5.11: Diffraction Pattern for Pentagonal Point Scatterers

Establish mask geometry:

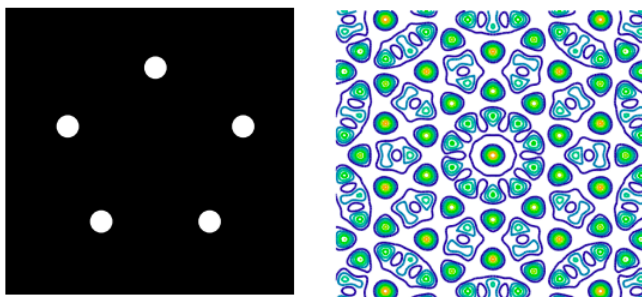$$R = 2 \quad m = 1..A \quad \Theta_m = \frac{2\pi m}{A} \quad x_m = R\sin(\Theta_m) \quad y_m = R\cos(\Theta_m)$$

Fourier transform of position wave function (mask geometry) into the momentum representation:

$$\Phi(p_x,\, p_y) = \frac{1}{2\pi\sqrt{A}} \sum_{m=1}^{A} (exp(-ip_x x_m)exp(-ip_y y_m))$$

Display mask geometry and diffraction pattern: $A \equiv 5$

$$N = 100 \quad \Delta p = 12 \quad j = 0..N \quad k = 0..N \quad px_j = -\Delta p + \frac{2\Delta p j}{N} \quad py_k = -\Delta p + \frac{2\Delta p\, k}{N}$$

$$\text{Diffraction Pattern}_{j,\, k} = (|\Phi(px_j,\, py_k)|)^2$$