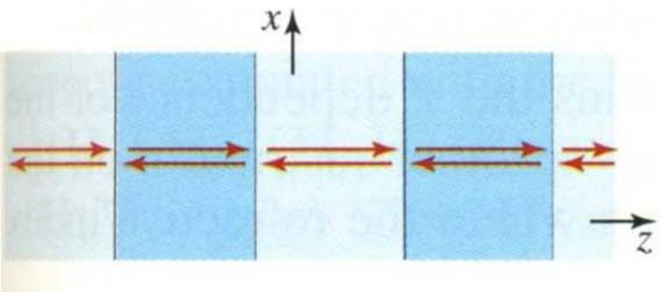
One-dimensional photonic crystal

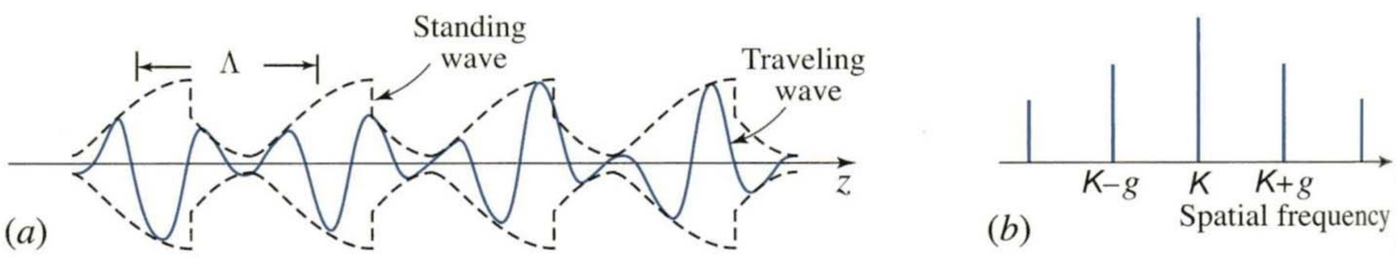
Bloch theorem



$$U(z) = p_K(z)\exp(-jKz),$$

Bloch mode

$$g = 2\pi/\Lambda$$



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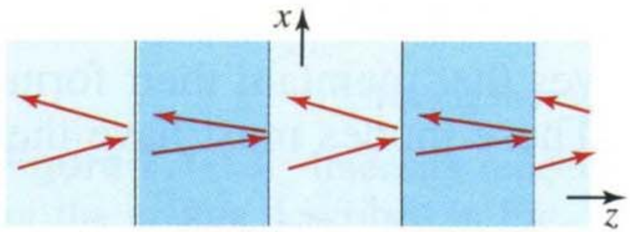
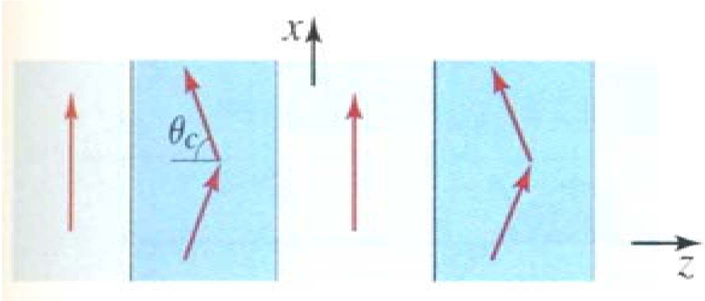


