

$$\frac{\partial A_p^+}{\partial z} + \frac{n}{c} \frac{\partial A_p^+}{\partial t} = -\frac{g_B}{2A_{eff}} Q_+ A_s^- + ikA_p^- + i\delta A_p^+ - \frac{\alpha}{2} A_p^+ + i\gamma \left[|A_p^+|^2 + 2(|A_p^-|^2 + |A_s|^2) \right] A_p^+$$

$$-\frac{\partial A_p^-}{\partial z} + \frac{n}{c} \frac{\partial A_p^-}{\partial t} = -\frac{g_B}{2A_{eff}} Q_- A_s^+ + ikA_p^+ + i\delta A_p^- - \frac{\alpha}{2} A_p^- + i\gamma \left[|A_p^-|^2 + 2(|A_p^+|^2 + |A_s|^2) \right] A_p^-$$

$$\frac{\partial A_s^+}{\partial z} + \frac{n}{c} \frac{\partial A_s^+}{\partial t} = \frac{g_B}{2A_{eff}} Q_- A_p^- + ikA_s^- + i\delta A_s^+ - \frac{\alpha}{2} A_s^+ + i\gamma \left[|A_s^+|^2 + 2(|A_s^-|^2 + |A_p|^2) \right] A_s^+$$

$$-\frac{\partial A_s^-}{\partial z} + \frac{n}{c} \frac{\partial A_s^-}{\partial t} = \frac{g_B}{2A_{eff}} Q_+ A_p^+ + ikA_s^+ + i\delta A_s^- - \frac{\alpha}{2} A_s^- + i\gamma \left[|A_s^-|^2 + 2(|A_s^+|^2 + |A_p|^2) \right] A_s^-$$

$$2\tau_B \frac{\partial Q_+}{\partial x} + Q_+ = A_p^+ A_s^{-*} + f_+$$

$$2\tau_B \frac{\partial Q_-}{\partial x} + Q_- = A_p^- A_s^{+*} + f_-$$

Boundary conditions – $A_p^+(0, t) = 1, A_p^-(0, t) = 0, A_s^+(0, t) = 0, A_s^-(0, t) = 0$