THE MULTIMODE APPROACH TO CHALLENGING PROBLEMS IN VIBRATION SPECTROSCOPY

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I will briefly describe the code "MULTIMODE", developed in collaboration with Stuart Carter and Nicholas Handy, and then present applications to the series of molecules H_3O^+, $H_3O_2^-$ and $H_5O_2^+$. I will also describe recent collateral work on developing full dimensional *ab initio*-based potential energy surfaces for these molecules. Some comparisons with Diffusion Monte Carlo calculations done by Anne McCoy on these molecules will also be presented.