杨雨函. 20200112199.

1. $L_D = L_C + K_\beta \sigma_D = K_\alpha\sqrt{2B} + K_\beta\sqrt{2B + L_D} = K_\alpha\sqrt{2B} + K_\beta\left(\sqrt{2B}\cdot\sqrt{1+\frac{L_D}{2B}}\right)$.

$2B \gg L_D$

$\rightarrow L_D \approx K_\alpha\sqrt{2B} + K_\beta\left(\sqrt{2B}\left(1+\frac{L_D}{4B}\right)\right) = K_\alpha\sqrt{2B} + K_\beta\left(\sqrt{2B} + \frac{L_D}{2\sqrt{2B}}\right)$

$\approx K_\alpha\sqrt{2B} + K_\beta\left(\sqrt{2B} + K_\alpha + K_\beta\right)$.

$\approx 4.653\sqrt{B} + 2.706$

2. $n_{总} = \frac{560}{600} \approx 0.933\ s^{-1}$

$n_b = \frac{390}{900} \approx 0.433\ s^{-1}$

$n_{信} = 0.5\ s^{-1}$

$\sigma = \sqrt{\frac{n_s}{t_s} + \frac{n_b}{t_b}} \approx 0.045$

3. $N_B = \frac{400}{600\times 10\%} \approx 6.667$

$\rightarrow L_D \approx 4.653\sqrt{N_B} + 2.706 \approx 14.716$

$MDA = \frac{L_D}{t\beta\gamma\varepsilon} \approx 13.07\ mBq$.