Cluster velocity distributions in a vapor at equilibrium

Soto, Rodrigo

Cordero, Patricio

We present the microscopic description of the vapor using the concept of cluster. Taking into consideration nonideal contributions, the distribution functions of every cluster species are obtained. From these distribution functions it is possible to derive kinetic "temperatures" associated with each cluster species and it is shown that the internal kinetic temperature and the kinetic temperature associated with the center of mass of the clusters are different from the thermodynamic temperature of the system as a whole. Molecular dynamic simulations show that the internal temperatures are smaller than the thermodynamic one, which is smaller than the kinetic temperatures for all cluster sizes. For the case of monomers more precise predictions can be made and they are in excellent agreement with our simulations.