

An alpha particle consists of 2 protons and 2 neutrons. What is the charge on an alpha particle (in Coulombs)?

$$(4) \quad Q = Ne = 2(1.6 \times 10^{-19} \text{ C}) = 3.2 \times 10^{-19} \text{ C}$$

What is the magnitude of the force between two alpha particles that are 1.00 nm apart? Is the force attractive or repulsive?

$$F = \frac{k q_1 q_2}{r^2} = \frac{(9 \times 10^9 \frac{\text{N} \cdot \text{m}^2}{\text{C}^2}) (3.2 \times 10^{-19} \text{ C})^2}{(1 \times 10^{-9} \text{ m})^2}$$

$$(4) \quad = 9.22 \times 10^{-10} \text{ N}$$

$k = 8.99 \times 10^9 \text{ N m}^2/\text{C}^2$
 $e = 1.602 \times 10^{-19} \text{ C}$
 $\vec{F}_{12} = \frac{kq_1q_2}{r_{12}^2} \hat{r}_{12}$

Extra Credit: (must get both) Who played clarinet for Bruce Springsteen? Who played clarinet for Billy Joel? (1 point)