**ANOMALOUS SHIFT OF THE MOST PROBABLE POSITION OF A PARTICLE IN A UNSTABLE OPTICALLY CREATED POTENTIAL**

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Recent technological progress in a precise control of optically trapped objects allows much broader ventures to the unexplored territory of studying thermal motion in non-linear potentials. We employ an experimental set-up of holographic optical tweezers to experimentally investigate Brownian motion of a micro-particle near the inflection point of the cubic optical potential [1]. Description and understanding of stochastic motion of a particle in an unstable potential can be principally limited by a occurrence of diverging trajectories leading to undefined statistic moments of particles position. Since this breaks down the standard statistical analysis of mechanical processes and their applications, a newly proposed approach [2] takes advantage of the local characteristics of the most-likely particle motion instead of the average motion. We experimentally verify theoretical predictions for a Brownian particle moving near an inflection point of a cubic optical potential [3]. Surprisingly, the most-likely position of the particle atypically shifts against the acting force despite the trajectories diverge in opposite direction.

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