r1

An EM plane wave comes from the left towards an interface. Reflected and transmitted waves leave. At the interface we expect to match the waves with something like: $\mathbf{E}_1^{//} = \mathbf{E}_2^{//}$

$$\left(\text{blah}\right)\mathrm{e}^{\left[i\left(\vec{k}_I\bullet\vec{r}-\omega_I t\right)\right]}+\left(\text{blah}\right)\mathrm{e}^{\left[i\left(\vec{k}_R\bullet\vec{r}-\omega_R t\right)\right]}=\left(\text{blah}\right)\mathrm{e}^{\left[i\left(\vec{k}_T\bullet\vec{r}-\omega_T t\right)\right]}$$

$$\left(\text{blah}\right)\mathrm{e}^{-i\omega_I t}+\left(\text{blah}\right)\mathrm{e}^{-i\omega_R t}=\left(\text{blah}\right)\mathrm{e}^{-i\omega_T t}$$

$$\omega_I=\omega_R=\omega_T$$

An EM plane wave comes from the left towards an interface. Reflected and transmitted waves leave. At the interface we expect to match the waves with something like: $\mathbf{E}_1^{//} = \mathbf{E}_2^{//}$

$$(\text{blah})\mathrm{e}^{\left[i\left(\vec{k}_I\bullet\vec{r}-\omega_I t\right)\right]}+(\text{blah})\mathrm{e}^{\left[i\left(\vec{k}_R\bullet\vec{r}-\omega_I t\right)\right]}=(\text{blah})\mathrm{e}^{\left[i\left(\vec{k}_T\bullet\vec{r}-\omega_I t\right)\right]}$$

$$(\text{blah})\mathrm{e}^{i\vec{k}_I\bullet\vec{r}}+(\text{blah})\mathrm{e}^{i\vec{k}_R\bullet\vec{r}}=(\text{blah})\mathrm{e}^{i\vec{k}_T\bullet\vec{r}}$$

$$\vec{k}_I\bullet\vec{r}=\vec{k}_R\bullet\vec{r}=\vec{k}_T\bullet\vec{r}$$