$$U(x, y, z) = p_K(z)\exp(-jKz)\exp(-jk_x x)$$



$$U(x, y, z) = p_0(z)\exp(-jk_x x)$$

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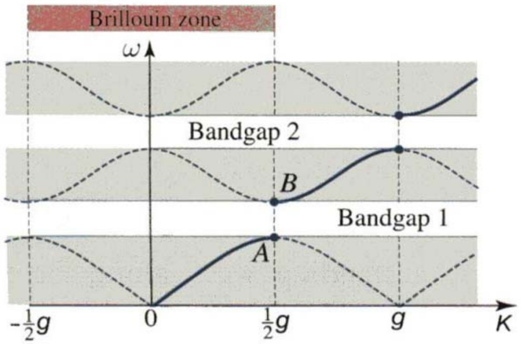
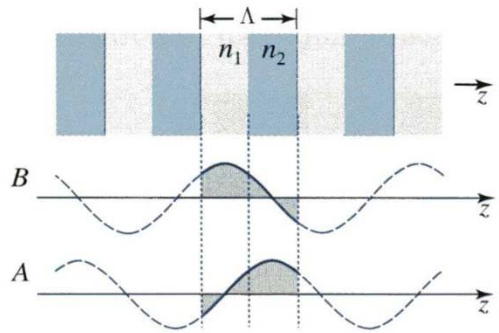
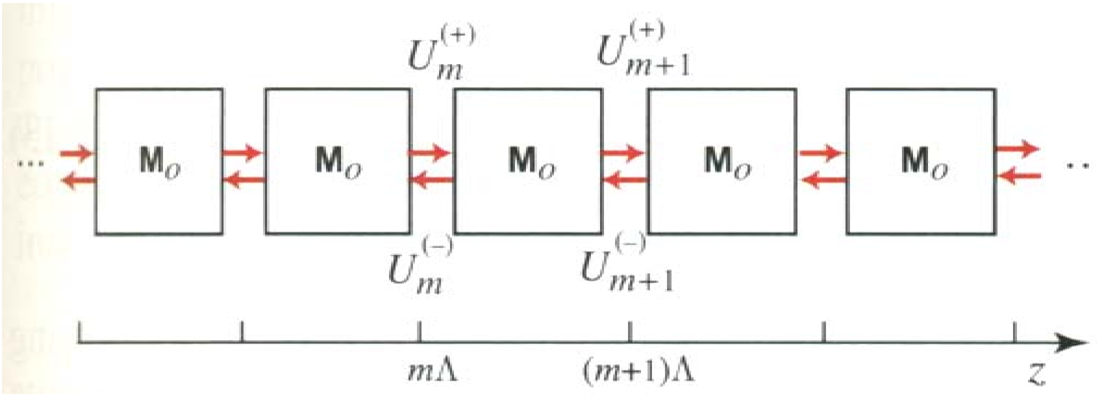




$$\mathbf{M}_o = \begin{bmatrix} 1/t^* & r/t \\ r^*/t^* & 1/t \end{bmatrix}$$

$$\begin{bmatrix} U_{m+1}^{(+)} \\ U_{m+1}^{(-)} \end{bmatrix} = \mathbf{M}_o \begin{bmatrix} U_m^{(+)} \\ U_m^{(-)} \end{bmatrix}$$



$$\begin{bmatrix} U_{m+1}^{(+)} \\ U_{m+1}^{(-)} \end{bmatrix} = e^{-j\Phi} \begin{bmatrix} U_m^{(+)} \\ U_m^{(-)} \end{bmatrix}, \quad m = 1, 2, \ldots;$$

$$\Phi = K\Lambda$$

$$\mathbf{M}_o \begin{bmatrix} U_0^{(+)} \\ U_0^{(-)} \end{bmatrix} = e^{-j\Phi} \begin{bmatrix} U_0^{(+)} \\ U_0^{(-)} \end{bmatrix}$$

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$$\cos\Phi = \mathrm{Re}\left\{\frac{1}{\mathrm{t}}\right\}$$

$$p_K(z) \propto \left[-\mathrm{r}e^{-jn_1k_0z} + \left(e^{-jK\Lambda} - 1\right) e^{jn_1k_0z}\right] e^{jKz}, \quad 0 < z < d_1$$

$$\cos\left(2\pi\frac{K}{g}\right) = \mathrm{Re}\left\{\frac{1}{\mathrm{t}(\omega)}\right\}$$

