1.8: Normal Flux Density F

The rate of passage of energy per unit area normal to the direction of energy flow is the normal flux density, expressed in $\mathrm{W\ m^{-2}}$.

If a point source of radiation is radiating isotropically, the radiant flux being Φ, the normal flux density at a distance r will be Φ divided by the area of a sphere of radius r. That is

$$F = \Phi/(4\pi r^2) \tag{1.8.1}$$

If the source of radiation is not isotropic (or even if it is) we can express the normal flux density in some direction at distance r in terms of the intensity in that direction:

$$F = I/r^2 \tag{1.8.2}$$

That is, the normal flux density from a point source falls off inversely with the square of the distance.