# Stochastic resonance in colloidal systems

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Stochastic resonance (SR) is believed to be responsible for an amazingly wide range of phenomena such as the periodic occurrence of ice ages, the feeding behavior of paddlefish or even human balance control and visual perception. The essential characteristic of SR is that it improves the detection of weak periodic signals in nonlinear systems by the presence of noise. While in most experimental systems noise is introduced by an external source only few cases were studied where it is inherently present. Owing to their intrinsic thermal noise, colloidal particles therefore provide an excellent model system where SR can be investigated in detail. By means of acousto-optic deflectors we create double-well potentials whose shape can be varied over time. We discuss the behavior of a colloidal particle for two limiting cases, i.e. the case of asymmetric potential modulation (corresponding to a tilt) and the case where only the height of the potential barrier is modulated (symmetric case). While SR is only observed in the first case, for symmetric modulation no synchronization between the modulation and the particle dynamics occurs.We also discuss the possibility to extend our setup for investigations of SR in spatially extended systems where array enhanced SR with spatio-temporal patterns is expected.