

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

A novel nature in nonequilibrium entropy production with odd-parity variables CHULAN KWON, Myongji University, HYUNGGYU PARK, Korea Institute of Advanced Studies, JOONHYUN YEO, Konkuk University, HYUN KEUN LEE, University of Seoul — We present our recent finding about a novel nature in nonequilibrium entropy production for systems with odd-parity variables under time reversal. In the presence of irreversible forces the entropy production ΔS_{env} transferred from system to environment is not equal to Q/T where Q is the heat transfer and T the temperature of heat bath. We consider a dissipative force applied by external agent in addition to that given by heat bath. Then ΔS_{env} has extra contribution to Q/T for which an appropriate physical explanation is still open. Another example for irreversible force is a form of $-A \cdot \vec{p}/m$ for antisymmetric matrix A which is realized by a Lorentz force in a uniform magnetic field. In spite of no heat dissipation ΔS_{env} has a nonvanishing positive contribution. We find that it is due to a nonzero phase space current remaining through stochastic average, which is in fact a nonzero average force. Basically it plays the same role as a nonzero position space current observed in system with even variables only. We suppose interesting situations for different types of irreversible forces.

Chulan Kwon
Myongji University

Date submitted: 08 Nov 2012

Electronic form version 1.4