

Direct imaging and spectral characterisation of benchmark brown dwarfs



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PlanetS



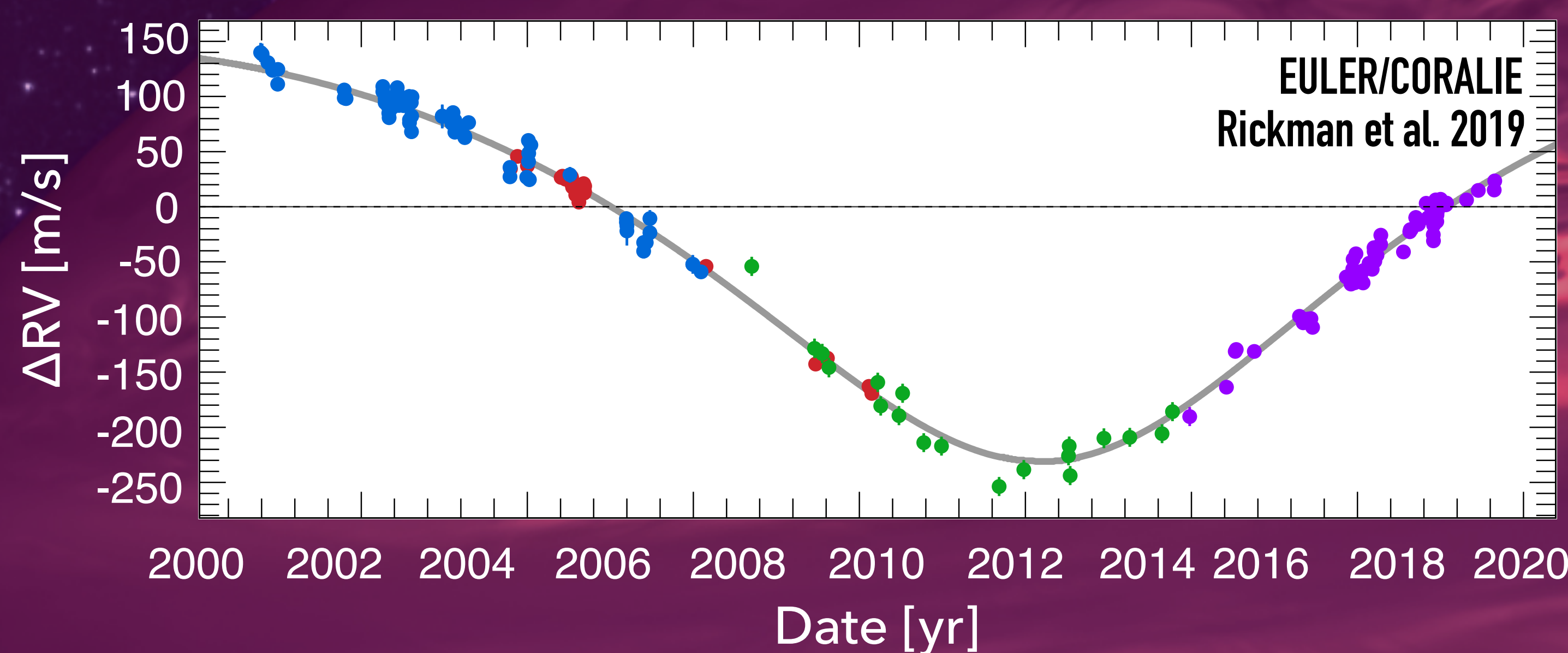
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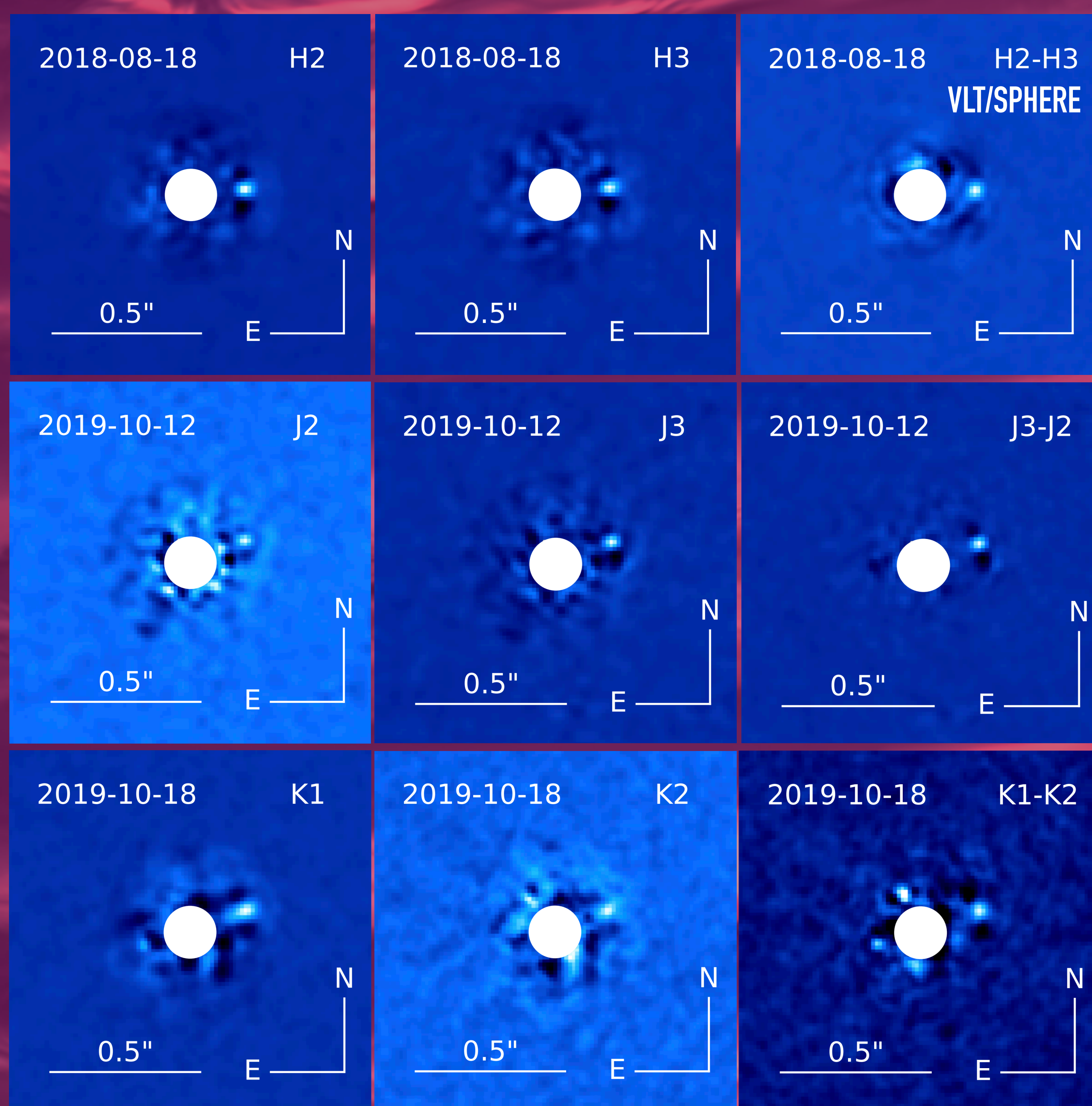


With over 20 years worth of radial velocity measurements from the CORALIE survey for extrasolar planets, we have identified several promising candidates that we have directly observed. Here we present the direct detection of a new benchmark $\sim 50M_{\text{Jup}}$ brown dwarf, HD13724B.

