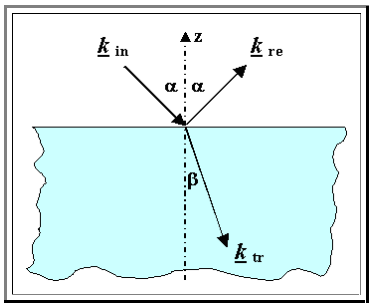
Exercise 5.1.1 Derivation of Snellius Law

Illustration

Consider the situation as given in the figure.



- Assume that the light consists of a stream of photons, all with the same energy $h\nu$ and with momentums given by $\hbar\underline{k}$.
- Assume a certain flux of photons (= number per second and cm^2) given by I_{in}, I_{ref}, and I_{tr}. Also assume that you have "mirror" reflection, i.e. both angles are identical (= α)

Show that you obtain $I_{tr} = I_{in} - I_{ref}$ and Snellius law ($\sin\alpha/\sin\beta = n$) from energy and momentum conservation.

Link to the solution