

Discovery of the Widest Known Brown Dwarf Binary

AAS Press Briefing - Jan 13th 2022



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Background – Backyard Worlds

The Backyard Worlds: Planet 9 (BYW) citizen science project is a collaborative effort between professional astronomers and citizen scientists from around the world.

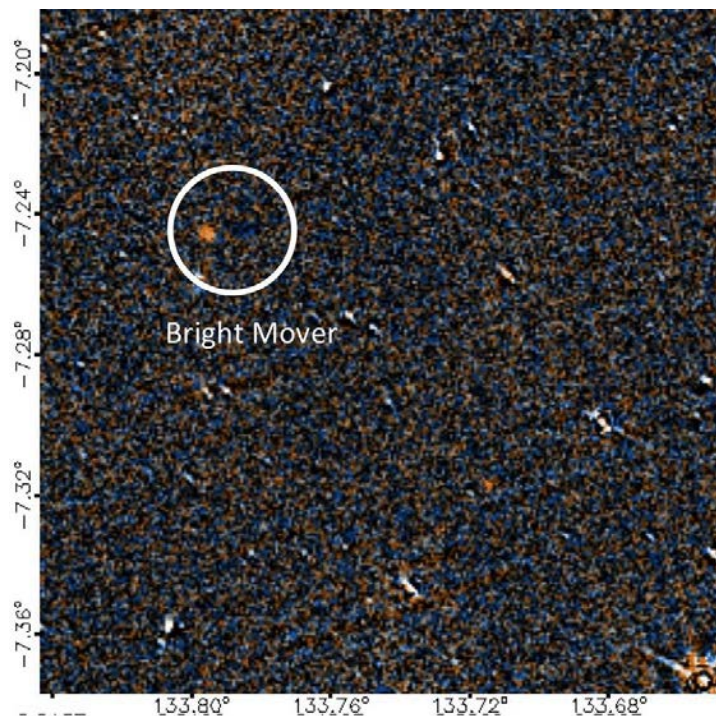
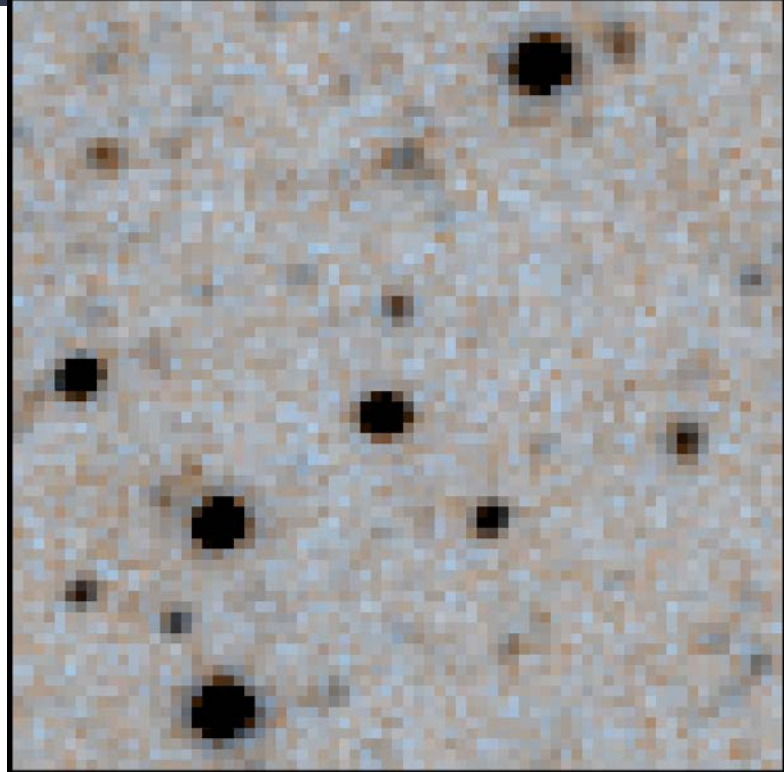