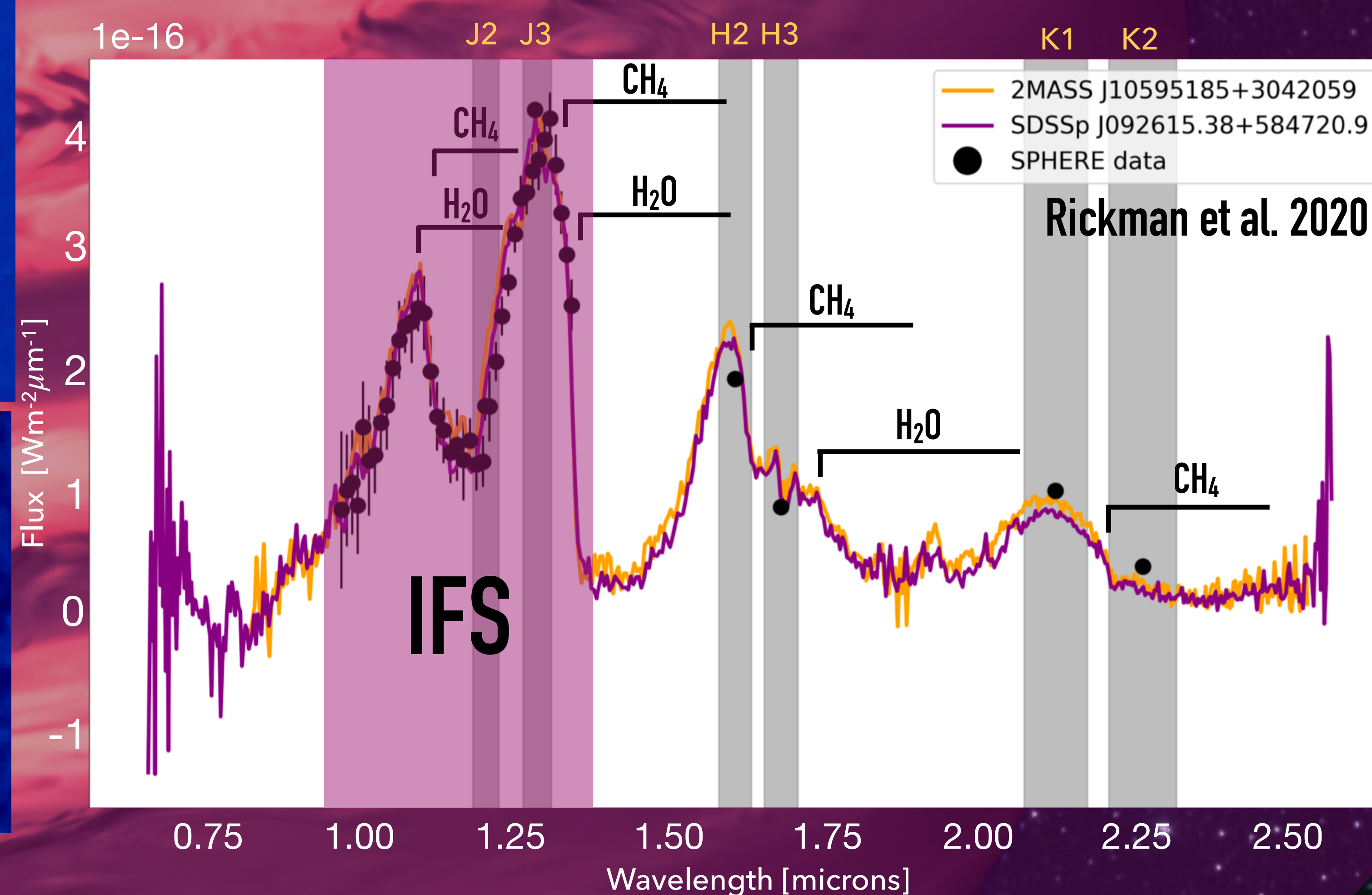
Radial velocity measurements provide only a lower limit on the measured masses due to the unknown orbital inclination. Therefore directly imaging these candidates is needed to break that degeneracy and provide constraints on the dynamical mass of the companion.

To date, individual dynamical masses are known for only a handful of brown dwarfs, therefore any new detections contributes greatly to brown dwarf models as they provide important analogues for the characterisation of exoplanets. The discovery of benchmark sources provides a powerful and critical tool of advanced evolutionary models. As we move toward imaging smaller and smaller objects it is important to use these objects as a laboratory to test theoretical atmospheric models.

