# HCCH OVERTONE STATES STUDIED BY LASER INDUCED DISPERSED FLUORESCENCE IN THE GROUND ELECTRONIC STATE

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The method of laser induced fluorescence (LIF) has been applied to study highly excited vibrational molecular overtones in the ground electronic state in the near infrared range. This method offers some advantages compared to conventional one-photon absorption techniques. Namely, it gives us an access to vibrational states that cannot be populated by one-photon transitions from the ground state. Up to now the LIF method has been successfully utilised for electronic transitions in atoms and molecules. We have developed a dispersed laser induced fluorescence method for the detection of weak rovibrational transitions in the electronic ground state and applied it to the HCCH molecule. The cell containing the sample has been placed inside a Ti:Sapphire ring laser cavity. Fluorescence signal has been collected by a parabolic mirror and directed into a high resolution FTIR-spectrometer. By pumping different single vibration-rotation lines we have measured the dispersed fluorescence from $\nu_1 + 3\nu_3$ ($\Sigma_u^+$) to $\nu_1 + 2\nu_3$ ($\Sigma_g^+$) in acetylene in the 2800 - 3300 cm$^{-1}$ range. Besides the two expected rovibrational transitions from the upper state many collision-induced transitions have been observed per one pumping line. The work on the development of the experimental set-up and on analysing the dispersed fluorescence and collision-induced transitions is in progress and the latest results will be presented at the conference.