



Mechanical Energy Kinetic Energy, energy of motion, $K = \frac{1}{2}mv^2$ Potential Energy, energy stored due to a conservative force, $\Delta U = -W = -\int \vec{F} \cdot d\vec{s}$







Potential Energy

Potential Energy due to Coulomb Force,

$$U = k \frac{q_1 q_2}{r_{12}}$$

Note: Potential Energy is a scalar!

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What does it mean that a set of charges has positive (negative) potential energy?







Conservation of Energy

 $E_f - E_i = \left(W_{\text{other}}\right)_{i \to f}$

 $(W_{other}$ refers to work done by non-conservative forces.)

 $U_0 + K_0 + W_{\text{other}} = U_f + K_f$

Example: Consider releasing two protons with a typical intranuclear separation of 2×10^{-15} m. Assume they are only subject to the Coulomb Force. What maximum speed do the protons achieve? How far apart are the protons when they achieve maximum speed?

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