INFRARED SPECTRUM OF THE CS_2 TETRAMER: OBSERVATION OF A STRUCTURE WITH D_{2d} SYMMETRY

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Infrared spectra of carbon disulphide clusters are studied in the region of the CS_2 ν_3 fundamental band ($\sim$1535 cm^{-1}), using a tuneable diode laser to probe a pulsed supersonic slit jet expansion. A symmetric rotor parallel band at 1551.438 cm^{-1} is assigned to CS_2 tetramer. The likely structure is a staggered and tilted barrel with D_{2d} symmetry, similar to the previously observed oblate tetramer of nitrous oxide, in reasonable agreement with that calculated from an empirical CS_2 intermolecular potential function. This is the first high-resolution spectroscopic detection of CS_2 tetramer, and the calculations suggest that there could be other lower energy isomers of $(CS_2)_4$ which are not yet observed.