

5. Structure Factors**Problems**

5.1. For each of the following space groups, determine:

- i) The point group from which the space group is derived;
 ii) The Laue class.

- a) $P2_1$ b) $P23$ c) $Iba2$ d) $P4_1$
 e) $P3_221$ f) $P6_522$ g) $F432$
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5.2. Structure factors F_H may be subject to amplitude and phase restrictions

a) State Friedel's Law, in terms of the structure factors $F_H = |F_H| \cdot e^{i\phi_H}$ and intensities I_H .

b) Show that the presence of a glide plane n_b restricts the phases of certain reflections H . Which reflections have restricted phase?

c) Show that the presence of a glide plane n_b indicates the systematic absence of certain reflections. Which reflections are absent?

5.3. For a particular crystal, a structure-factor triplet is found to be:

$$F_h F_k F_{-h-k} = (37.1) e^{-i(0.83)\pi}$$

Another triplet is found to be:

$$F_k F_j F_{-h-k-j} = (95.2) e^{+i(0.83)\pi}$$

After changing coordinates, one structure factor is determined to be:

$$F'_{h+k} = (4.9) e^{+i(0.16)\pi}$$

In these coordinates, we also find that:

$$F'_j F'_{-h-k-j} = (27.0) e^{-i(0.78)\pi}$$

Determine the value of F'_h in the original coordinates.
