

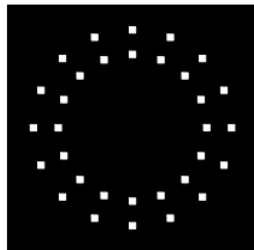
## 5.16: Diffraction Pattern for Two Concentric Rings

Create hole positions:

$$A = 32 \quad R = 1.2 \quad m = 1..16 \quad \Theta_m = \frac{2\pi m}{16} \quad x_m = R \sin(\Theta_m) \quad y_m = R \cos(\Theta_m)$$

$$R = .9 \quad m = 17..A \quad \Theta_m = \frac{2\pi m}{16} \quad x_m = R \sin(\Theta_m) \quad y_m = R \cos(\Theta_m)$$

Display coordinate-space wave function (mask geometry):  $m = 1..A$



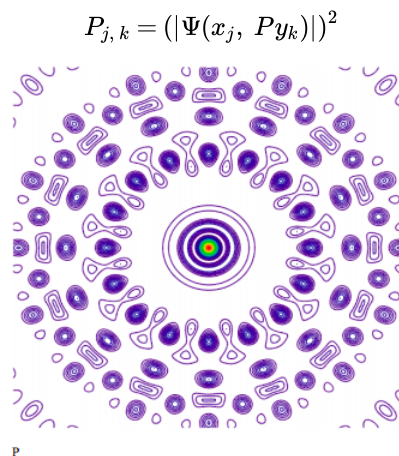
Fourier transform position wave function into the momentum representation:

$$\Delta = 30 \quad N = 200 \quad j = 0..N \quad px_j = -\Delta + \frac{2\Delta j}{N} \quad k = 0..N \quad py_k = -\Delta + \frac{2\Delta k}{N}$$

Hole dimension:

$$d = .1 \quad \Psi(p_x, p_y) = \frac{1}{2\pi d\sqrt{A}} \sum_{m=1}^A \left( \int_{x_m - \frac{d}{2}}^{x_m + \frac{d}{2}} \exp(-ip_x x) dx \int_{y_m - \frac{d}{2}}^{y_m + \frac{d}{2}} \exp(-ip_y y) dy \right)$$

Display diffraction pattern:



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