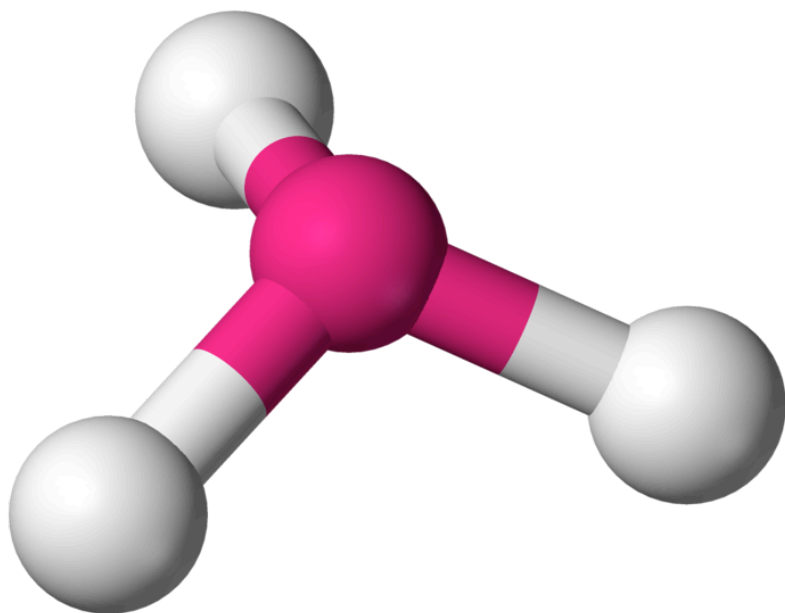
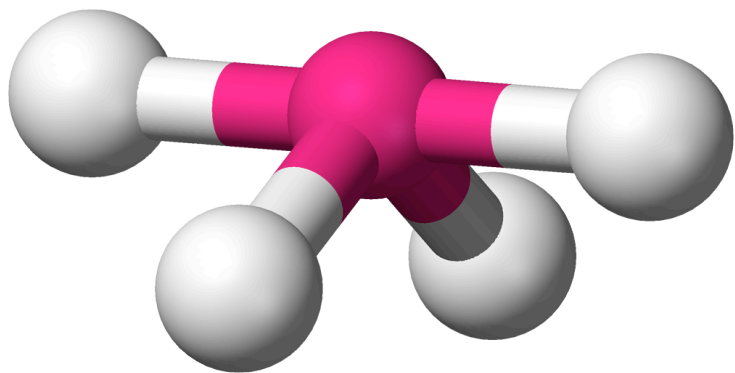


