Vibrational Modes

Monday, April 18, 2016 11:40 AM

vibrational selection rule

$$\frac{d\mu_o}{dq} \neq 0 \; \Delta v = \pm 1$$

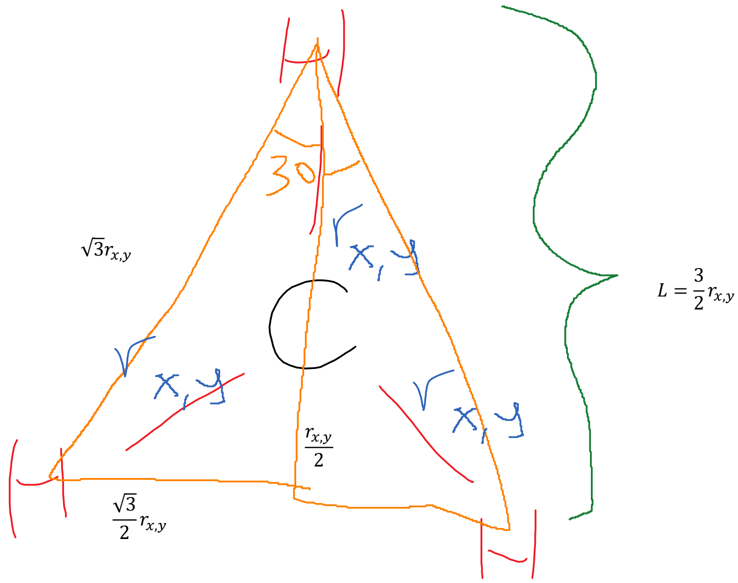
For $\Delta v = 2,3,4 \ldots$ *require anharmonicity overtones*

Define $q_i = \sqrt{m_i}\Delta r_i$

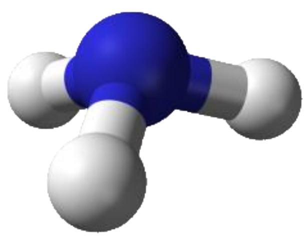
$$\dot{q_i} = \frac{d}{dt} q_i$$

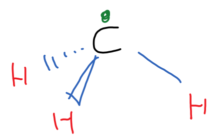
$$V = V_o + \sum_{i=1}^{4} V_i \text{ ; use morse potentials?}$$

$$T = \frac{1}{2}\sum_{i=1}^{4} m_i \dot{r}_i^2 = \frac{1}{2}\sum_{i=1}^{4} \dot{q_i}$$

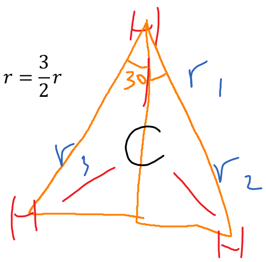


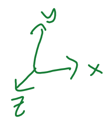
Two types of power supplies
Switching regulator and
Series regulator





$$\frac{1}{2} r + r = \frac{3}{2} r$$





$$\vec{r_1} = \langle 0, r_{1,y}, r_{1,z} \rangle$$
$$\vec{r_2} = \langle r_{2,x}, r_{2,y}, r_{2,z} \rangle$$
$$\vec{r_3} = \langle r_{3,x}, r_{3,y}, r_{3,z} \rangle$$

$$r_{3,x} = -r_{2,x} = -x'_H$$
$$r_{2,y} = r_{3,y} = -y'_H$$
$$r_{1,z} = r_{2,z} = r_{3,z} = -z_H$$
$$r_{1,y} = \sqrt{{y'}_H^2 + {x'}_H^2}$$

$$\vec{r_1} = \langle 0, r_{x,y}, -r_z \rangle$$
$$\vec{r_2} = \left\langle \frac{\sqrt{3}}{2} r_{x,y}, -\frac{1}{2} r_{x,y}, -r_z \right\rangle$$
$$\vec{r_3} = \left\langle -\frac{\sqrt{3}}{2} r_{x,y}, -\frac{1}{2} r_{x,y}, -r_z \right\rangle$$

$$\vec{r_1} = \langle 0, r_{x,y}, -r_z \rangle \Rightarrow, \qquad \vec{r}'_1 = \langle 0, r_{x,y}, -r_z + 3\alpha r_z \rangle = \langle 0, r_{x,y}, r_z(3\alpha - 1) \rangle$$
$$\vec{r_2} = \left\langle \frac{\sqrt{3}}{2} r_{x,y}, -\frac{1}{2} r_{x,y}, -r_z \right\rangle \Rightarrow \quad \vec{r}'_2 = \left\langle \frac{\sqrt{3}}{2} r_{x,y}, -\frac{1}{2} r_{x,y}, r_z(3\alpha - 1) \right\rangle$$
$$\vec{r_3} = \left\langle -\frac{\sqrt{3}}{2} r_{x,y}, -\frac{1}{2} r_{x,y}, -r_z \right\rangle \Rightarrow \quad \vec{r}'_3 = \left\langle -\frac{\sqrt{3}}{2} r_{x,y}, -\frac{1}{2} r_{x,y}, r_z(3\alpha - 1) \right\rangle$$
$$\vec{r}_c = \vec{r}_4 = 0 \qquad \Rightarrow \quad \vec{r}'_4 = \langle 0, 0, 3\alpha r_z \rangle$$