# METHANE OPACITIES IN T-DWARF ATMOSPHERES

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We present the current status of PHOENIX model atmospheres for dwarfs of spectral type T, typical for older field brown dwarfs and low-mass brown dwarfs. In comparison to warmer L dwarf atmosphers, the spectral features of these objects can largely be reproduced by treating the influence of dust in the limiting case of complete settling, i. e. neglecting the dust opacity (Cond models). One major challenge in modelling cool brown dwarf atmospheres is the correct treatment of the molecular lines of $H_2O$ and $CH_4$. These are the dominant opacity sources in the IR and responsible for the very blue colours of T dwarfs in the near infrared. Reliable opacity data for these absorbers are thus mandatory for a correct determination of the temperature structure as well as for detailed modelling of the characteristic absorption features in the H and K bands, which are the defining criteria of spectral class T.

Line lists extracted from low temperature atmospheric databases such as HITRAN and GEISA are generally strongly limited to lower-state energies. To overcome these limits, a new list of line-by-line predictions for the methane opacities from the four lowest vibrational states has been computed with the Spherical Top Database System (STDS). Improvements of these line lists have been achieved thanks to recent successes in the experimental calibration of the molecular parameter describing the vibrational and rotational bands in the spherical top model. This allowed extrapolations to higher rotational states than previously possible. As a result our opacity sampling models now allow a much more complete reproduction of the strong features occuring in the temperature regimes of brown dwarf atmospheres. A more diffuse background opacity remains due to the extremely high line density from higher vibrational states, which at this time can be described only partly by statistical models.