Vibrational Modes and Symmetry



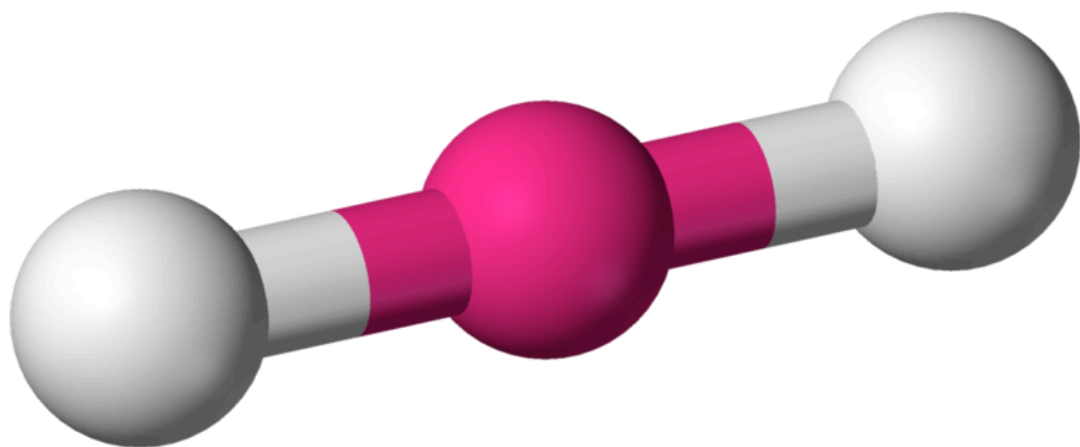
C_{3v}

$$4 \times 3 - 6 = 6 \text{ vibrations: } 2A_1 + 2E$$



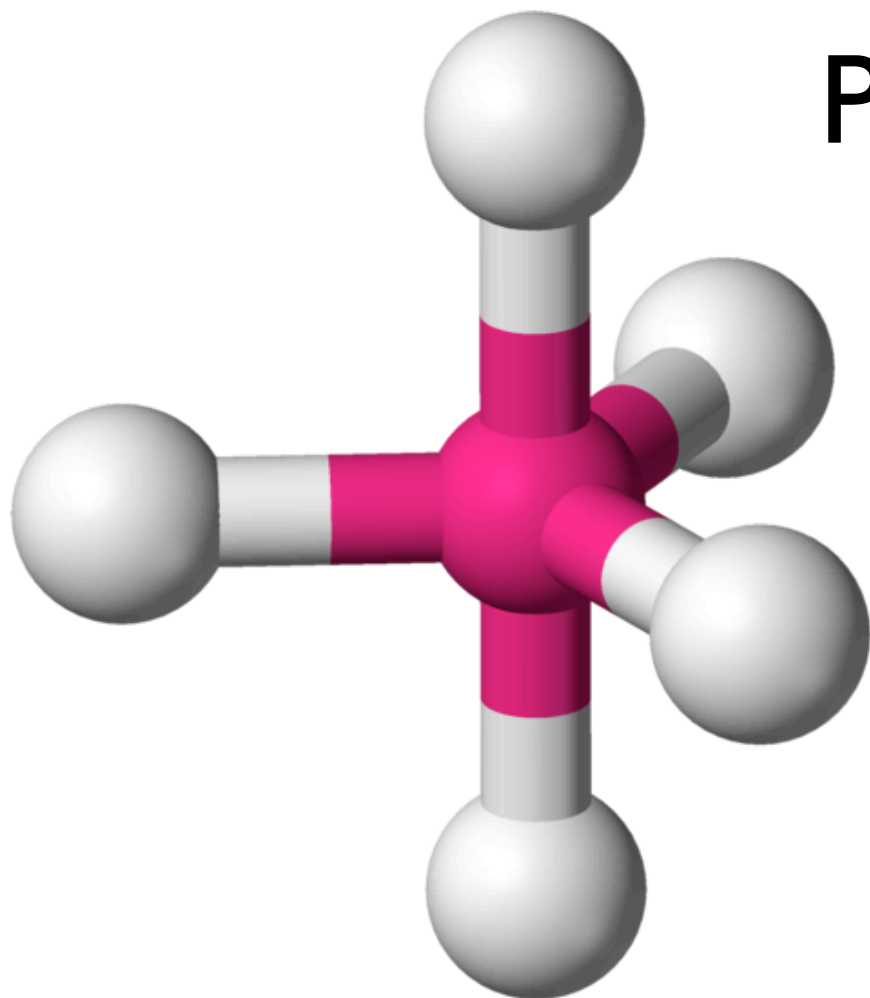
Seesaw Geometry

$$5 \times 3 - 6 = 9 \text{ vibrations: } 4A_1 + A_2 + 2B_1 + 2B_2$$



$D_{\infty h}$

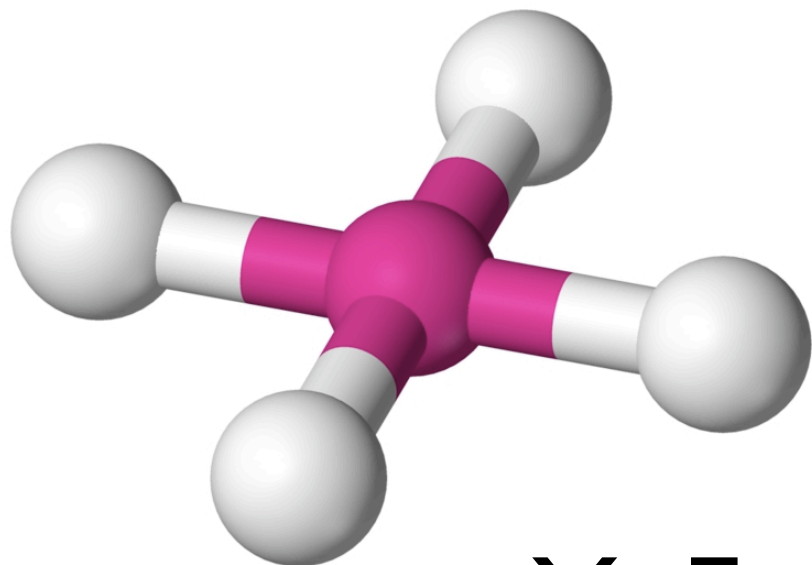
$3 \times 3 - 5 = 4$ vibrations: $\Sigma_g^+ + \Sigma_u^+ + \Pi_u$



