

中央大學物理學系

Department of Physics, National Central University



Colloquium

How to win over the Second Law of Thermodynamics

Prof. Pik Yin Lai (黎璧賢)

Dept. of Physics, National Central University

Date: 2024/09/10 (Tue)

Venue: S4-625

Time: 14:00-16:00

Abstract :

Modern techniques in the miniaturization of systems/devices to observe fluctuations in microscopic scales, together with theoretical breakthrough in Fluctuation Relations, open up the era of modern non-equilibrium statistical physics. In this talk, I will give a brief overview of the progress in non-equilibrium statistical physics in the past few decades. I will also discuss on my recent work on manipulating Brownian particles and the issue of violating the Second Law of Thermodynamics on the trajectory level. In particular, the ability of a gambling demon to extract work with a prescribed stopping threshold of cumulative work is analyzed theoretically and realized experimentally in the paradigm system of a Brownian particle in a time-dependent squeezing potential. The mechanism for the demon to beat the Second Law of Thermodynamics (having a negative dissipative work or win) is sorted out in detail.