FIRST MICROWAVE SPECTRA IN DOPED HELIUM CLUSTERS

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In the framework of the investigation of the relaxation mechanisms of molecular rotational and vibrational excitations in a superfluid helium cluster environment, the first microwave absorption spectra have been obtained for He clusters doped with acetonitrile (CH_3CN). Two broad (≈ 1 GHz) peaks centered at about 12.5 and 15 GHz have been observed using bolometric detection of the beam attenuation caused by successive absorption of several microwave photons in a 10 cm long waveguide. The change in rotational constants induced by the presence of the medium preclude assignment based on a mere comparison with gas phase spectra. Further measurements are currently in progress to assign the observed features and determine the rotational relaxation times of the system.