

As noted in Level 1, different fields of science have developed different terminology and notation for the same physical quantities. Tabel shows the "historic" and "modern" notations seen in oceanographic literature. The recommended (modern) notation came into use the late 1970s and is employed, for example, in Jerlov (1976) and further refined in Morel and Smith (1982). The historic notation is generally found in works published before the late 1970's, most notably in Preisendorfer's 1977 *opus magnum* Hydrologic Optics.

Quantity & SI Units & Recommended	Symbol & Historic	Symbol
radiant energy & J & Q & U		
radiant power & W & Φ & P		
radiant intensity & W sr ⁻¹ & I & J		
radiance & W m ⁻² sr ⁻¹ & L & N		
plane irradiance & W m ⁻² & E & H		
downward plane irradiance & W m ⁻² & E_d & $H(-)$		
upward plane irradiance & W m ⁻² & E_u & $H(+)$		
scalar irradiance & W m ⁻² & E_o & h		
downward scalar irradiance & W m ⁻² & E_{od} & $h(-)$		
upward scalar irradiance & W m ⁻² & E_{ou} & $h(+)$		
vector irradiance & W m ⁻² & \vec{E} & \vec{H}		
vertical net irradiance & W m ⁻² & $E_d - E_u$ & —		
emittance & W m ⁻² & M & W		
photosynthetically available radiation & photons s ⁻¹ m ⁻² & PAR or E_{PAR} & —		

Table 1: Terms, units, and symbols for radiometric quantities commonly used in hydrolight optics. The quantities as shown represent broadband measurements. For narrow band (monochromatic) measurements, add the adjective "spectral" to the term, add nm⁻¹ to the units, and add a wavelength index λ to the symbol, e.g., spectral radiance, L_λ or $L(\lambda)$, with units of W m⁻² sr⁻¹ nm⁻¹. PAR is always broadband.

It is occasionally convenient to distinguish conceptually between photons leaving a surface and photons arriving at a surface. In radiative transfer theory, *field radiance* L^- refers to the radiance of photons arriving at a surface; this is the quantity measured by a radiance meter. *Surface radiance* L^+ is the radiance attributed to a real or imaginary surface emitting photons. *Irradiance* E refers to photons incident onto a surface; the corresponding measure of photons leaving a surface is denoted by *radiant exitance* or *emittance* M . Likewise, intensity can be subdivided into field intensity I^- and surface intensity I^+ . The figure summarizes this hierarchy of radiometric concepts.

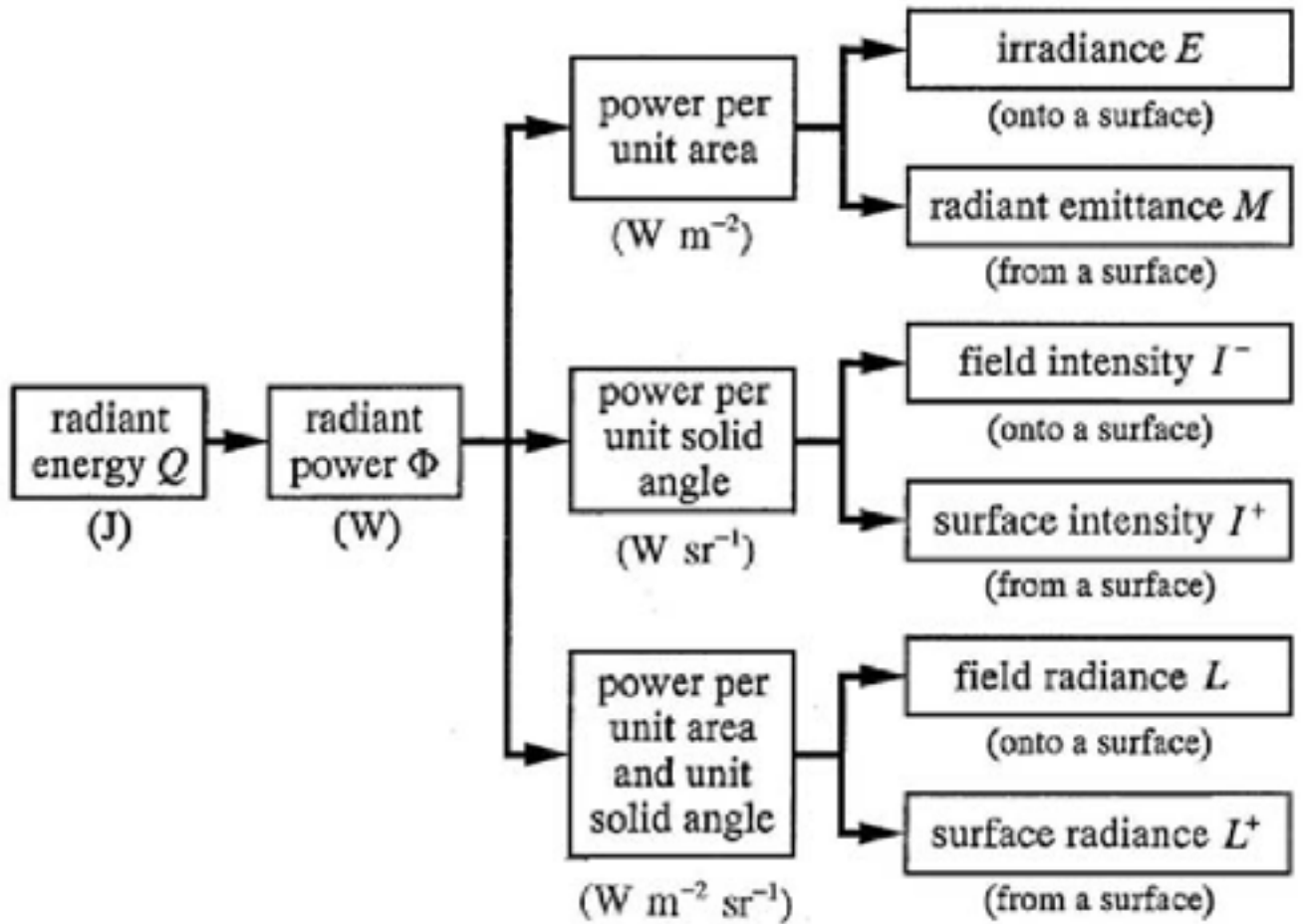


Figure 1: The hierarchy of radiometric concepts.