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Physics 211A - Solid State Physics
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Problem Set I.

Problem 1.

Show that non cumulative (uncorrelated) disorder does not broaden linewidths, and cumulative disorder does.

(See W. Sevenhans, et al, Phys. Rev. B. 34, 5955 (1986).

Problem 2.

Kittel, problem 2, page 49.

Problem 3.

Sketch the 1st Brillouin zone for a layered crystal made of 4 unit cell thick of two materials of lattice constant C_1 and C_2 .

Problem 4.

Describe the differences in diffraction between an amorphous material and one formed from small crystallites.

See, for instance, S.C. Moss and J.F. Graczyk, Phys. Rev. Lett. 23, 1167 (1969), R.J. Temkin, W. Paul and G.A.N. Connell, Adv. Phys. 22, 581 (1973).

Problem 5.

Describe Rietveld refinement method used for the determination of structure in complex solids. As an example, see M.A. Beno et al, Appl. Phys. Lett. 51, 57 (1987).

