$$S_{r0} = S_{b1} f_r \left(1 - e^{-\alpha_r(\lambda_b) z_l}\right) \eta_r \tag{85}$$

$$S_{gn} = S_{g0} E_{g0} \tag{86}$$

$$S_{yg0} = \eta_y S_{g0} T_{g0} t_y \tag{87}$$

$$S_{rg0} = \eta_r S_{g0} T_{g0} t_r \tag{88}$$

$$S_{yn} = S_{y0} E_{y0} + S_{yg0} E_{yg0} \tag{89}$$

$$S_{ry0} = S_{y0} T_{y0} \eta_r \tag{90}$$

$$S_{ryg0} = S_{yg0} T_{yg0} \eta_r \tag{91}$$

$$S_{rn} = S_{r0} E_{r0} + S_{rg0} E_{rg0} + S_{ry0} E_{ry0} + S_{ryg0} E_{ryg0} \tag{92}$$

$$S_{bn} = S_{b1} \left[f_g e^{-\alpha_g(\lambda_b) z_l} + f_y e^{-\alpha_y(\lambda_b) z_l} + f_r e^{-\alpha_r(\lambda_b) z_l} \right] \tag{93}$$

Since S_{bn}, S_{gn}, S_{yn} and S_{rn} are known parameters, by solving Eq. (86), (89), (92) and (93) for S_{b1}, power conversion efficiency of the QD-WLED can be calculated given the quantum efficiencies of QDs (η).

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