

Abstract Submitted
for the APR06 Meeting of
The American Physical Society

On the Correct Formulation of the First Law of Thermodynamics
TEMUR Z. KALANOV, Home of Physical Problems, Pisatelskaya 6a, 700200 Tashkent, Uzbekistan — The critical analysis of the generally accepted formulation of the first law of thermodynamics is proposed. The purpose of the analysis is to prove that the standard formulation contains a mathematical error and to offer the correct formulation. The correct formulation is based on the concepts of function and differential of function. Really, if internal energy U of a system is a function of two independent variables $Q = Q(t)$ (describing of the thermal form of energy) and $R = R(t)$ (describing non-thermal form of energy), then the correct formulation of the first law of thermodynamics is: $\frac{dU(Q,R)}{dt} = \left(\frac{\partial U}{\partial Q}\right)_R \frac{dQ}{dt} + \left(\frac{\partial U}{\partial R}\right)_Q \frac{dR}{dt}$, where t and $-\left(\frac{\partial U}{\partial R}\right)_Q / \left(\frac{\partial U}{\partial Q}\right)_R$ are time and measure of mutual transformation of forms of energy, correspondingly. General conclusion: standard thermodynamics is incorrect.

Temur Z. Kalanov
Home of Physical Problems, Pisatelskaya 6a, 700200 Tashkent, Uzbekistan

Date submitted: 24 Oct 2005

Electronic form version 1.4