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**Constructive role of Brownian motion: Brownian motors and Stochastic Resonance<sup>1</sup>**

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Noise is usually thought of as the enemy of order rather as a constructive influence. For the phenomena of Stochastic Resonance [1] and Brownian motors [2], however, stochastic noise can play a beneficial role in enhancing detection and/or facilitating directed transmission of information in absence of biasing forces. Brownian motion assisted Stochastic Resonance finds useful applications in physical, technological, biological and biomedical contexts [1,3]. The basic principles that underpin Stochastic Resonance are elucidated and novel applications for nonlinear classical and quantum systems will be addressed. The presence of non-equilibrium disturbances enables to rectify Brownian motion so that quantum and classical objects can be directed around on a priori designed routes in biological and physical systems (Brownian motors). In doing so, the energy from the haphazard motion of (quantum) Brownian particles is extracted to perform useful work against an external load. This very concept together with first experimental realizations are discussed [2,4,5].

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