

THE BENDING VIBRATIONS OF THE C_3 -ISOTOPOLOGUES IN THE 1.9 TERAHERTZ REGION

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Short carbon chains are fundamental for the chemistry of stellar and interstellar ambiances. The linear carbon chain molecule C_3 has been found in various interstellar and circumstellar environments, encompassing diffuse interstellar clouds, star forming regions, shells of late type stars, as well as cometary tails. Due to the lack of a permanent dipole moment C_3 can only be detected by electronic transitions in the visible spectral range or by vibrational bands in the mid- and far-infrared region. We performed experiments where C_3 was produced via laser-ablation of a graphite rod with a 3 bar He purge and a subsequent adiabatic expansion into a vacuum resulting in a supersonic jet. We report laboratory measurements of the lowest bending mode transitions of six ^{13}C -isotopologues of the linear C_3 molecule. Fifty-eight transitions have been measured between 1.8-1.9 THz with an accuracy of better than 1 MHz. Molecular parameters have been derived to give accurate line frequency positions of all ^{13}C isotopologues to ease their future interstellar detection. A dedicated observation for singly substituted ^{13}CCC is projected within the SOFIA airborne observatory mission.