

Mask Diffraction Patterns - Point Pentagon

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Establish mask geometry:

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

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

$$\Phi(p_x, p_y) := \frac{1}{2 \cdot \pi \cdot \sqrt{A}} \cdot \sum_{m=1}^A \left(\exp(-i \cdot p_x \cdot x_m) \cdot \exp(-i \cdot p_y \cdot y_m) \right)$$

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

$$N := 100 \quad \Delta p := 12 \quad j := 0..N \quad k := 0..N \quad p_{x_j} := -\Delta p + \frac{2 \cdot \Delta p \cdot j}{N} \quad p_{y_k} := -\Delta p + \frac{2 \cdot \Delta p \cdot k}{N}$$

$$\text{DiffractionPattern}_{j,k} := \left(\left| \Phi(p_{x_j}, p_{y_k}) \right| \right)^2$$

