

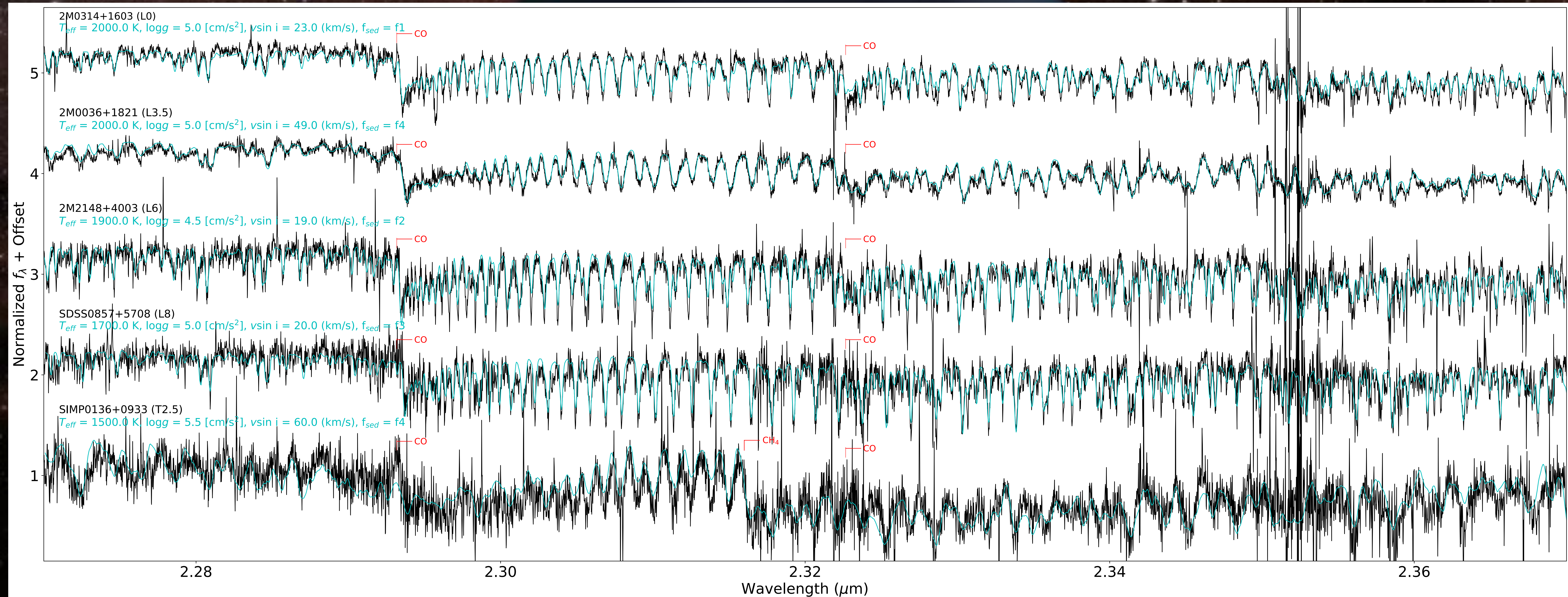
# Deriving Parameters of Ultracool Dwarfs Using High-Resolution Spectroscopy



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- Ultracool dwarfs have been studied extensively using photometry and low- and moderate-resolution spectroscopy, but rarely using high-resolution spectroscopy.
- We have assembled the first high-resolution *H*- and *K*-band spectroscopic sequence of ultracool dwarfs. Our sample contains 31 objects with spectral types ranging from M1.5V to T6, and also contains low-gravity objects at five spectral types (M9, L0, L1, L2, L3, L5)
- All spectra were obtained using the Immersion GRating Infrared Spectrometer (IGRINS) on the 4.3 meter Lowell Discovery Telescope at a resolving power of  $R \sim 45,000$ .



- We compared 22 of our objects to synthetic spectra created from the atmospheric models of Saumon & Marley 2008. We fit both the whole *K*-band (2.05-2.35  $\mu\text{m}$ ) and the CO band (2.27-2.35  $\mu\text{m}$ ), to obtain estimates of  $T_{\text{eff}}$ ,  $\log g$ ,  $v \sin i$ , and  $f_{\text{sed}}$  for each of our objects.
- *K*-band fits for five of our objects are shown above. The objects are plotted in black and the best fitting model for each object is shown in cyan, along with the parameters of the best fitting model.
- We find our  $T_{\text{eff}}$  values are high when compared to those calculated using bolometric luminosities by Filippazzo et al 2015 but agree well with those found using the same models at moderate resolution by Cushing et al 2008
- We find systematic differences in the values for  $T_{\text{eff}}$ ,  $\log g$ ,  $v \sin i$ , and  $f_{\text{sed}}$  obtained by our *K*-band and CO band fits. We are still investigating the cause of this.

If you have  
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