THE DYNAMICS OF HCN AND HF IN SMALL HYDROGEN CLUSTERS

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Finite clusters of parahydrogen have the potential to be superfluid and are thus of great current interest. In an effort to explore the dynamics of these highly quan tum systems, we have used the helium dropet method to grow small clusters of hydrog en, to which HCN and HF are added. This enables us to obtain rotationally resolved spectra for clusters containing as many as 14 hydrogen molecules. When less than one solvent shell of hydrogen (in this case HD) surround the HCN, its rotational mo tion is quenched. However, when the first solvent shell is completed, the HCN is a ble to to rotate within the hydrogen solvent cage, indicative of the essentially is otropic solvent invironment.