

2. We establish a ratio, using Eq. 22-4 and Eq. 14-1:

$$\begin{aligned}\frac{F_{\text{gravity}}}{F_{\text{electric}}} &= \frac{Gm_e^2/r^2}{ke^2/r^2} = \frac{4\pi\epsilon_0 Gm_e^2}{e^2} \\ &= \frac{(6.67 \times 10^{-11} \text{ N} \cdot \text{m}^2/\text{C}^2)(9.11 \times 10^{-31} \text{ kg})^2}{(9.0 \times 10^9 \text{ N} \cdot \text{m}^2/\text{C}^2)(1.60 \times 10^{-19} \text{ C})^2} \\ &= 2.4 \times 10^{-43} .\end{aligned}$$

Since $F_{\text{gravity}} \ll F_{\text{electric}}$, we can neglect the gravitational force acting between particles in a bubble chamber.