PCl_5

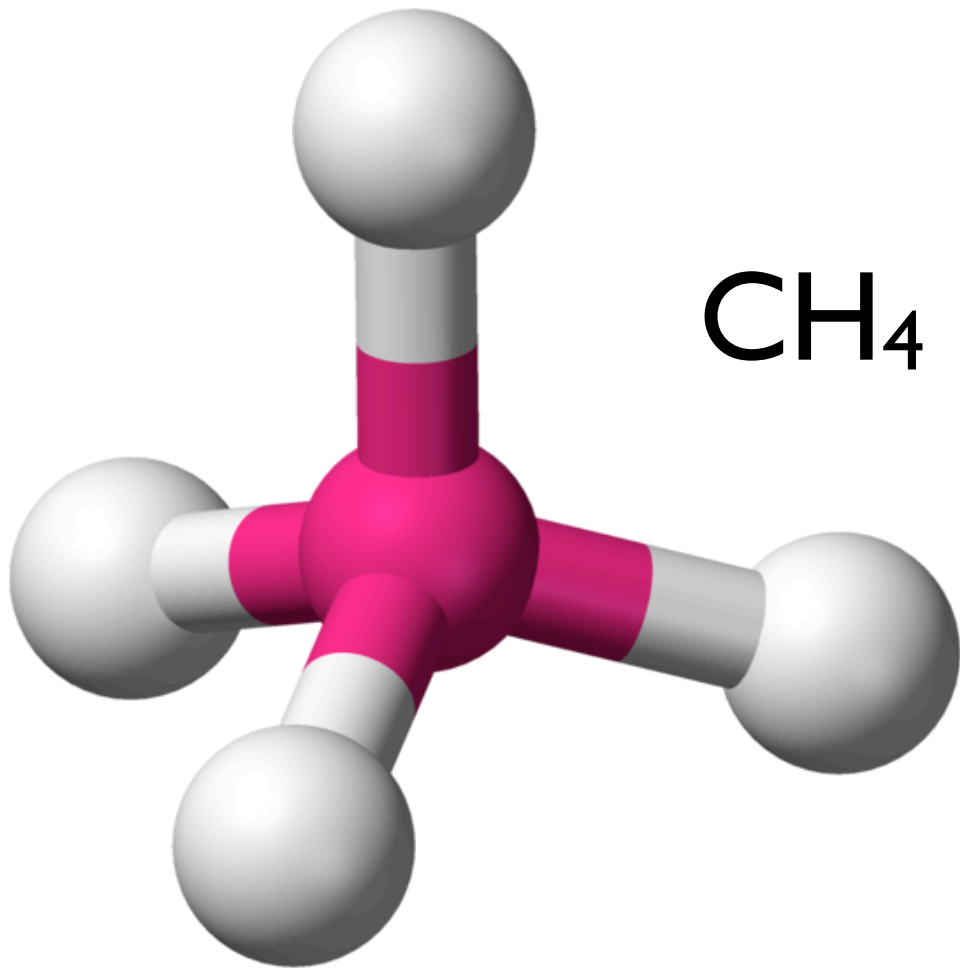
D_{3h}

$6 \times 3 - 6 = 12$ vibrations: $2A_1' + 2A_2'' + 3E' + E''$



D_{4h}

5x3-6 = 9 vibrations: A_{1g} + B_{1g} + B_{2g} + A_{2u} + B_{2u} + 2E_u



