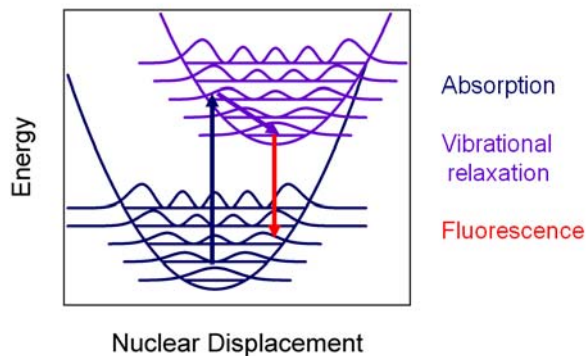


Describe the “mirror-image relationship” between absorption and fluorescence spectra in two parts.

Part 1. Describe the molecular energy levels using a diagram. Describe the phases of absorption, vibrational relaxation and fluorescence.

Answer: Excitation into an excited state is followed by vibrational relaxation. Therefore the upward transition states in the 0 quantum number of the vibrational system and the downward transition starts in the 0' quantum number.



Part 2. Describe the consequences for absorption and fluorescence spectra. Use a sketch to show how they are related to one another. Label diagrams and sketches as completely as you can.

Since the overlaps of 0-0', 0-1', 0-2', 0-3' etc. in the upward transition are exact the same as the 0'-0, 0'-1, 0'-2, 0'-3 of the downward transition, the net effect is that both lineshapes are the same, the they are “reflected” about 0-0' (which is the same as 0'-0).

