

# Thermodynamics And The Kinetic Theory Of Gases

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Fiziks ...Average kinetic energy of one mole of the gas is equal to  $= (3/2) RT$  Since one mole of the gas contains  $N_A$  number of atoms where  $N_A$  is the Avogadro number we have  $M = N_A m$   $1/2 \langle v^2 \rangle = 3/2 \cdot 1/2 \langle v^2 \rangle = 3/2 \cdot 1/2 \langle v^2 \rangle = 3/2 \cdot k_B T$  is Boltzmann constant Average kinetic energy per molecule of the gas is equal to  $(3/2) k_B T$

**KINETIC THEORY OF GASES AND THERMODYNAMICS**

The kinetic theory of gases is a historically significant, but simple, model of the thermodynamic behavior of gases, with which many principal concepts of thermodynamics were established. The model describes a gas as a large number of identical submicroscopic particles, all of which are in constant, rapid, random motion. Their size is assumed to be much smaller than the average distance between the particles. The particles undergo random elastic collisions between themselves and with the enclosure.

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Thermodynamics is a branch of physics that deals with heat, work, and temperature, and their relation to energy, radiation, and physical properties of matter. The behavior of these quantities is governed by the four laws of thermodynamics which convey a quantitative description using measurable macroscopic physical quantities, but may be explained in terms of microscopic constituents by ...Thermodynamics - Wikipedia

We said before that the temperature of a substance is a measure of how fast its molecules are moving—or in other words, a measure of the average kinetic energy of the molecules. Well, the kinetic theory of gases lets us relate the kinetic energy of the molecules in a gas to the temperature, volume, and pressure of the gas.

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**The First Law of Thermodynamics** is simply a statement of energy conservation as Energy is conserved, and both heat and work are forms of energy Let  $U$  be the internal energy of the system; this can include the kinetic energy of the particles, the rotational energy, the chemical potential energy, the electrical energy, and so on.

**A1: Thermodynamics, Kinetic Theory and Statistical Mechanics**

**Synopsis** This text is a major revision of An Introduction to Thermodynamics, Kinetic Theory, and Statistical Mechanics by Francis Sears. The general approach has been unaltered and the level remains much the same, perhaps being increased somewhat by greater coverage. Thermodynamics, kinetic theory and statistical ...As already explained in the article Temperature and particle motion, the temperature of a gas is a measure of the kinetic energy of the particles. Even at a constant temperature, however, not all the molecules have the same speed. After all, in a gas there are permanent collisions between the particles.

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