

Green function near a mirror

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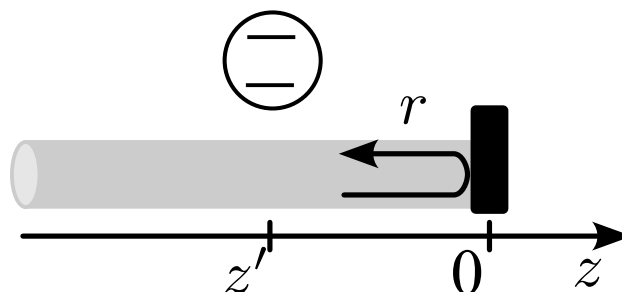


FIG. 1 Emitter near a mirror

Find a Green function $G(z, z')$, describing an electric field of an emitter located at the left ($z' < 0$) of a mirror. The mirror is characterized by the amplitude reflection coefficient r and is located at $z = 0$.

Outside the mirror region, the Green function should satisfy the equation

$$(\partial_z^2 + q^2)G(z, z') = -\delta(z - z'), \quad (1)$$

where $q = \omega/c$ is the light wave vector.

Answer:

$$G(z, z') = \frac{i}{2q} \left[e^{iq|z-z'|} + r e^{-i(z+z')} \right] \quad (2)$$