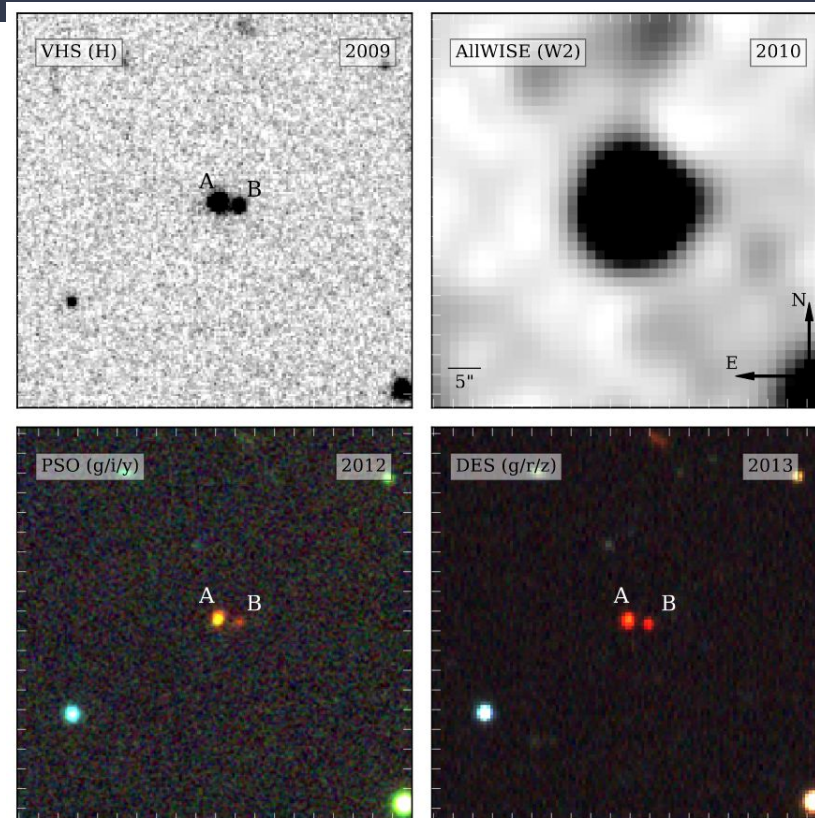
Figure from BYW: Planet 9

CWISE J014611.20-050850.0AB

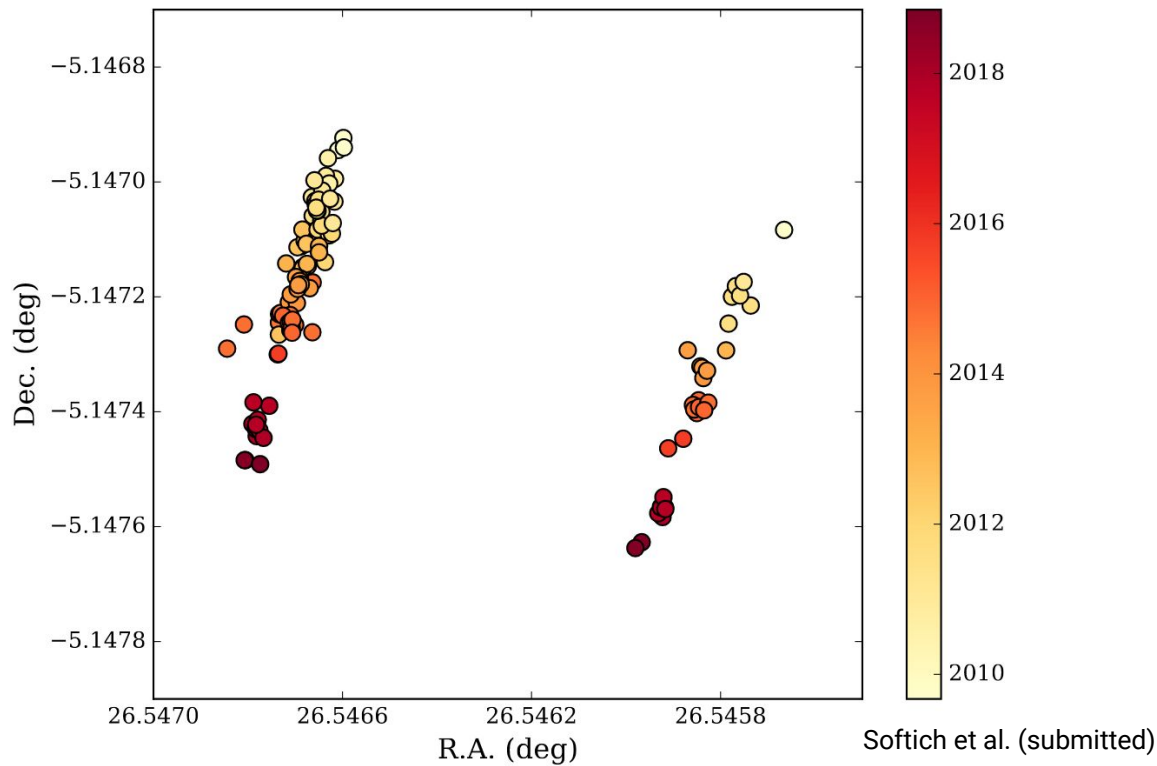


- First identified by citizen scientists: Nikolaj Stevnbak, Sam Goodman, Melina Thevenot, Dan Caselden, and Frank Kiwy.

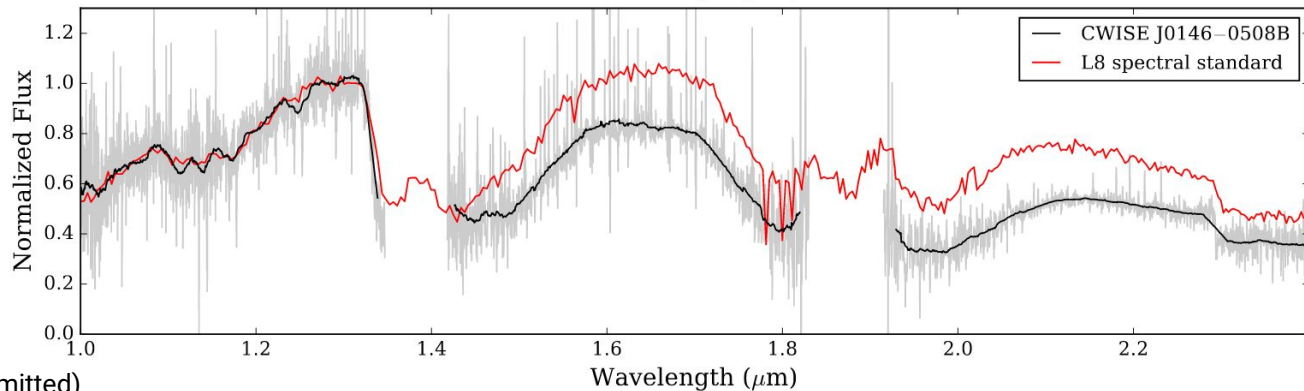
