We consider a solar cell with a concrete EQE (External Quantum Efficiency, i.e. the percentual ability of the cell to convert a photon into an electron). Therefore, this EQE is a function of the wavelength () because the cell has different ability of photon conversion to electricity depending on the energy of the photon. For example, if the energy of the photon is lower than the energy band gap of the active layer (AL) material, the EQE will be as a first approximation 0 as no photon is absorbed at this energy range.

If the EQE is known, one can calculate the photocurrent () of a cell when illuminated with a specific light irradiance (which typically is the AM 1.5G solar spectrum) considering no recombination losses:

Where is the light irradiance expressed in , and is the electric charge of an electron in absolute value. Typically, the AM1.5G solar irradiance is expressed in , and therefore, the relation between both functions is:

Thus, the complete expression is:

In the Rainbow setup measurements, the incident light is a spectral fraction of the AM1.5G solar spectrum. As a first and rude approximation we can express this incident light as a step function with a cutting wavelength ():

Now we can split the integral in two parts, and because the second part corresponding to the defined integral from to infinite is zero, the expression for is:

The derivative of with respect to is the slope of the measured curves in the rainbow setup:

If we discretise the expression, we obtain:

Considering that . Finally, the equation can be rewritten as: