

Applications of Group Theory

Lectures	Tue	10:00 - 11:30	PHY 9.1.09
	Thu	10:00 - 11:30	PHY 9.1.09
Exercises	Fri	10:00 - 11:30	PHY 5.0.21

Sheet 12

1. Vibrational modes of ethylene

Ethylene (C_2H_4) is a planar molecule which has the configuration shown in Fig. 1.

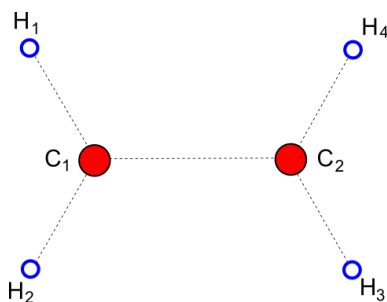


Figure 1: Geometrical configuration of ethylene (C_2H_4).

1. Using the point group of the molecule and the atomic site representation, find the symmetries of the allowed molecular vibrations for the C_2H_4 molecule.
2. Sketch the normal mode displacements for each of the allowed molecular vibrations obtained at the previous point.
3. Which modes are infrared-active? Which are Raman-active? What are the polarization selection rules?

Frohes Schaffen!