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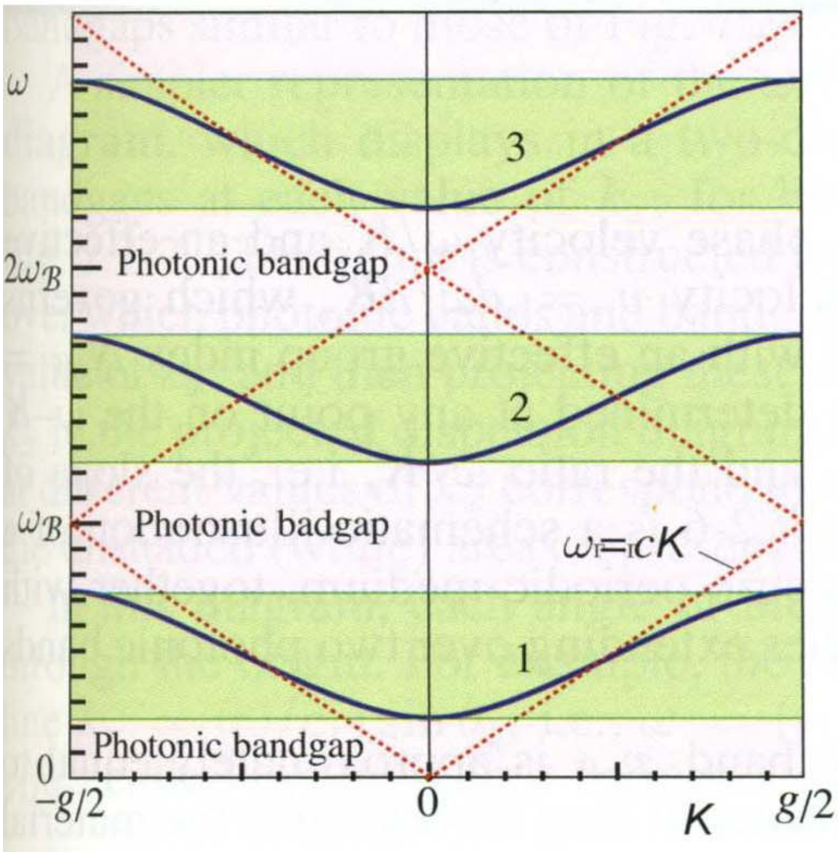

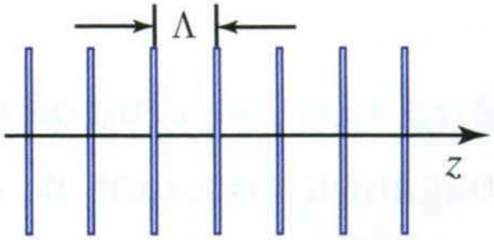

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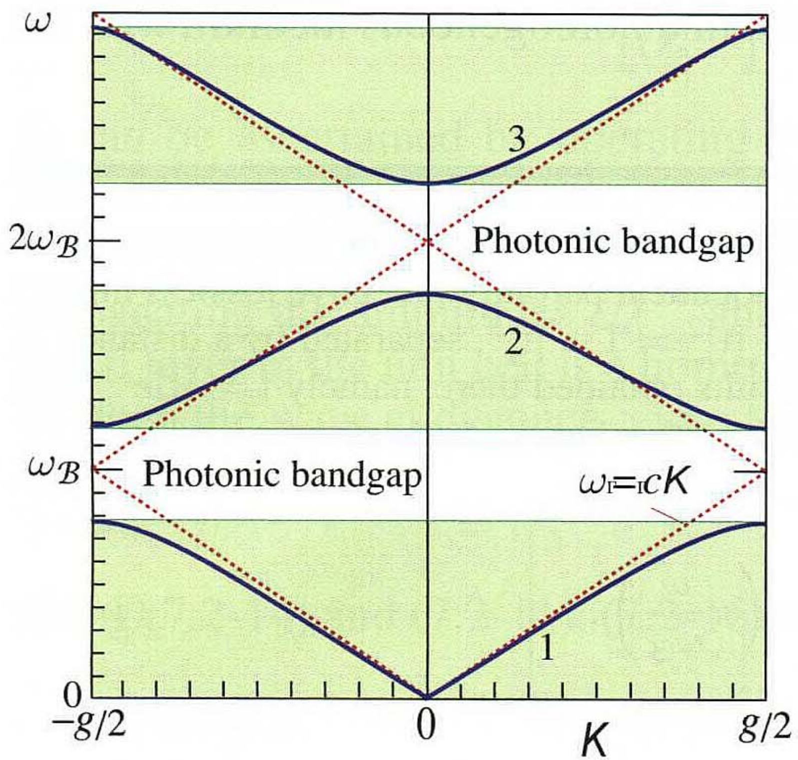

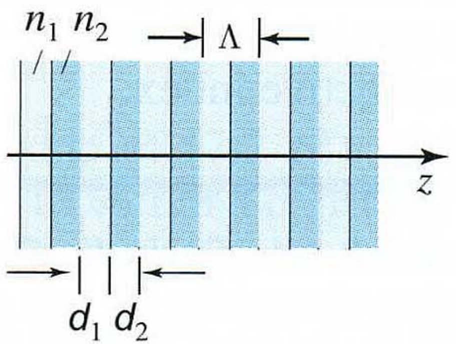

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