Sangyun Lee

Personal Information

Date of Birth:	5 September 1992
Address:	Department of physics, KAIST, Daejoen, Korea
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Education

Mar 2015-Present	Integrated Master's ph.D program in Physics, **KAIST**, Deajeon, Korea Advisor: Prof. Hawoong Jeong
FEB 2015	BS in Physics, **Korea University**, Seoul, Korea

Research interests

- **Stochastic thermodynamics**
  Stochastic thermodynamics is the study of nonequilibrium dynamics in small systems. In this field, researchers have tried to expand the results of equilibrium thermodynamics and find the laws in the nonequilibrium systems. I aim to investigate the role of magnetic field in a nonequilibrium steady state.
- **Quantum thermodynamics**
  Understanding the consequence of quantumness is important in statistical physics. To clarify the quantum effects, many researchers have researched quantum devices. I aim to reveal the quantum effects on a quantum heat engine with quasiprobability representation. In addition, I am interested in thermalization.

Honors & awards

Feb 2019	Silver prize in BK21 plus Young Physicists Workshop Awarded for the poster presentation, *Finite time quantum heat engine*
2015	Baekwoon Scholarship from Korea university Baekwoon foundation
2011-2015	National Graduate Science & Technology Scholarship from Korea Student Aid Foundation

Teaching experience

2015	Teaching assistant at department of physics, KAIST General physics

Skills & specialities

Specialties:	Statistical physics, stochastic processes, quantum thermodynamics, Monte Carlo method
Computer:	Python, MATHEMATICA, LaTeX, PyTorch
Language:	English, Korean

References

Hawoong Jeong — Professor
Department of Physics and KI for BioCentury, KAIST, Daejeon 305-701, South Korea
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Publications

1. Sangyun Lee, Meesoon Ha, and Hawoong Jeong, *Quantumness and TUR of finite-time Otto cycle, arXiv:2011.05699.*

2. Dong-Kyum Kim, Youngkyoung Bae, Sangyun Lee, and Hawoong Jeong, *Learning entropy production via neural networks, arXiv:2003.04166, Phys. Rev. Lett. 125, 140604 (2020).*

3. Sangyun Lee, Meesoon Ha, Jong-Min Park, and Hawoong Jeong, *Finite-time quantum Otto engine: Surpassing the quasi-static efficiency due to friction, arXiv:1911.03622, Phys. Rev. E 101, 022127 (2020).*

4. Jong-Min Park, Sangyun Lee, Hyun-Myung Chun, and Jae Dong Noh, *Quantum mechanical bound for efficiency of quantum Otto heat engine, arXiv:1905.05432, Phys. Rev. E 100, 012148 (2019).*

5. Sangyun Lee, and Chulan Kwon, *Nonequilibrium driven by an external torque in the presence of a magnetic field, arXiv:1901.02622, Phys. Rev. E 99, 052142 (2019).*

Presentations

2020 (poster) *Can a neural network learn arrow of time only from observed data?*, NetSci 2020, Rome, Italy, 21-25 Sep
(poster) *Thermodynamic uncertainty relation for Otto cycle*, Korean Physical society Meeting, Deajeon, Korea, 13-15 July

2019 (poster) *Quantum Otto engine can be improved by friction*, Thermalization, Many body localization and hydrodynamics ICTS, Bangalore, India, 19-29 Nov

(oral) *Can quantum friction improve the performance of a quantum heat engine?*, Korean Physical society Meeting, Deajeon, Korea, 23-25 Oct

(poster) *Difference between quantum and classical Otto heat engine*, Korean Physical Society Meeting, Deajeon, Korea, 24-26 Apr

(poster) *Finite quantum heat engine*, 11$^{\text{th}}$ BK21 Young Physicists Workshop, Pohang, Korea, 14-15 Feb

2018 (poster) *Role of magnetic field on a Brownian particle under presence of non-conservative force field*, 8th KIAS Conference on Statistical Physics, Seoul, Korea, 9-12 Jul

(oral) *Non-equilibrium in Magnetic field driven by External Torque beyond Overdamped Limit*, Korean Physical Society Meeting, Deajeon, Korea, 24-26 Apr

Attended schools

19 Nov - 29 Nov 2019	Thermalization, Many body localization and hydrodynamics ICTS, Bangalore, India Generalized hydrodynamics and many body localization
14 JAN - 18 JAN 2019	16^{th} KIAS-APCTP Winter School on Statistical Physics The ocean hotel, Yeosoo, Korea Critical phenomena and renormalization Group for Millennials
8 JAN - 12 JAN 2018	15^{th} KIAS-APCTP Winter School on Statistical Physics POSTECH, Pohang, Korea Machine Learning for Physicists
16 DEC - 22 DEC 2017	13^{th} KIAS-SNU Physics Winter Camp KIAS, Seoul, Korea Nonequilibrium statistical physics, density function theory, quantum magnetism, modern cosmology, instanton, Alphago and gravitational waves.
9 JAN - 13 JAN 2017	14^{th} KIAS-APCTP Winter School on Statistical Physics High1 resort, Korea Stochastic processes in pure and applied physics
9 JAN - 13 JAN 2016	13^{th} KIAS-APCTP Winter School on Statistical Physics POSTECH, Pohang, Korea Stochastic thermodynamics, fluctuation and responses in stochastic processes and rigorous thermodynamics and the entropy principle