

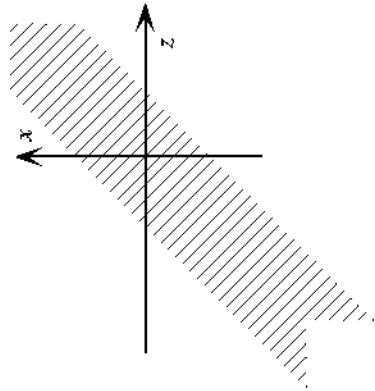
ANGLE & INTENSITY VS. PHASE & AMPLITUDE: a cross-reference

angle description

inclined plane wave:

$$\mathcal{A}(x, y) = \theta$$

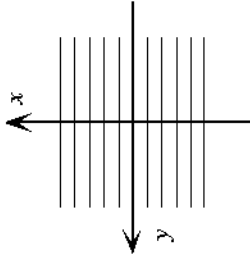
wavefront snapshot



phase description

$$\phi(x, y) = \frac{2\pi}{\lambda} \sin \theta \cdot x$$

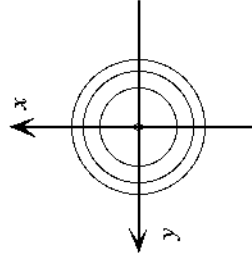
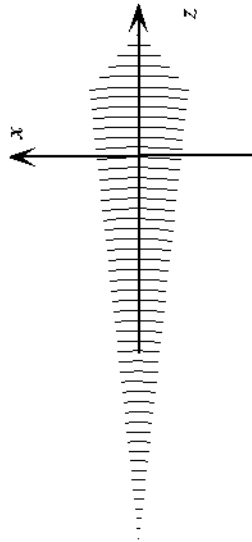
“phase footprint”
contours of equal phase
(0° or $n \cdot 360^\circ$)



on-axis spherical wave:

We must restrict our attention to the x - z plane because, for non-zero values of y , the normal to the wavefront tilts out of the plane, and the angle cannot be so simply described.

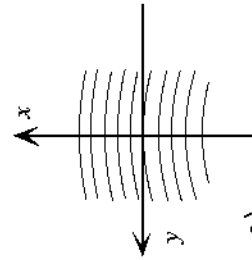
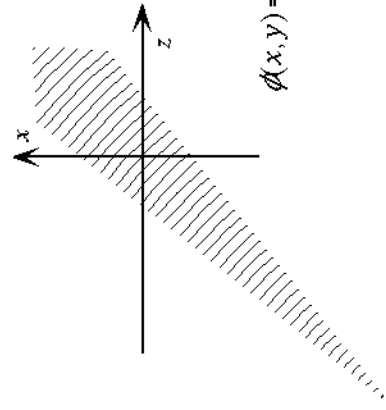
$$\mathcal{A}(x, 0) = \frac{1}{R_0} x$$



$$\phi(x, y) = \frac{2\pi}{\lambda} R_0 + \frac{\pi}{\lambda R_0} (x^2 + y^2)$$

off-axis spherical wave:

$$\mathcal{A}(x, 0) = \theta + \frac{\cos \theta}{R_0} x$$



$$\phi(x, y) = \frac{2\pi}{\lambda} R_0 + \frac{2\pi}{\lambda} \sin \theta \cdot x + \frac{\pi}{\lambda R_0} (\cos^2 \theta \cdot x^2 + y^2)$$

in general: $\sin \mathcal{A}(x, 0) = \frac{\lambda}{2\pi} \left. \frac{d\phi(x, y)}{dx} \right|_{x,0}$

= $\cos \theta_x$, or ℓ in disguise