

$$i\partial_z F_F + \left(i\bar{\beta}_F^{(1)} \partial_r - \frac{1}{2} \bar{\beta}_F^{(2)} \partial_r^2 \right) F_F + F_F^* F_{S_1} e^{ikz} = 0$$

$$i\partial_z F_{S_1} + (k - i\bar{\beta}_S^{(1)} \partial_r) F_{S_1} + C F_{S_2} + \frac{1}{2} F_F^2 e^{-ikz} = 0$$

$$i\partial_z F_{S_2} + (k + i\bar{\beta}_S^{(1)} \partial_r) F_{S_2} + C F_{S_1} = 0$$

z = distance [m]

τ = retarded time [s]

$\tau = 1 \text{ ps}^4 \text{ eta} \rightarrow \text{pulse duration} + \text{ps}$

$$\underbrace{\text{eta}}_{} = 3$$

dimensionless time

$$k = 6.9e + \delta \text{ [1/m]}$$

$$\bar{\beta}_P^{(1)} = 563.3 \text{ [ps/m]}$$

$$\bar{\beta}_{S_1}^{(1)} = 533.3 \text{ [ps/m]}$$

$$y = 100 \text{ [m] } \sqrt{\omega}$$

$$\bar{\beta}_F^{(0)} = 0.83 \text{ [ps}^2/\text{m]}$$

$$\bar{\beta}_{S_1}^{(2)} = 0.22 \text{ [ps}^2/\text{m]}$$

$$\bar{\beta}_{S_2}^{(2)} = 2.53 \text{ [ps}^2/\text{m]}$$

$$i\partial_z F = -\Gamma_2 \partial_z^2 F$$

$$\frac{1}{i} = \frac{1}{\sqrt{-1}}$$

$$\overline{FFT} \xrightarrow{R} u_{et} = ik\hat{u}$$

$$u_{et} = -u^2 \hat{u}$$

$$\partial_z F = -\beta_1 \partial_r F - i \frac{\beta_2}{2} \partial_z^2 F + i \gamma F^* S e^{ikz}$$

$$\partial_z S = i X + \beta_1 \partial_r S + i CP + i \frac{\beta_2}{2} F^2 e^{-ikz}$$

$$\text{① } \partial_z F_F^F = i \left(i \bar{\beta}_F^{(1)} \partial_\gamma - \frac{1}{2} \bar{\beta}_F^{(2)} \partial_\gamma^2 \right) F_F^F + i F_F^* F_{S_1}^S e^{ikz}$$

$$\text{② } \partial_z F_{S_1}^S = -\bar{\beta}_{12} \partial_\gamma F_F^F - i \bar{\beta}_{2F} \partial_\gamma^2 F_F^F$$

$$\text{③ } \partial_z F_{S_2}^S = i \left(k - i \bar{\beta}_S^{(1)} \partial_\gamma \right) F_{S_1}^S + i C F_{S_2}^P + i \frac{1}{2} F_F^2 e^{-ikz}$$

$$-\frac{1}{2} \bar{\beta}_S^{(2)} \partial_\gamma^2 \quad !!!$$