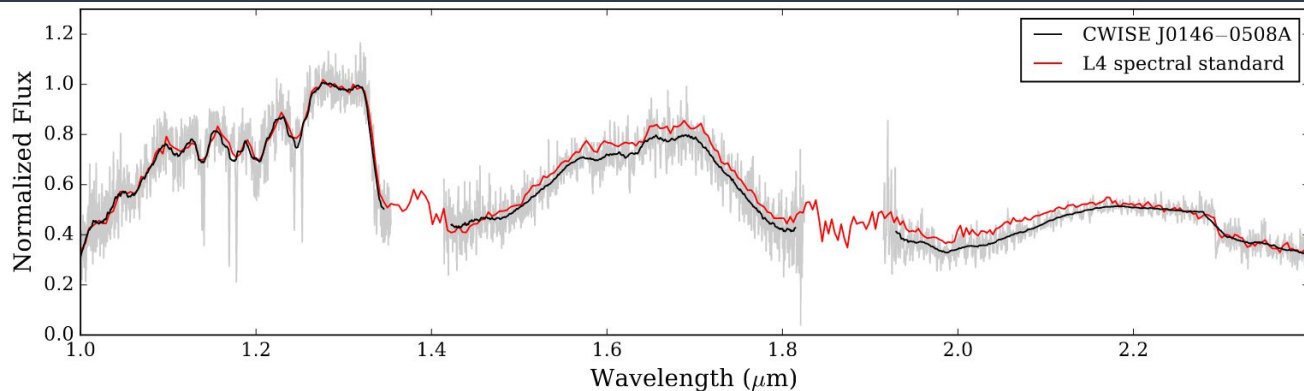
CWISE J014611.20-050850.0AB



CWISE J0146 - Proper Motion



CWISE J0146AB – Keck/NIRES Spectra



CWISE J0146AB – Physical Properties

Distance estimated using relationships from Kirkpatrick et al. (2021) : **41 ± 5 pc**

