Question:

Define classical interaction energy.

Answer:

Interaction is the direct effect that one kind of particle has on another, in particular, in inducing the emission or absorption of one particle by another. The interaction energy is the energy which is transfer between elementary particles, between a particle and a field, or between fields. For example, Interaction energy of Dipole-dipole interaction can be approximated using the **London formula**. A German physicist, Fritz London proved that potential energy of two uncharged molecules or identical atoms can be measured by following equation:

$$V = -\frac{3}{4}\frac{\alpha_2 I}{r^6}$$

Above equation is used as mention below for nonidentical atoms or molecules 1 and 2

$$V = -\frac{3}{2}\frac{I_1 I_2}{I_1 + I_2}\frac{\alpha_1' \alpha_2'}{r^6}$$

with

- o I is the first ionization energy of each molecule
- o α is the polarizability
- o r is the distance between molecules