Laser Exercise 3

FYSS3552

Available at https://andry3vi.github.io/FYSS3552

Problem 1

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Let's considering laser separation of two isotopes using a 2-step laser ionization scheme. The isotope shifts are 3 GHz for the first excitation and 5 GHz for the second excitation step, respectively. Assuming a FWMH laser bandwidth of $\Delta_{\text{laser},1} = 2$ GHz for the first step, $\Delta_{\text{laser},2} = 3$ GHz for the second step and ignoring the natural linewidth as well as any saturation of the transitions or contributions from Doppler broadening, one wants to compute the selectivity, i.e. the ratio of the ion signal of the two isotopes when both lasers frequencies are set resonant to one isotope :