Spectroscopic Classification Schemes for T dwarfs

Talk (Outline) Submittal for Adam Burgasser
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I. What are T dwarfs
- brown dwarfs with spectral signatures of CH4
- blue NIR colors, red Optical-NIR colors
- searches by 2MASS, SDSS, NTT have uncovered 20 to date

II. NIR Spectroscopic Classification
- CO + 3H2 -> CH4 + H2O => look for strengthening in CH4 and H2O => seen in early "transition" T dwarfs
- problem: latter T dwarfs are very similar
  - EX: Gl 229B and Gl 570D have similar NIR spectra, very different Teff
  - differences still exist: relative strength of H and K bands, depth of H2O and CH4 bands, strength of K I lines

III. Red Optical Classification
- optical-NIR colors continuously reddening from L -> T
- many Teff-sensitive features: alkalis, FeH, H2O - possible to form spectral indices
- difficulty: exceedingly faint, must be done with Keck

IV. Conclusions
- variety of spectral features exist from 0.6-2.5 um that are readily accessible
- variety of T dwarfs now known to exist from 1300 - 750 K
- must disentangle the effects of gravity, temperature, metallicity in order to gain physical insight
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Conclusions

- Variety of spectral features from 0.6 - 2.5 μm available for classification.
- Variety of T dwarfs have been discovered ranging in $T_{\text{eff}}$ from 1300 to 750 K.
- Must disentangle the effects of gravity, temperature, and metallicity in order to gain physical insight.