10.2.1 Radiation

Table 10.1 presents the nomenclature and symbols used to describe sources of radiant energy and their activity. The *radiation quantities* in Table 10.1 will generally be functions of *wavelength*, *wavenumber*, or *frequency* and may need to be specified for a *bandwidth* of wavelengths. The radiance within such a bandwidth would be indicated as B, and called the *spectral radiance*. Radiation quantities in terms of bandwidth are expressed, as above, as *spectral radiation quantities*.

The radiation quantities for the *black body* are important in spectroscopy and can be distinguished by an additional superscript, b. The *spectral radiance* of the black body is thus denoted by B^b. If the radiation quantities act as light, affecting the human eye, there is a corresponding set of *luminous qualities* that can be related to the radiant quantities for the *normal eye (standard observer)*. To avoid confusion, subscripts, *e*, (energy) for radiant and v, (visible) for luminous quantities can be added. The normal, light-adapted eye is characterized by a wavelength-dependent function, the *spectral luminous efficacy*, K, whose maximum occurs at 555 nm and has the value K_m = 680 m/w. The function $K(\lambda)/K_m = V(\lambda)$ is called the (spectral) *luminous efficiency*. The relationship between radiant flux ϕ_e, and the luminous flux ϕ_v is as follows

$$\phi_v = K_m \int_{380nm}^{780nm} V(\lambda)\phi_{e,\lambda}\,\mathrm{d}\lambda \qquad (1)$$

The measurement of light in this context is called *photometry*.