

4) $^{127}\text{I}^{35}\text{Cl}$ -en konstante rotasjonella $0,1142 \text{ cm}^{-1}$ er gitt da. Kalkulerer molekylens rotasjonsmomentet.

$$M(^{127}\text{I}) = 126,9045 \text{ u}$$

$$m(^{35}\text{Cl}) = 34,9688 \text{ u}$$

$$1 \text{ u} = 1,66054 \cdot 10^{-27} \text{ kg}$$

$$\begin{aligned} B &= \frac{h}{8\pi^2 \cdot I \cdot c} \Rightarrow I = \frac{h}{8\pi^2 \cdot B \cdot c} \\ I &= \frac{m_1 \cdot m_2}{m_1 + m_2} \cdot r_0^2 \end{aligned} \quad \left\{ \begin{aligned} r_0 &= \sqrt{\frac{h(m_1 + m_2)}{8\pi^2 \cdot B \cdot c \cdot m_1 \cdot m_2}} \end{aligned} \right.$$

$$r_0 = \sqrt{\frac{6,62608 \cdot 10^{-34} \text{ J} \cdot \text{s} \cdot (34,9688 \text{ u} + 126,9045 \text{ u}) \cdot 1,66054 \cdot 10^{-27} \text{ kg}}{8 \cdot \pi^2 \cdot 0,1142 \text{ cm}^{-1} \cdot 2,998 \cdot 10^{10} \text{ cm/s} \cdot 34,9688 \text{ u} \cdot 126,9045 \text{ u} \cdot (1,66054 \cdot 10^{-27} \text{ kg})^2}} \Rightarrow$$

$$r_0 = 2,32 \cdot 10^{-10} \text{ m}$$