DIODE LASER SPECTRUM OF JET-COOLED CH_2F_2 IN THE 9-10 μm REGION

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Utilizing CO_2 laser optical pumping in the 9-10 μm region, methylene fluoride is a common gain medium in far-infrared gas lasers. Unfortunately, this part of methylene fluoride's infrared spectrum is very dense and not well characterized, making it difficult to identify the transitions responsible for FIR laser action. Four vibrational bands (ν_3, ν_7, ν_9, $2\nu_4$) are present with several Coriolis coupled to one another. Hot bands and high-J transitions contribute to the congestion. Rotational and vibrational cooling of methylene fluoride in a pulsed-jet expansion leads to a much simpler spectrum, which we have obtained using a tunable diode laser spectrometer. Work on the ν_3, ν_7, and ν_9 bands has been completed and Coriolis effects have been studied.