

Curriculum Vitae

Personal Particulars

Name: Juzar Yahya Thingna (**researcher id:** H-3209-2013)

Date of birth: 18/10/1985

Web page: <https://sites.google.com/view/noneq-quant-thermo/home>

Google Scholar: <https://scholar.google.com/citations?user=3CkpiUYAAAAJ&hl=en>

Current Appointment

- [Postdoctoral Research Associate](#) May 2022 - present
University of Massachusetts, Lowell, USA.
- [Senior Visiting Scientist](#) Oct. 2021 - present
University of Maryland, Baltimore County, USA.
- [PCS Associate](#) Oct. 2021 - present
Center for Theoretical Physics of Complex Systems,
Institute for Basic Science, S. Korea.
- [Editorial board member](#) Jan. 2021 - present
Chaos, Solitons, and Fractals (Elsevier)
- [Assistant Editor](#) Oct. 2009 - present
Scholarpedia (the peer-reviewed open-access encyclopedia)

Previous Appointments

- *Associate Professor (Senior Research Fellow)* Mar. 2020 – Sep. 2021
Korea University of Science and Technology, S. Korea.
- *Young Scientist Fellow (Senior Research Fellow)* Feb. 2019 – Sep. 2021
Center for Theoretical Physics of Complex Systems,
Institute for Basic Science, S. Korea.
- *Research Associate* Aug. 2016 – Jul. 2018
Physics and Materials Science Research Unit,
University of Luxembourg, Luxembourg.
- *Post-doctoral Associate* Jun. 2015 – May 2016
Singapore-MIT Alliance for Research and Technology and
Massachusetts Institute of Technology, Singapore.
- *Post-doctoral fellow* May 2013 – May 2015
Institute for Physics, University of Augsburg, Germany.

Teaching Experience

- Lecturer for *Advanced statistical mechanics* (graduate level)
Korea University of Science and Technology, Daejeon, South Korea. Mar. 2020 – Jul. 2020
- Lecturer for *Introduction to open quantum systems* (graduate level, short course)
Center for Theoretical Physics of Complex Systems, Daejeon, South Korea May 2019 – Aug. 2019
- Tutor for *Quantum mechanics* (undergraduate level)
University of Augsburg, Augsburg, Germany. Apr. 2014 – Jul. 2014
- Tutor for *Electrodynamics* (undergraduate level)
University of Augsburg, Augsburg, Germany. Oct. 2013 – Jan. 2014
- Instructor for *Physics lab* (undergraduate level)
National University of Singapore, Singapore. Jan. 2010 – Jan. 2013

Academic Services

- *Refereeing* (reviews for premier journals)
Europhysics Letters, The European Physical Journal B/ST, The Journal of Chemical Physics, New Journal of Physics, Journal of Physics A: Mathematical and Theoretical, International Journal for Medical Informatics, Journal of Physics Communications, Physica A, The Journal of Physical Chemistry Letters, Scientific Reports, Quantum, Entropy, Symmetry, Chaos, AVS Quantum Science, and Physical Review A/B/E/R/X/X Quantum/Lett..
- *Committees*
 - Research grant reviewing committee [Narodowe Centrum Nauki (National Science Center), Poland].
 - Tenure evaluation committee [Lahore University of Management Sciences (LUMS), Pakistan].
 - Doctoral thesis pre-examination committee [Aalto University, Finland].

- [Invited panelist](#) for the Vaishwik Bharatiya Vaigyanik Summit on Quantum Technologies [Government of India, India].

Research Interests

- Dissipative quantum systems
- Transport in molecular junctions
- Floquet theory for driven open systems
- Symmetries in open systems
- Landau-Zener approach to open systems
- Quantum thermodynamics and machines
- Evolutionary models and game-theory
- Stochastic modelling for ligand-receptor bonds

Education

- Ph.D. Dept. of Physics and CCSE, National University of Singapore, Singapore. May 2013
Supervisor: Prof. Wang Jian-Sheng.
- M.Sc. Honors in Physics [*First-class Honors with highest marks in class*] Jun. 2008
Dept. of Physics, University of Pune, Pune, India.
- B.Sc. Honors in Physics [*First-class Honors with highest marks in class*] May 2006
Dept. of Physics, Fergusson College, University of Pune, Pune, India.

