Lecture 2 - Practical exercise:

1.) Use a green laser pointer with a known wavelength (532nm) to determine mesh size of electron microscopy grids (300 and 400 mesh). The “mesh” indicates the number of grid squares per one inch (2.41cm). Use reflections [1;0] and [5;0] for the measurements and calculations. Use your calculated value of the mesh size to calculate the wavelength of a red laser pointer.

Tasks

1. Draw a 2D lattice with a=b; α=90°. Draw the following lattice planes in the lattice:
2. [0;1], [1;0], [0;-1]; [-1;0]; [1;1], [-1;-1], [1;-1]; [-1;1]
3. [2;1]; [3;2]; [-1;2]
4. At what phase angle will an electromagnetic wave have 65% of the maximum possible electric field strength? (Use Angard diagram.)
5. Calculate how many periods of the electromagnetic wave will pass through a given point in vacuum in one second for:

(a) visible light (λ=500nm)

(b) x-ray radiation (λ=1Å)

1. What will be the amplitude and the phase (relative to wave A) of a wave resulting from the addition of two waves A and B with identical amplitudes and wavelengths. In case the wave B is shifted:

(a) +45° relative to A

(b) -20° relative to A