# Radiative Transfer in Molecular Lines

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Molecular lines are generally very good tracers of the physical conditions in cold regions of the Universe (e.g. molecular clouds, cool stars, etc.), but molecular species are also found in not so cold environments (e.g. the magnetized solar atmosphere). For a reliable interpretation of spectroscopic and spectropolarimetric observations of molecular lines it is often necessary to carry out detailed radiative transfer simulations in molecular lines, both in LTE and NLTE. Here we present a multilevel radiative transfer code for the synthesis of molecular lines in stellar atmospheres, showing some illustrations of calculations in different astrophysical contexts and considering molecules like $H_2O$, CO and OH. We will discuss our implementation of highly convergent iterative methods and formal solvers with especial emphasis on spherical geometry. We will also present a chemical evolution code which is currently allowing us to check the approximation of instantaneous chemical equilibrium in the calculation of the abundances of a variety of molecular species.