Fellowships

- *Young scientist fellowship* Feb. 2019 – Sep. 2021
To establish and operate a “Nonequilibrium Quantum Thermodynamics” group at the Institute for Basic Science (IBS), Daejeon, South Korea.

Funding per year: 200,000,000 KRW (~ 170,000\$)

Group size: 5 members [PI (Juzar Thingna) + Ph. D. (JungYun Han) + Ph. D. (Taufiq Murtadho) + Postdoc (Varinder Singh) + Postdoc (Dominik Šafránek)]

List of Publications

1. J. Son, P. Talkner, and [J. Thingna](#), “Charging Quantum Batteries via Otto Machines: Influence of Monitoring,” *Phys. Rev. A* (2022).
2. T. Becker, A. Schnell, and [J. Thingna](#), “Canonically Consistent Quantum Master Equation,” *Phys. Rev. Lett.* (2022).
3. J. N. Bandyopadhyay and [J. Thingna](#), “Floquet Engineering of Lie Algebraic Quantum Systems,” *Phys. Rev. B (Letters)* **105**, L020301 (2022).
4. J.-Y. Han, D. Leykam, D. G. Angelakis, and [J. Thingna](#), “Quantum transient heat transport in hyper-parametric oscillator,” *Phys. Rev. A* **104**, 052220 (2021).
5. J. Son, P. Talkner, and [J. Thingna](#), “Monitoring quantum Otto engines,” *Phys. Rev. X Quantum* **2**, 040328 (2021).
6. J.-W. Ryu, A. Lazarescu, R. Marathe, and [J. Thingna](#), “Stochastic thermodynamics of inertial Stuart-Landau dimer,” *New J. Phys.* **23**, 105005 (2021).
7. [J. Thingna](#) and D. Manzano, “Degenerated Liouvillians and steady-state reduced density matrices,” *Chaos* **31**, 073114 (2021).
8. A. Tejero, [J. Thingna](#), and D. Manzano, “Comment on: Loss-free excitonic quantum battery,” *J. Phys. Chem C* **125**, 7518 (2021).
9. S. Denisov, O. Vershinina, [J. Thingna](#), P. Hänggi, and M. Ivanchenko, “Quasi-stationary states of game-driven systems: a dynamical approach” *Chaos* **30**, 123145 (2020).
10. [J. Thingna](#) and P. Talkner, “Quantum measurement of sums” *Phys. Rev. A* **102**, 012213 (2020).
11. [J. Thingna](#), D. Manzano, and J. Cao, “Magnetic field induced symmetry breaking in nonequilibrium quantum networks” *New J. Phys.* **22**, 083026 (2020).
12. S. Gündoğdu, [J. Thingna](#), and D. Leykam, “Edge mode bifurcations of two-dimensional topological lasers” *Optics Letters* **45**, 3673 (2020).
13. Y. B. Lim, [J. Thingna](#), F. Kong, M. Dao, J. Cao, and C. T. Lim, “Temperature induced catch-slip bond transit in Plasmodium Falciparum-infected erythrocytes,” *BioPhys. J.* **118**, 105 (2020).
14. [J. Thingna](#), M. Esposito, and F. Barra, “Landau-Zener Lindblad equation and work extraction from coherences,” *Phys. Rev. E* **99**, 042142 (2019).
15. X. Xu, [J. Thingna](#), C. Guo, and D. Poletti, “Many-body open quantum systems beyond Lindblad master equations,” *Phys. Rev. A* **99**, 012106 (2019).

