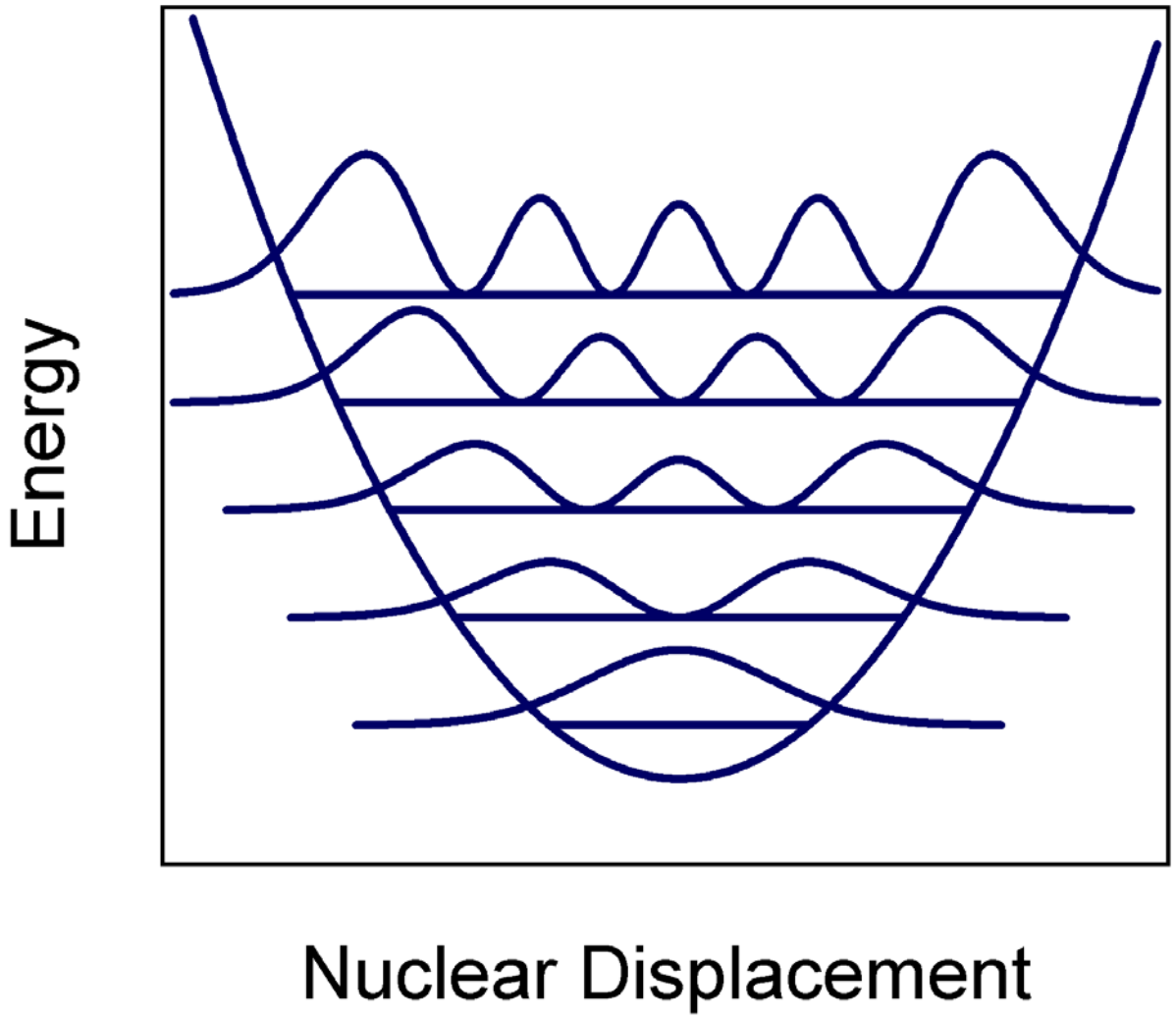
Root-mean-square displacement problem



Root-mean-square displacement problem

Calculate and compare the root-mean-square displacement of H_2 and O_2 in the lowest vibrational eigenstate. The definition of the root-mean-square displacement is:

$$\sqrt{<Q^2>} = \sqrt{\int_{-\infty}^{\infty} \chi_0 Q^2 \chi_0 dQ}$$

The vibrational wavenumbers of H_2 and O_2 are 4,400 and 1,580 cm^{-1}, respectively.