Car tires on a road, raindrops falling through the atmosphere and Langevin’s phenomenological theory of Brownian motion of particles in a fluid, are reviewed as examples of phenomenological friction theories. Next, a microscopic quantum theory is presented which leads to a generalized quantum Langevin theory which is shown to embrace a rich variety of phenomena. These include the solution to the problem of runaway solutions in quantum electrodynamics, atomic energy shifts due to blackbody radiation, entropy of an oscillator in a heat bath, mean square deviation of the phase of Josephson junctions for strong coupling, charge fluctuations on a small tunnel junction, as well as decoherence and disentanglement problems in quantum theory.

Publications:


