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Light wave in z direction

$$\vec{E} = e^{ikz - i\omega t}(\mathcal{E}_x, \mathcal{E}_y, 0)$$

$(\mathcal{E}_x, \mathcal{E}_y)$: complex 2d vector

~~Linear~~ polarization

$$\mathcal{E}_x = \mathcal{E}_0 \cos\theta, \quad \mathcal{E}_y = \mathcal{E}_0 \sin\theta$$

~~Circ~~ circular polarization

$$\mathcal{E}_x = \frac{\mathcal{E}_0}{\sqrt{2}}, \quad \mathcal{E}_y = \pm i \frac{\mathcal{E}_0}{\sqrt{2}}$$

General elliptic polarization

general complex $\mathcal{E}_x, \mathcal{E}_y$

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