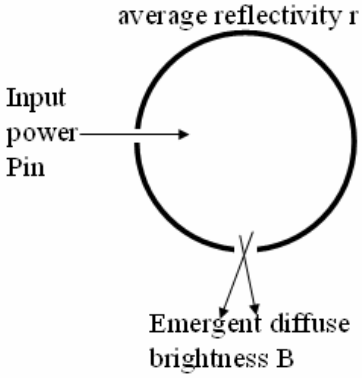
Integrating Sphere Theory



E = Total optical energy contained within sphere

$\dot{E}$ = powerGain – powerLoss

In steady state....

$$0 = Pin - Fnormal \cdot [(1-r) \cdot (4\pi R^2 - Aholes) + Aholes]$$

where r = average reflectivity.

Use $$Fnormal = \int_{hemisphere} B \cdot \cos(\theta) d\Omega$$

where B = emitted brightness , uniform over angle,

measured in watts /m^2 steradian

$$Fnormal \equiv \int_{\theta=0}^{\pi/2} B \cdot 2\pi \sin(\theta)\cos(\theta) d\theta = \pi B;$$

hence $$B = \frac{Pin/\pi}{(4\pi R^2 - Aholes)\cdot(1-r) + Aholes}$$