

3% Solutions (to formerly intractable problems)

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Positions, intensities and widths measured through Fourier transform spectroscopy have often revealed inadequacies in our quantum mechanical models. The spectra of lighter molecules containing hydrogen have been particularly challenging even in the fundamental regions. As a result, a large number of good and comprehensive measurements (generated for various applications) have existed for over 10 years without anyone attaining the right theoretical calculation. Recently, however, there have been some successes involving asymmetric, symmetric and spherical rotors. Analyses of infrared water, hydrogen sulfide, ammonia and methane spectra have reproduced intensities and widths to within an experimental precision of 3% or better. These studies will be discussed along with recommendations for future measurements and analyses needed to advance our theoretical understanding of ro-vibrational spectra in the infrared.

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