MODELS FOR ROTATION OF MOLECULES IN LIQUID HELIUM NANODROPLETS

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The rotational spectra of molecules observed in liquid helium-4 nanodroplets typically display substantially reduced rotational constants (except for the very lightest rotors), which implies that helium motion contributes to the effective moment of inertia of the molecules even though the damping is very small. For small droplets ($N \leq 100$), Monte Carlo calculations can give unbiased predictions for the rotational excitation energies that have been found to be in quantitative agreement with experiment. More approximation model calculations are still of value as they allow treatment of droplets of the size range of most experiments ($N \sim 10^3 - 10^4$) and perhaps provide more insight into the nature of the dynamics. In this talk, I will review work we have done on hydrodynamic calculations and more even more highly simplified "toy" models.