$$I = I_0 e^{-\frac{\mu}{\rho_m}\eta} = I_0 e^{-\mu_m \eta} = I_0 e^{-\mu_m \rho_m l}$$

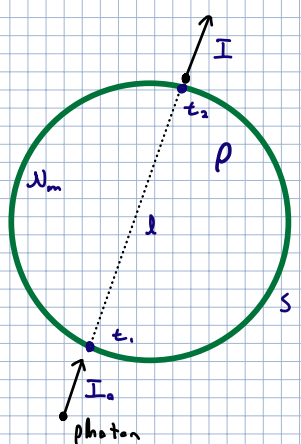
$$\eta = \rho_m l$$

Based upon several interactions:

- Rayleigh scattering
- Compton scattering
- photoelectric absorbtion
- pair production

• Varies w/ energy

$$\frac{I}{I_0} = e^{-\mu_m \rho_m l} = \text{probability of transmission} = P$$




Upon interaction

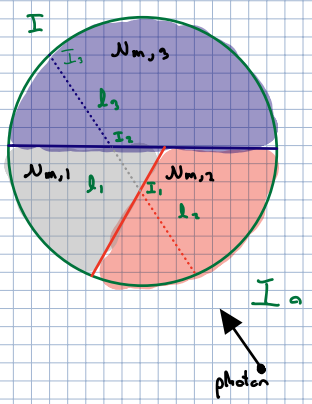
- let ray travel straight through S
- measure $t_1$ + $t_2$
- calculate l (need to set some basis units; what $P(t_2) - P(t_1)$ is?)
- Compute $P = e^{-\mu_m \rho l}$ for sample photon
- Calculate whether Transmit = True or False

```
bool decision(float probability)
{
    return rand()<probability;
}
        [0,1)
```

- If True: Transmit Photon, Energy becomes $E_0$ (empty atoms)
- If False: Stop tracing photon (Ignore Reflection)
- Repeat again for photon if True

- Mass - Energy absorbtion coefficients to calculate $E_{abs}$

# Composite

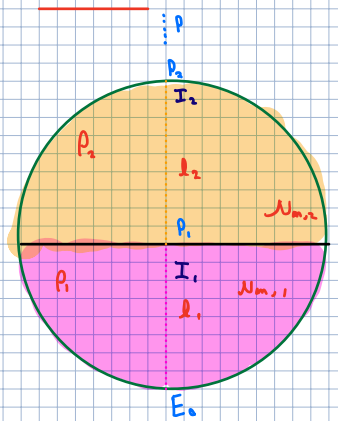



$\frac{I}{I_0} = ?$

## How it might work

- Calculate prob to pass through each path with Energy $E_0$
- Calculate composite prob $P = P_1 P_2$
- Run RNG to determine transmission.

## Test




$P_1 = e^{-N_{m,1} \rho_1 l_1}$

$P_2 = e^{-N_{m,2} P_2 l_2}$

Sanity Check!!!

let $N_{m,1} = N_{m,2} = N_m$, $\rho_1 = \rho_2 = \rho$

and $l_1 + l_2 = l$

$P = P_1 P_2 = e^{-N_m \rho (l_1 + l_2)} = e^{-N_m \rho l}$ ✓