HD13724 is a benchmark brown dwarf, detected using radial velocities from the CORALIE survey with a minimum mass of $27M_{\text{Jup}}$. Follow-up imaging data with VLT/SPHERE revealed the direct detection of the $50M_{\text{Jup}}$ companion with an effective temperature of 1000K and spectral type of T4 from comparisons with atmospheric models and field brown dwarfs.

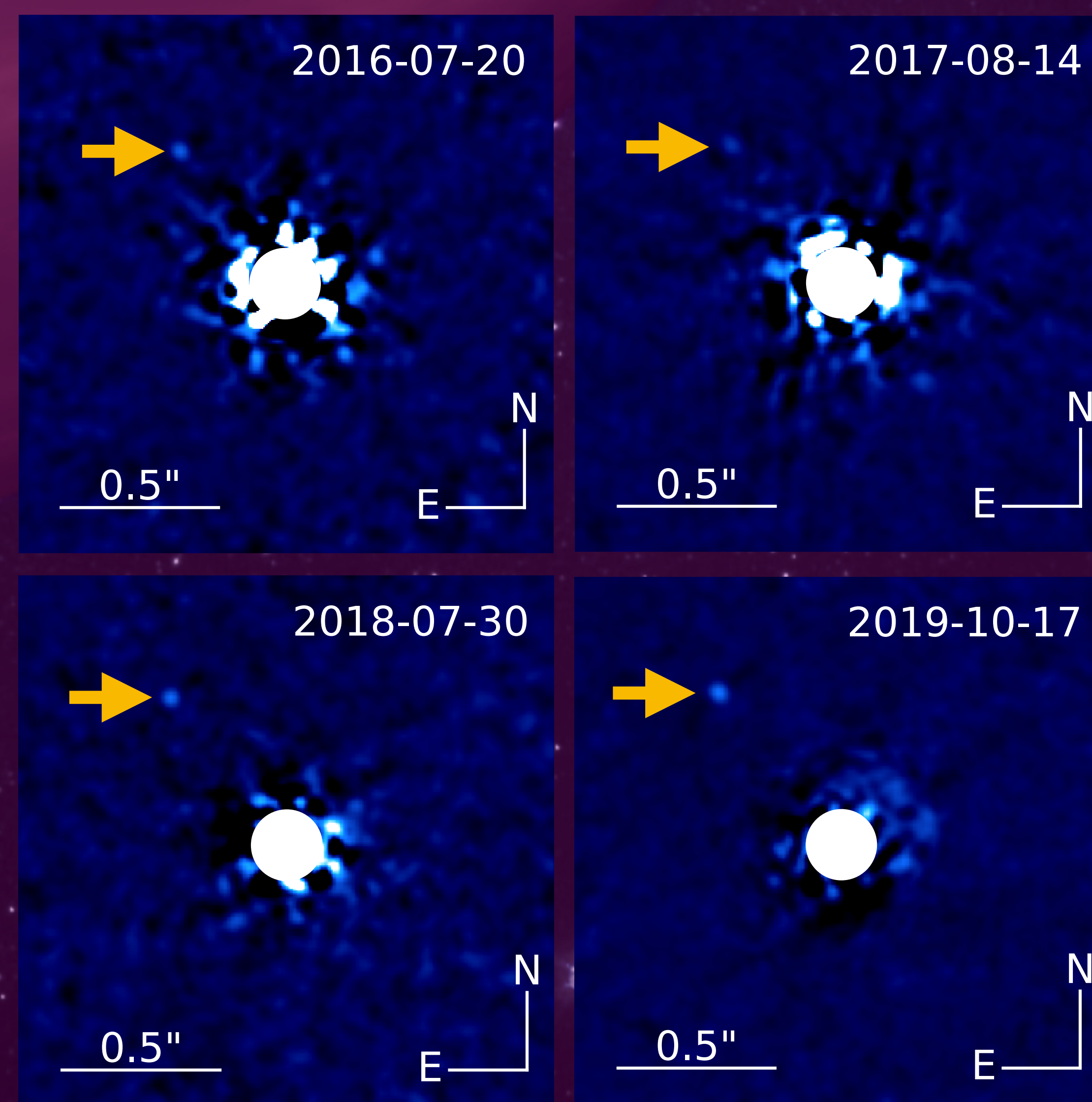
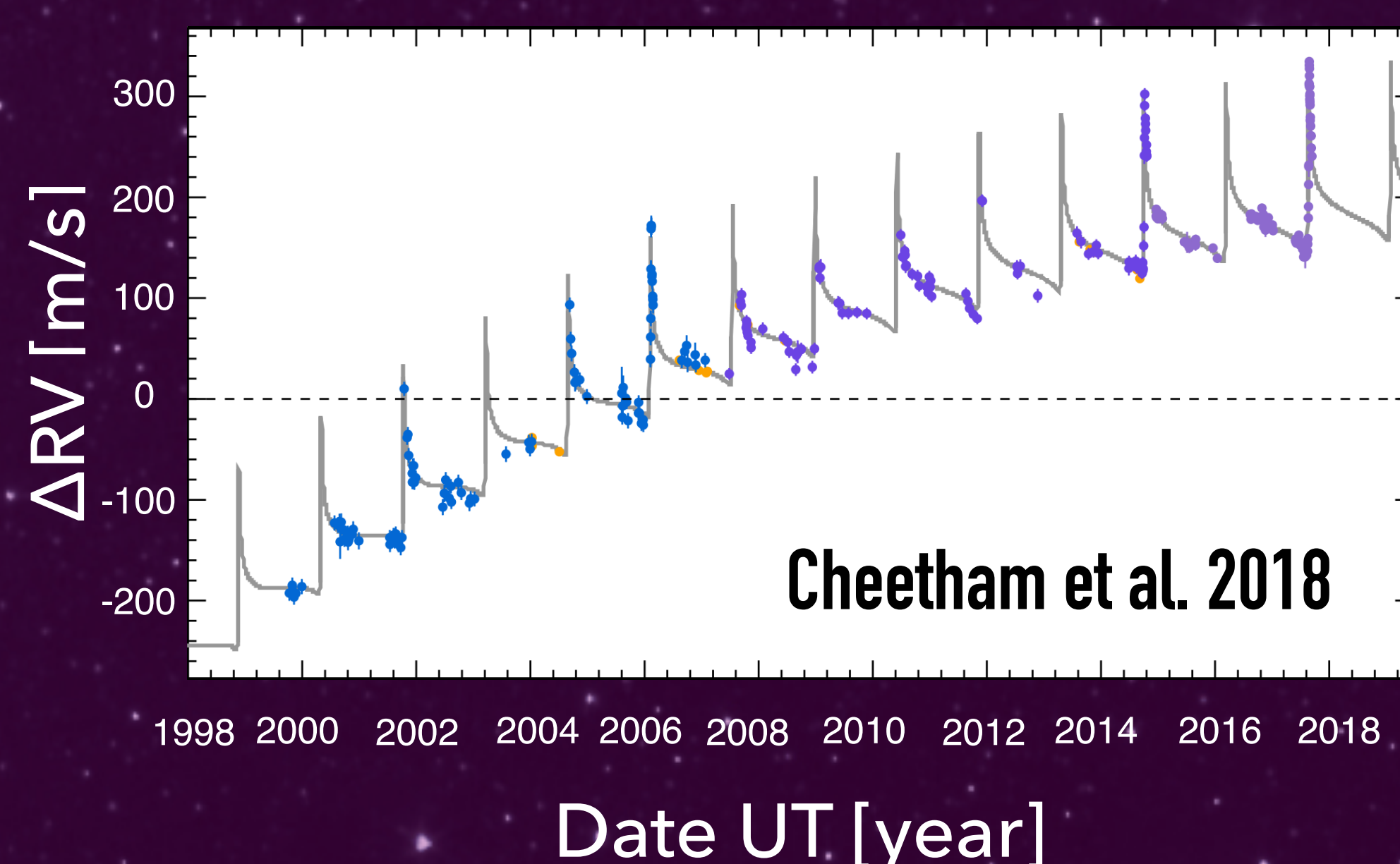
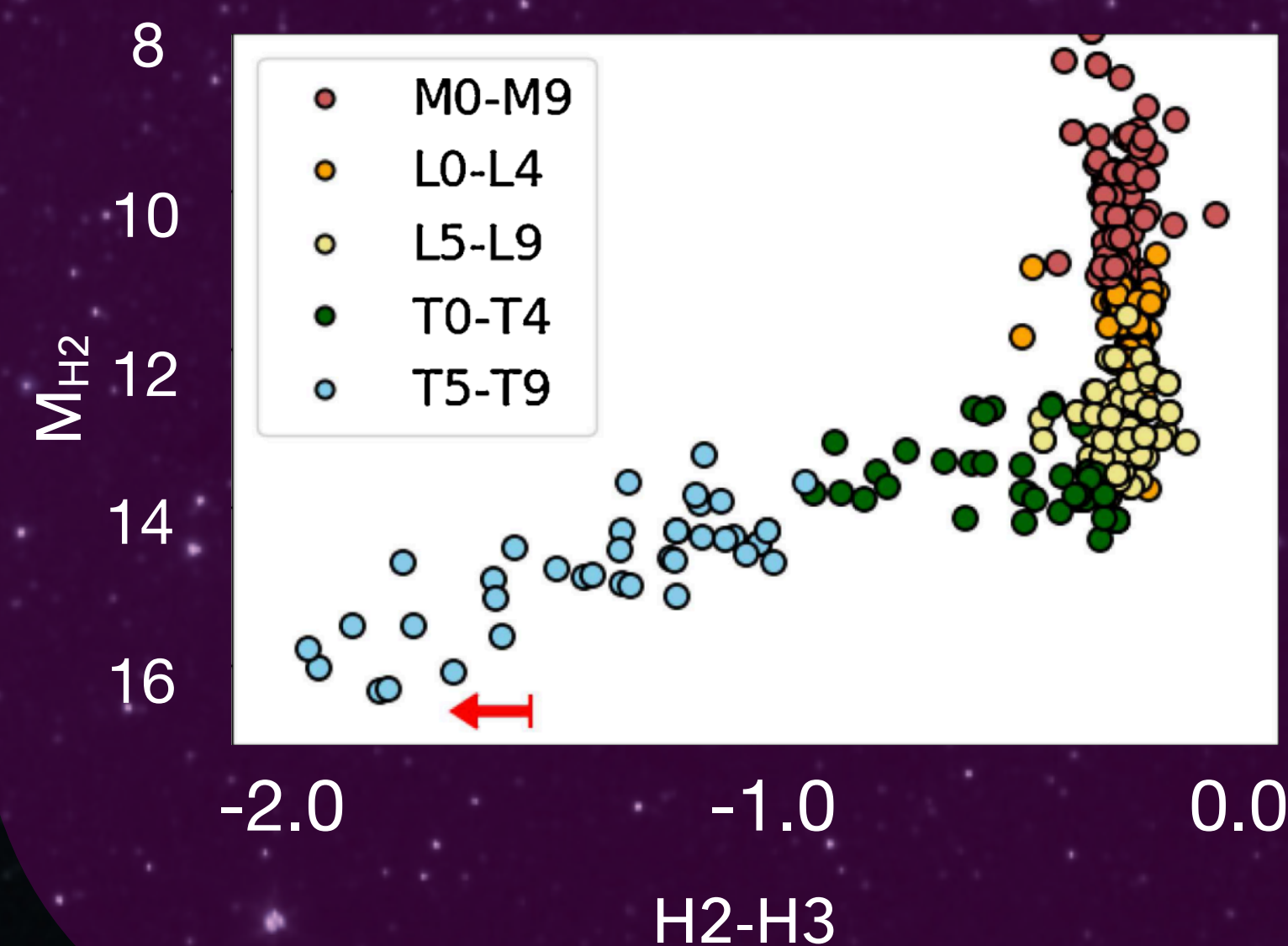
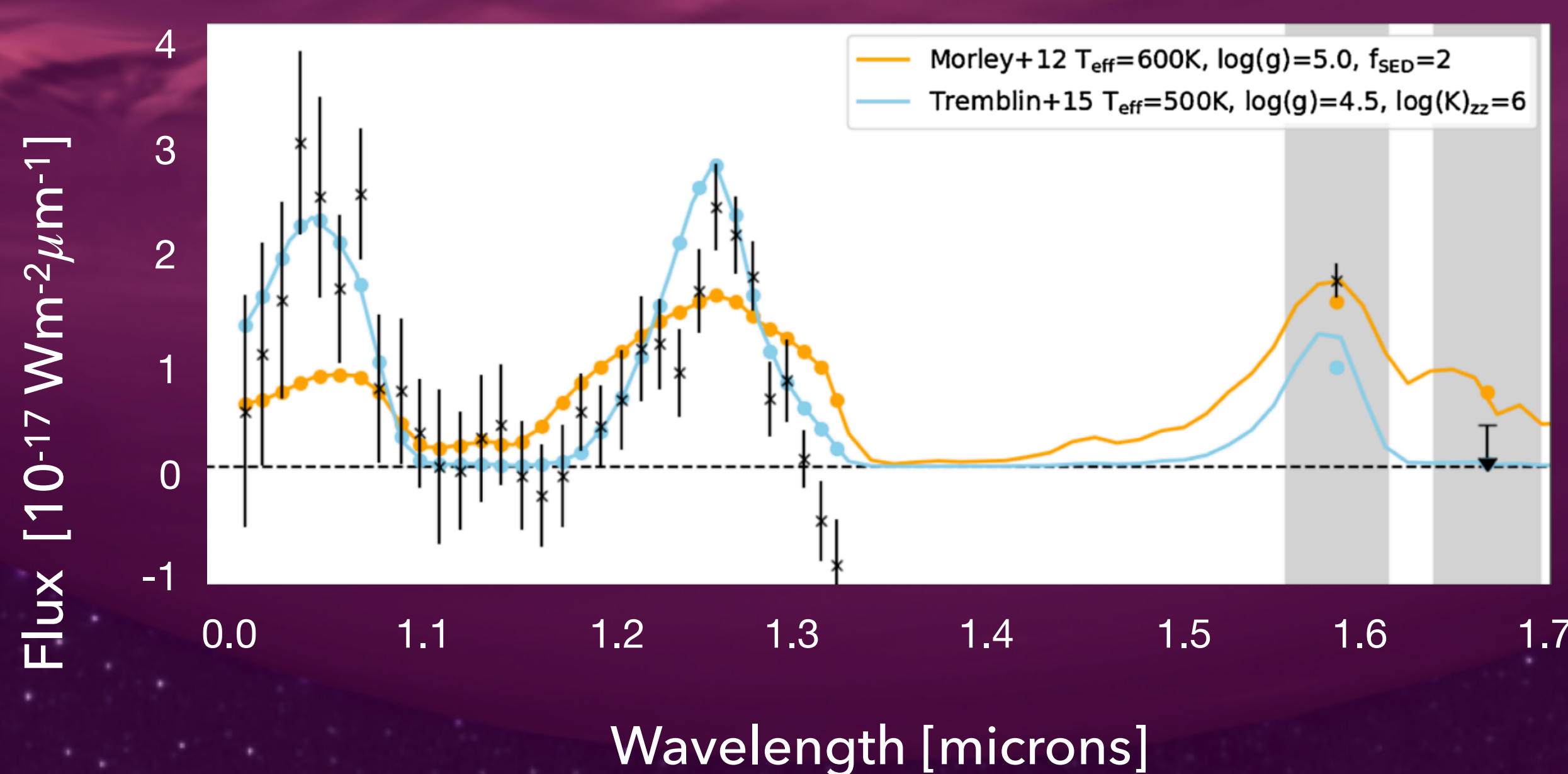


Rickman et al. 2020



Introducing HD4113C...

An ultracool substellar companion and the first T/Y transition object with a measured dynamical mass.



Rickman et al. in prep.