π-π and CH-π DISPERSION INTERACTIONS IN THE N_2-C_5H_5N AND CH_4-C_5H_5N DIMERS

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We will discuss the results of our high resolution spectroscopic studies of the dinitrogen-pyridine (N_2-C_5H_5N) and methane-pyridine (CH_4-C_5H_5N) dimers. The two dimers represent simple binary van der Waals systems that are good prototypes for studying the weak π-π and CH-π bonds involving polar and non-polar aromatic molcules. The pyridine molecule is of great interest because many of its derivatives are prevalently found in plants and microorganisms. Our preliminary results show that the dimers adopt T-shaped configurations. The N_2 lies perpendicularly to the aromatic plane with its center of mass closes to the c-inertial axis of the free pyridine molecule; similarly, the CH_4 molecule in CH_4-C_5H_5N sits above the aromatic plane. These are the only configurations presently observed for both dimers in our experiments. The talk will focus on the rotational spectra and structural properties of these dimers.

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