Integrating Sphere Theory

E = Total optical energy contained within sphere
\dot{E} = \text{powerGain} - \text{powerLoss}

In steady state,...

0 = Pin - \int B \cdot \cos(\theta) d\Omega

where r = average reflectivity.

Use \ F_{\text{normal}} = \int_{\text{hemisphere}} B d\Omega

where B = emitted brightness, uniform over angle, measured in \text{watts/m}^2 \text{steradian}

\ F_{\text{normal}} = \int_{\theta=0}^{\pi/2} B \cdot 2\pi \sin(\theta) \cos(\theta) d\theta = \pi B,

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