

RETRIEVAL OF THE BD+60 1417 B SYSTEM: A NEARBY PLANETARY-MASS COMPANION

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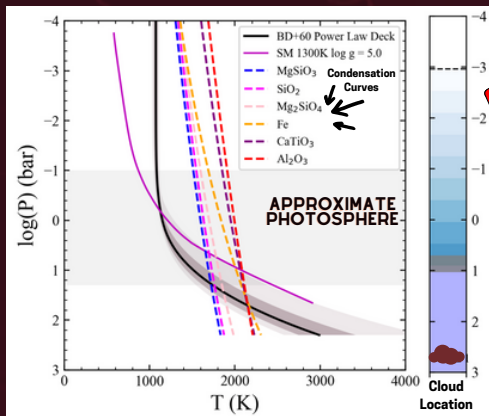
BD+60 1417 B

- Recently discovered **widely separated** companion at the **planet-brown dwarf boundary ($15 \pm 5 M_{\text{Jup}}$)** with a well known, young star ($\sim 50 - 150$ Myr)[Faherty+2021]
- Similar spectral morphology to HR 8799 directly imaged planets & young L-dwarfs
- **Quick Facts:** Spectral Type \sim L6-L8, dist \sim 45 pc, $T_{\text{eff}} \sim 1300$ K, Separation ~ 1662 AU
- Color magnitude diagram colors (**J-K [MKO] = 2.72**) indicate complex atmosphere with **THICK** clouds

QUESTIONS?

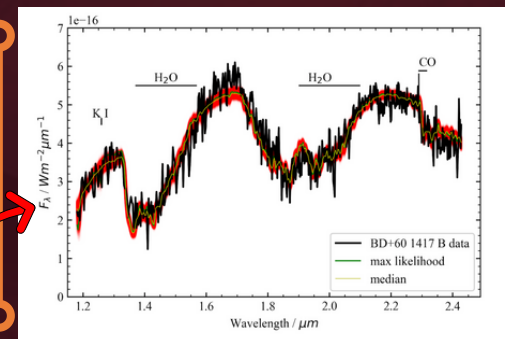
- How do brown dwarfs form and how do we distinguish them from planets?
- How can retrievals be used to understand the atmospheres of complex young low-surface gravity objects?

RETRIEVAL ANALYSIS



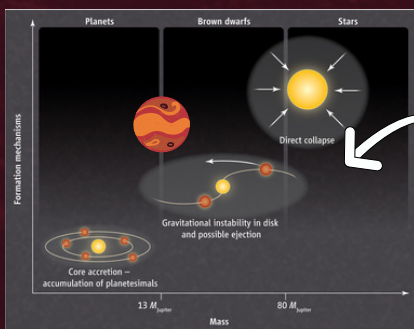
Pressure - temperature profile for the best fit model that uses the Lavie P-T profile with a power law cloud deck.

- We use the **BREWSTER** atmospheric retrieval code [Burningham+2017, 2021] to constrain abundances, P-T profile, cloud preference
- We **constrain** H₂O and CO
- Our retrieved P-T profiles produce isothermal results - as such we test different P-T parameterizations
- Retrieval is **struggling with fitting** this young, low surface gravity object and features (e.g. triangular H-band shape) similar to PSO 318



Best Fit Model: Power Law Cloud Deck and the median and maximum likelihood retrieved spectra compared to observed data (Spex Prism) for best fit model.

FUTURE WORK



- Compare BD+60 1417 B to another young low surface gravity red object W0047
- Constrain the C/O abundance and compare to host star to explore formation pathways
- **EXCELLENT JWST target** for mid-infrared data similar to VHS 1256 b and PSO 318, (other young low-gravity objects) **to study clouds and composition**

