Using Superlevels to Calculate Molecular NLTE

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We present the method we use in the atmosphere code PHOENIX to calculate molecular NLTE. It is based on the concept of superlevels. Superlevels consist of many similar levels added together which are assumed to be populated by a relative LTE distribution. This reduces the size of the system of rate equations to be solved tremendously. However, we modified the classical superlevel method and combined it with our dynamical opacity sampling technique which allows us to treat millions of lines. Therefore, we can calculate the transitions with maximum accuracy. We demonstrate the qualities of this method with the examples of CO and TiO.