Coulomb’s Law (1)

Electrostatic force between two charged particles:

\[ F = \frac{1}{4\pi \varepsilon_0} \frac{|q_1 q_2|}{r^2} = k \frac{|q_1 q_2|}{r^2} \]

Permittivity constant: \( \varepsilon_0 = 8.854 \times 10^{-12} \text{C}^2\text{N}^{-1}\text{m}^{-2} \)

Coulomb constant: \( k = 8.99 \times 10^9 \text{Nm}^2\text{C}^{-2} \)

Action-reaction pair of forces: \( \vec{F}_{21} = -\vec{F}_{12} \).
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**Newton’s law of gravitation** (for comparison)

Gravitational force between two massive particles:

\[ F = G \frac{m_1 m_2}{r^2} \]

Gravitational constant: \( G = 6.673 \times 10^{-11} \text{Nm}^2\text{kg}^{-2} \)