Molecular opacities and cool star atmospheres

Uffe Gråe Jørgensen

Niels Bohr Institute, Astronomical Observatory, Juliane Maries Vej 30, DK-2100 Copenhagen, Denmark

The rapid development during recent years in observational facilities, has made it possibly to observe cool stars at wavelengths which were never before accessibly, and at fainter absolute magnitudes than ever. These improvements have further increased the demand for extensive and accurate input data of many kinds, in order to make it possible to model and understand the new observations.

Comparison between synthetic spectra and the new high-quality observations has been an extra challenge in modelling the atmospheres of cool objects. It has lead to real progress in the field, but also to new *ad hoc* speculations based on models lacking reliable input data.

I review here recent progress in obtaining the necessary molecular data for the coolest objects, which include the coolest red giants, cool white dwarfs and cool main sequence dwarfs, as well as proto-solar nebulae, brown dwarfs and hot-Jupiter giant planets.

I will, in particular, report on recent calculations of the opacities of water and methane.