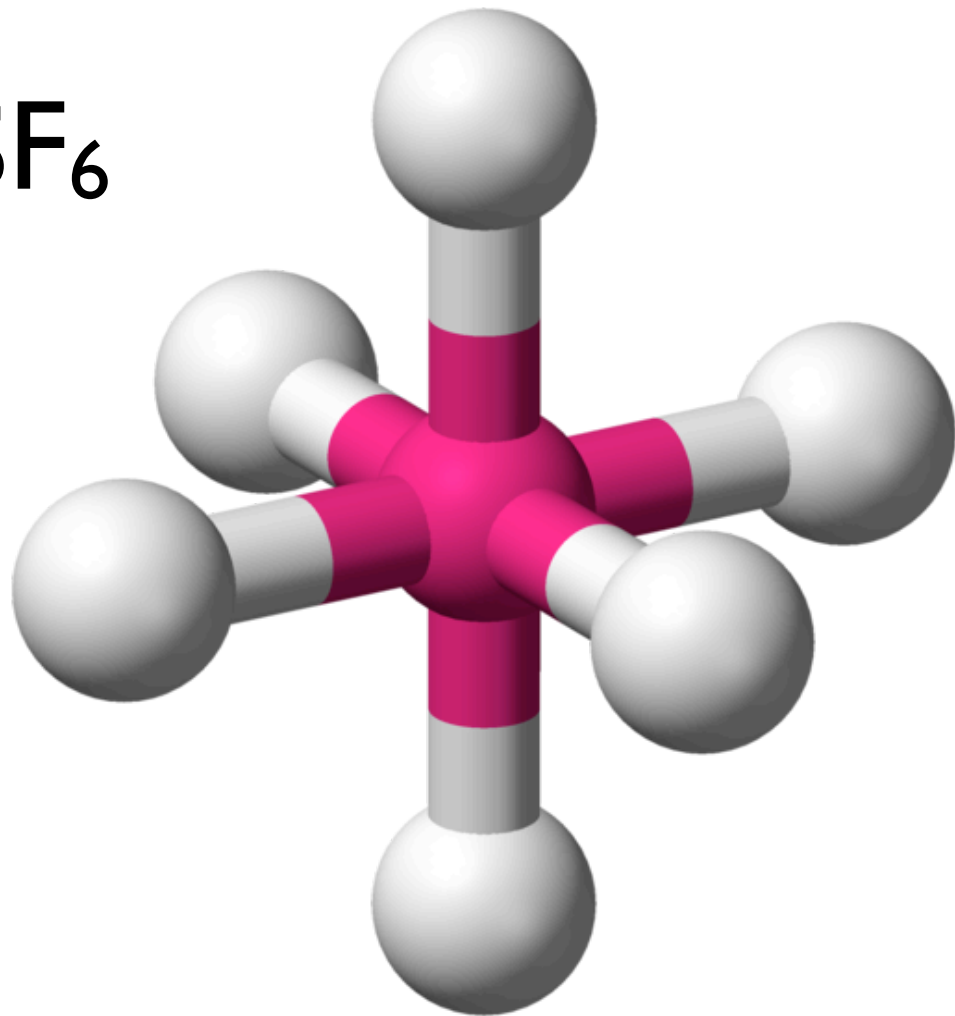
CH₄

T_d

Tetrahedral Symmetry

$5 \times 3 - 6 = 9$ vibrations: $A_1 + E + 2F_2$

SF_6



O_h

Octahedral Symmetry

$7 \times 3 - 6 = 15$ vibrations: $A_{1g} + E_g + 2T_{1u} + T_{2g} + T_{2u}$