

Homework 5

Go back to the HW4 and now model the Q-switched pulse. Consider this to be a Nd:YAG laser with rod that is 5 mm long and 1mm in diameter. The total cavity length is 4cm. The material parameters are given in Lecture 5. Assume the intrinsic absorption/scattering losses of the order $\alpha \sim 0.1 \text{ cm}^{-1}$. The laser is pumped at 880nm and emits at 1060nm. Pumping efficiency (percent of the power actually absorbed by the Nd atoms is $\eta_{\text{pump}} \sim 50\%$.)

Choose the mirror reflectivity at will. Then find the cavity lifetime. Your pump pulse is as before super-gaussian and you shall try different pulse lengths, pump pulse energies, and also try different times of Q-switch opening relative to the pump pulse. Assume some residual absorption for the Q-switch in the open state.

Do not forget to reduce the step of your integration routine once the lasing starts.

With all that show how the Q-switch pulse varies as you change all the above parameters.