Abstract Submitted
for the NES05 Meeting of
The American Physical Society

Quantum explanation of Brownian motion ELIAS P. GYFTOPOULOS, member — In "Investigations of the Brownian movement", Einstein bases his arguments "on the molecular-kinetic theory of heat." In this article, I provide incontrovertible evidence against the molecular-kinetic conception of heat, and an explanation of Brownian motion that differs from all procedures in the archival literature. The explanation is based on two revolutionary theories, one thermodynamic, and the other quantum mechanical. No heat is involved because heat is a mode of interaction and not a property of any system. In a system that consists of constant amounts and volumes of a solvent and an insoluble solute, the shapes of the two volumes change continuously in time as solvent and solute try to interpenetrate each other as a result of differences in total potentials. The shape changes affect the energy eigenstates that enter the expressions of the stable equilibrium states of solvent and solute. A nonlinear quantum mechanical equation of motion that we conceived redistributes the constituents of the solvent and the solute to the continuously varying density operators without affecting the energy, the amounts of constituents, the volumes, and the entropy of either subsystem. The equation of motion is neither the Schroedinger nor the von Neumann equation because the effects of shape changes are nonunitary. The processes just cited are everlasting because the favorable but ineffective total potential differences are everlasting.

Elias P. Gyftopoulos
member

Date submitted: 18 Feb 2005 Electronic form version 1.4