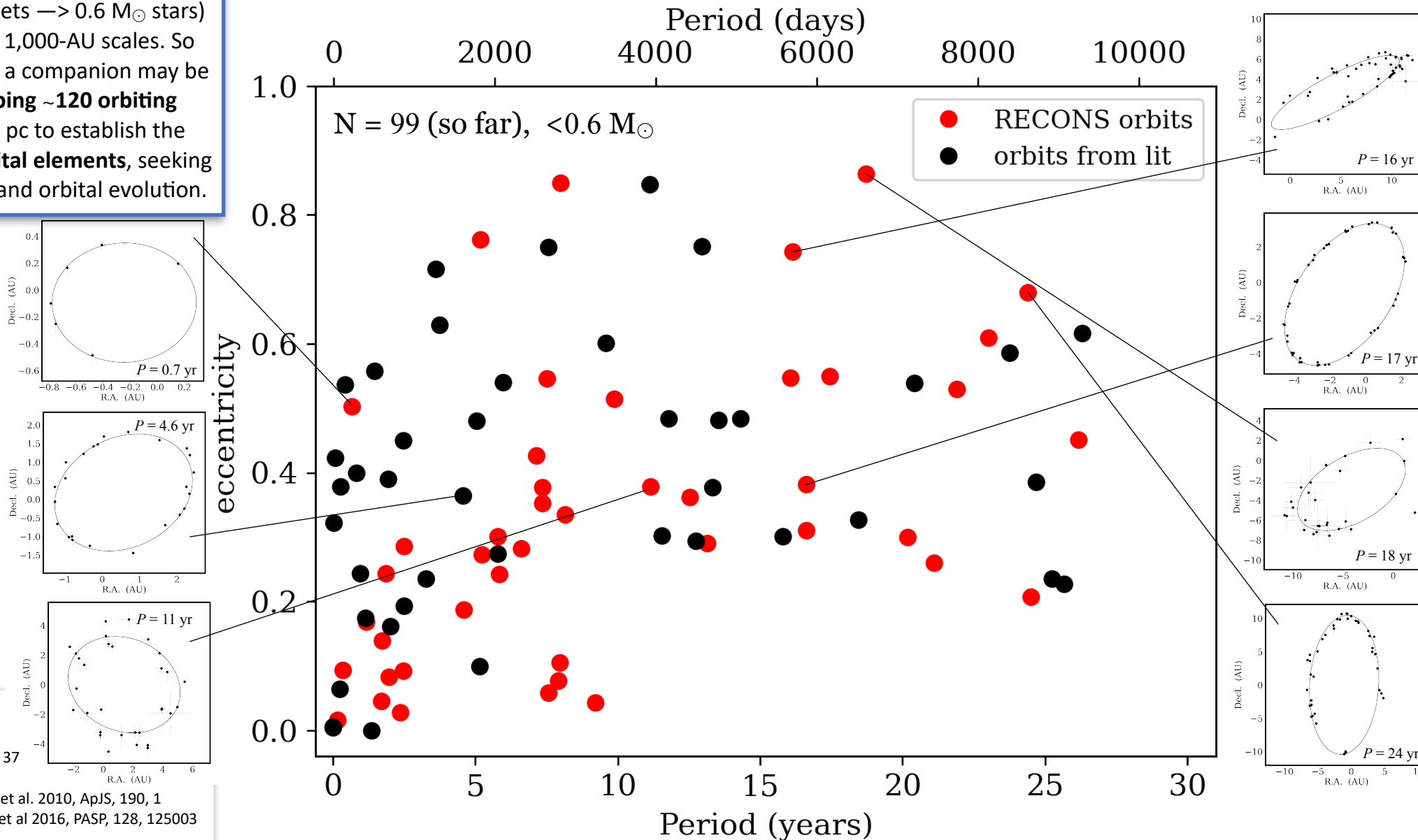
M dwarfs host companions spanning a factor of 100,000 in mass (planets  $\rightarrow$   $0.6 M_{\odot}$  stars) that orbit on sub-AU to 1,000-AU scales. So how do you know where a companion may be lurking? We are **mapping ~120 orbiting companions** within 25 pc to establish the distributions of their **orbital elements**, seeking clues to their formation and orbital evolution.

Orbits come from:

- **Astrometry** at CTIO 0.9m (22+ yr)
- **Speckle interferometry** at SOAR 4.1m (2+ yr)
- **RVs & imaging** (literature)

**Bonus:** we will determine **dynamical masses** for the systems overlapping on both the astrometry and speckle lists.

References:  
Bate, M. 2015, Living Together: Planets, Host Stars and Binaries, 496, 37  
Dupuy & Liu 2017, ApJS, 231, 15  
Raghavan, D., McAlister, H., Henry, T., et al. 2010, ApJS, 190, 1  
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The orbits seen today are shaped by their formation configuration and subsequent dynamical evolution. In turn, these outcomes are dictated by primary mass, mass ratio, environment, age, and more (Bate 2015).

