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## PHYSICS

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**P. Hänggi, P. Talkner, M. Borkovec, "Reaction-rate theory: fifty years after Kramers," *Reviews of Modern Physics*, 62:251-341, 1990.**

**Peter Hänggi** (Institute of Physics, University of Augsburg, Germany): "The evaluation of reaction rate coefficients impacts the study of transport phenomena in such diverse disciplines as chemistry, surface science, electronics, quantum optics, and information and energy transfer in biological systems, to name just a few. The authors of this paper report, extend, and interpret the present status of the field as it has emerged since the original work by H.A. Kramers was published 50 years ago ['Brownian motion in a field of force and the diffusion model of chemical reactions,' *Physica* (Utrecht), 7:284-304, 1940].

"One of the principal goals of the endeavor was to consolidate the progress put forward by the scientists working in various fields of applications. Because of the multidisciplinary nature of the field, the authors made a serious attempt at identifying the common principles and ideas put forward within the communities of physics and physical chemistry. Moreover, the paper is one of the first to compare a wealth of analytical methods with the numerical and experimental work of several groups.

"In covering tunneling phenomena in addition to classical, noise-activated rate theory in equilibrium and nonequilibrium situations, this survey paper presents a completely unified picture of dissipation-modified escape events at all temperatures. It is the first article that contains all the known results, extending over the entire temperature range from absolute zero up to room temperature, together with the turnover theory describing the regime of weak-to-moderate-to-strong friction."