Physical separation of objects: **149AU**

Mass found using evolutionary models from Phillips et al. (2020):

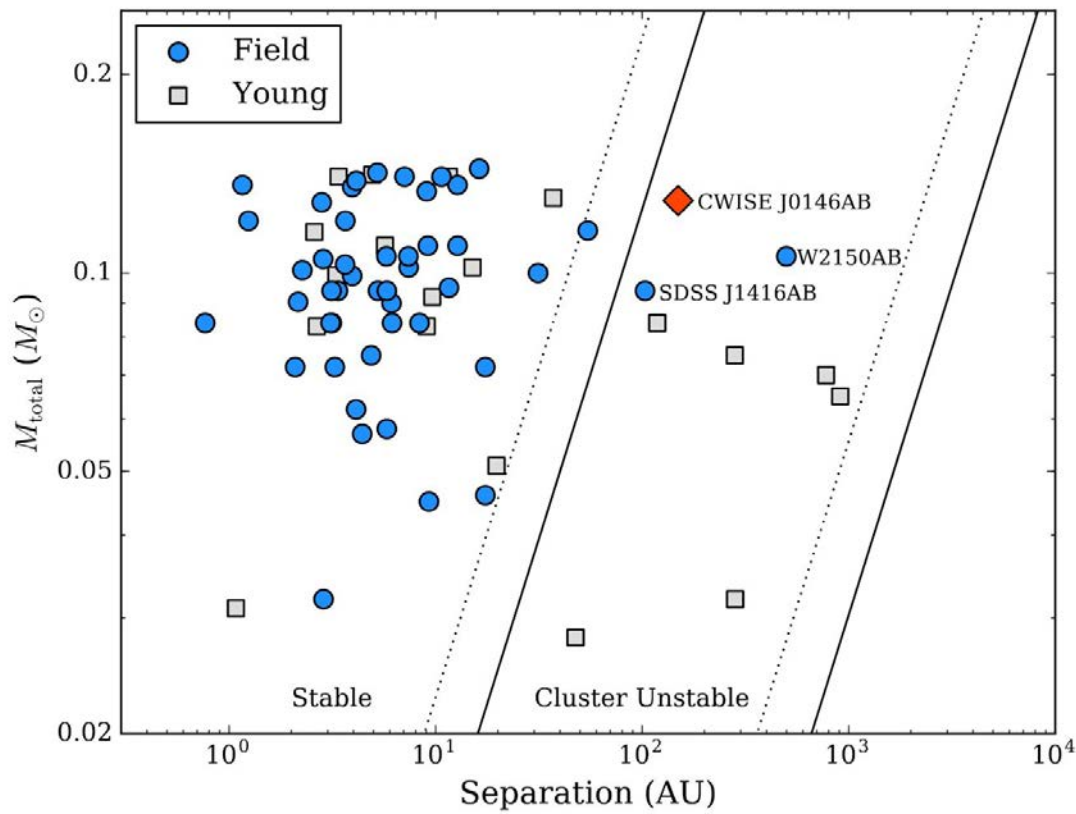
- **$72 \pm 6 M_{\text{Jup}}$ for CWISE J0146A**
- **$66 \pm 10 M_{\text{Jup}}$ for CWISE J0146B**

Binding energy of **3.8×10^{41} ergs**

Table 1. Properties of CWISE J0146–0508AB Components

Parameter	CWISE J0146–0508A	CWISE J0146–0508B
μ_{α} (mas yr ⁻¹)	79.14±1.10	83.94±3.43
μ_{δ} (mas yr ⁻¹)	-214.40±1.03	-210.33±3.35
Spec. Type	L4	L8 (blue)
T_{eff} (K)	1720±150	1340±140
Mass (M_{Jup})	72±6	66±10

CWISE J0146AB – Physical Properties



Softich et al. (submitted)

Conclusion/Future Work

This unique system brings up many questions:

- Is it truly a one of a kind system
or
- Is it just the first of its kind to be discovered

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	J0146A	J0146B
Mass	$72 \pm 6M_{\text{Jup}}$	$66 \pm 10M_{\text{Jup}}$
Spectral Type	L4	L8
Binding Energy	3.8 E41 ergs	
Distance	41 ± 5 pc	
Seperation	149 AU	