In [2]:
```python
import numpy as np
```

In [3]:
```python
# Function to calculate transmitted light intensity
def transmitted_light(I_0, beta, d):
    """
    Calculates transmitted light intensity through a material.

    Parameters:
    I_0 (float): Initial light intensity (W/m^2)
    beta (float): Absorption coefficient (1/m)
    d (float): Thickness of material (m)

    Returns:
    float: Transmitted light intensity
    """
    return I_0 * np.exp(-beta * d)
```

In [4]:
```python
# Function to calculate reflected light intensity at an interface
def reflected_light(I_0, n1, n2):
    """
    Calculates reflected light intensity at an interface.

    Parameters:
    I_0 (float): Incident light intensity (W/m^2)
    n1 (float): Refractive index of the first material
    n2 (float): Refractive index of the second material

    Returns:
    float: Reflected light intensity
    """
    R = ((n2 - n1) / (n2 + n1))**2  # Reflection coefficient
    return R * I_0  # Reflected intensity
```

In [5]:
```python
I_0 = 10  # Index of reflextion of material
n_air = 1.00
n_PMMA = 1.489
n_water = 1.333
n_polymer = 1.46

beta_PMMA = 0.132  # Absorption coefficient (1/m)
beta_polymer = .132
beta_water = .097

d_PMMA = 0.02  # Thickness of material (m)
d_polymer = 0.025
d_water = 0.03
```

In [6]:
```python
# Light moving from one matieral into the other, then subtract the reflected lig
# light traveling thorugh the material, then subtracting the absorbed light from
# Repeat until being out of all material
I_1 = I_0 - reflected_light(I_0, n_air, n_PMMA)  # Air → PMMA
I_2 = transmitted_light(I_1, beta_PMMA, d_PMMA)  # Transmission through PMMA
I_3 = I_2 - reflected_light(I_2, n_PMMA, n_water)  # PMMA → Water
```

```
I_4 = transmitted_light(I_3, beta_water, d_PMMA)  # Transmission through water
I_5 = I_4 - reflected_light(I_4, n_water, n_polymer)  # Water → Polymer
I_6 = transmitted_light(I_5, beta_polymer, d_polymer)  # Transmission through Po
I_7 = I_6 - reflected_light(I_6, n_polymer, n_PMMA)  # Polymer → PMMA
I_8 = transmitted_light(I_7, beta_PMMA, d_PMMA)  # Transmission through last PMM
I_final = I_8 - reflected_light(I_8, n_PMMA, n_air)  # PMMA → Air
```

In [7]:

```
print(f"Final Transmitted Light Intensity: {I_final:.4f} W/m^2")
```

```
Final Transmitted Light Intensity: 9.0985 W/m^2
```