

(6.11) A  $^{239}\text{Pu}$  compound is placed in a test tube in a 40 MHz nmr machine. At what field strength does resonance occur with the nuclear spin? Is the measurement possible? Relevant data appear in Table 6.3.

Definitions:

$$B_n := 5.050787 \cdot 10^{-27} \cdot \frac{\text{joule}}{\text{tesla}}$$

$$h := 6.626076 \cdot 10^{-34} \cdot \text{joule} \cdot \text{sec}$$

$$\nu := 40 \cdot \text{MHz}$$

The given resonance frequency.

$$I := \frac{1}{2}$$

$$\mu_I := 0.203 \cdot B_n$$

From Table 6.3 for  $^{239}\text{Pu}$ .

$$g_I := \frac{\mu_I}{B_n \cdot I}$$

Eqn. (6.27)

$$g_I = 0.406$$

$$B := \frac{h \cdot \nu}{g_I B_n}$$

Eqn. (6.46) and (3.39) for  $\Delta E$ .

$$B = 12.925 \cdot \text{tesla}$$