16. T. Herpich, [J. Thingna](#), and M. Esposito, “Collective power: Minimal model for thermodynamics of nonequilibrium phase transitions,” *Phys. Rev. X* **8**, 031056 (2018).
17. D. He, [J. Thingna](#), and J. Cao, “Interfacial thermal transport with strong system-bath coupling: A phonon delocalization effect,” *Phys. Rev. B* **97**, 195437 (2018).
18. G. Tang, [J. Thingna](#), and J. Wang, “Thermodynamics of energy, charge, and spin currents in a thermoelectric quantum-dot spin valve,” *Phys. Rev. B* **97**, 155430 (2018).
19. [J. Thingna](#), F. Barra, and M. Esposito, “Kinetics and thermodynamics of a driven open quantum system,” *Phys. Rev. E* **96**, 052132 (2017).
20. Y. B. Lim, [J. Thingna](#), J. Cao, and C. T. Lim, “Single molecule and multiple bond characterization of catch bond associated cytoadhesion in malaria,” *Scientific Reports* **7**, 4208 (2017).
21. X. Xu, [J. Thingna](#), and J.-S. Wang, “Finite coupling effects in double quantum dots near equilibrium,” *Phys. Rev. B* **95**, 035428 (2017).
22. D. He, [J. Thingna](#), J.-S. Wang, B. Li, “Quantum thermal conduction through anharmonic nano-junctions: A self-consistent phonon approach,” *Phys. Rev. B* **94**, 155411 (2016).
23. [J. Thingna](#), D. Manzano, and J. Cao, “Dynamical signatures of molecular symmetries in nonequilibrium quantum transport,” *Sci. Rep.* **6**, 28027 (2016).
24. T. Shirai, [J. Thingna](#), T. Mori, S. Denisov, P. Hänggi, and S. Miyashita, “Floquet-Gibbs states for dissipative quantum systems,” *New J. Phys.* **18**, 053008 (2016).
25. H. Zhou, [J. Thingna](#), P. Hänggi, J.-S. Wang, and B. Li, “Boosting thermoelectric efficiency using time-dependent control,” *Sci. Rep.* **5**, 14870 (2015).
26. H. Zhou, [J. Thingna](#), J.-S. Wang, and B. Li, “Thermoelectric transport through a quantum nanoelectromechanical system and its backaction,” *Phys. Rev. B* **91**, 045410 (2015).
27. J.-S. Wang, B. K. Agarwalla, H. Li, and [J. Thingna](#), “Nonequilibrium Green’s function method for quantum thermal transport,” *Frontiers of Physics* **9**, 673 [Invited review] (2014).
28. [J. Thingna](#), H. Zhou, and J.-S. Wang, “Improved Dyson series expansion for steady-state quantum transport beyond the weak coupling limit – divergences and resolution,” *J. Chem. Phys.* **141**, 194101 (2014).
29. [J. Thingna](#), P. Hänggi, R. Fazio, and M. Campisi, “Geometric quantum pumping in the presence of dissipation,” *Phys. Rev. B* **90**, 094517 (2014).
30. [J. Thingna](#) and J.-S. Wang, “Spin rectification in thermally driven XXZ spin chain via spin-Seebeck effect,” *EPL* **104**, 37006 (2013).
31. [J. Thingna](#), J.-S. Wang, and P. Hänggi, “Reduced density matrix for nonequilibrium steady states: A modified Redfield solution approach,” *Phys. Rev. E* **88**, 052127 (2013).
32. L. Zhang, [J. Thingna](#), D. He, J.-S. Wang, and B. Li, “Nonlinearity enhanced interfacial thermal conductance and rectification,” *EPL* **103**, 64002 (2013).
33. [J. Thingna](#), J.-S. Wang, and P. Hänggi, “Generalized Gibbs state with modified Redfield solution: Exact agreement up to second order,” *J. Chem. Phys.* **136**, 194110 (2012).
34. [J. Thingna](#), J. L. García-Palacios, and J.-S. Wang, “Steady-state thermal transport in anharmonic systems: Application to molecular junctions,” *Phys. Rev. B* **85**, 195452 (2012).
35. [J. Thingna](#) and J.-S. Wang, “Geometric effects on spin injection: 3D spin drift diffusion model,” *J. Appl. Phys.* **109**, 124303 (2011).
36. [J. Thingna](#), R. Prasad, and S. Auluck, “Photo-absorption spectra of small hydrogenated silicon clusters using the time-dependent density functional theory,” *J. Phys. Chem. Solids* **72**, 1096 (2011).

Invited Talks/Seminars

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| 1. <i>Effect of measurements on quantum devices</i>
Quantum thermodynamics conference 2022 (QTD2022), Belfast, UK. | Jun. 2022 |
| 2. <i>Noisy quantum systems</i>
Colloquium at the University of Maryland, Baltimore County, USA. | Mar. 2022 |
| 3. <i>Effects of measurements on quantum devices</i>
Seminar in Theoretical Physics, University of Massachusetts, Lowell, USA. | Feb. 2022 |
| 4. <i>Monitoring quantum Otto engines</i>
39th Samahang Pisika ng Pilipinas
International Physics Conference and Annual Meeting, Philippines (Online). | Oct. 2021 |
| 5. <i>Measuring quantum Otto engines operating far from equilibrium</i>
Nonequilibrium Collective Phenomena workshop, APCTP, Gyeongju, S. Korea. | Sep. 2021 |
| 6. <i>Degenerated Liouvillians and controlling transport</i>
Non-Hermitian Physics, virtual conference, ICTS India (Online). | Mar. 2021 |
| 7. <i>Effect of measurements on quantum Otto heat engine</i>
NITheP Workshop “Quantum Thermodynamics,” South Africa (Online). | Nov. 2020 |
| 8. <i>Role of open system symmetries in quantum transport</i>
Dynamic Days Asia Pacific 2020, Singapore (Online). | Nov. 2020 |

9. *Quantum attractors and complex spacing statistics* Jul. 2020
Korean Physical Society Spring Meeting 2020, virtual conference, South Korea.
10. *Symmetries in open quantum systems* Dec. 2019
709. WE-Heraeus-Seminar, Quantization of Dissipative Chaos: Ideas and Means, Bad Honnef, Germany.
11. *Nonequilibrium statistical physics: a master equation perspective* Nov. 2019
Indian Institute of Technology, Delhi, India.
12. *Symmetry breaking and current control in open quantum systems* Nov. 2019
5th KIAS Workshop on Quantum Information and Thermodynamics, POSTECH, Pohang, South Korea.
13. *Quantum measurement theory* Nov. 2019
Workshop on Complex Condensed Matter Systems, University of Philippines Diliman, Quezon City, Philippines.
14. *Symmetries in open quantum systems* May 2019
37th Samahang Pisika ng Pilipinas International Physics Conference and Annual Meeting, Tagbilaran City in Bohol, Philippines.
15. *Nonequilibrium phase transitions and machines* May 2019
Center for Soft and Living Matter, Institute for Basic Science, Ulsan, South Korea.
16. *Symmetry breaking in open quantum systems: effect of magnetic field* Apr. 2019
Korean Physical Society Spring Meeting 2019, Daejeon, South Korea.
17. *Nonequilibrium statistical physics: a master equation perspective* Aug. 2018
Indian Institute of Technology, Kanpur, India.
18. *Thermodynamics of synchronization* Feb. 2018
Indian Institute of Technology, Delhi, India.
19. *Evolutionary game theory: an oscillatory fate of individuals* Feb. 2018
Ashoka University, Sonapat, India.
20. *Stochastic dynamics and synchronization* Dec. 2017
University of Chile, Santiago, Chile.
21. *Landau-Zener kinetics and thermodynamics of a driven quantum system* Oct. 2017
International Workshop on Dissipative Quantum Chaos: from Semi-Groups to QED Experiments, Daejeon, South Korea.
22. *Dynamics and thermodynamics of a driven quantum system* Jul. 2017
Microenergy 2017, Gubbio, Italy.
23. *Driven quantum dot interacting with finite reservoirs* Jun. 2017
14th Granada seminar, Quantum systems in and out of equilibrium: fundamentals, dynamics, and applications, Granada, Spain.
24. *Thermoelectrics of quantum nanoelectromechanical systems* May 2017
NEREID Workshop on Alternative Computing Paradigms, Sitges, Spain.
25. *Signatures of molecular symmetries in quantum transport* Jun. 2016
International Centre for Theoretical Sciences, Bangalore, India.
26. *Signatures of molecular symmetries in quantum transport* May 2016
Xiamen University, Xiamen, China.
27. *Slip and Catch bond mechanisms in cytoadhesion* Jan. 2016
Singapore-MIT Alliance for Research and Technology, Singapore.
28. *Visual approach to dissipative geometric quantum pumping* Jul. 2014
Ulm University, Ulm, Germany.
29. *Geometrical effects on spin injection* Feb. 2011
16th Raman Memorial Conference, University of Pune, Pune, India.

Other Activities

- [Scientific organizer](#) (along with Jayendra Bandyopadhyay, Peter Talkner, and Tapio Ala-Nissilä) International workshop on Open Quantum Dynamics and Thermodynamics Mar. 2021
- [Member of an Advanced study group](#): Open quantum systems far from equilibrium Max-Planck institute for Physics of Complex Systems, Dresden, Germany. Dec. 2019