Francis A. Bayocboc, Jr.

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EDUCATION

The University of Queensland, St. Lucia, Queensland, Australia

- Doctor of Philosophy (Physics) — Apr 2017 – Dec 2021
  - Thesis: Quench dynamics and relaxation of one-dimensional Bose gases
  - Adviser: Prof. Karén V. Kheruntsyan

University of the Philippines, Diliman, Quezon City, Philippines

- Master of Science (Physics) — Jun 2013 – Jun 2015
  - Thesis: Work fluctuation and irreversible entropy in a quenched XY Heisenberg magnet
  - Adviser: Prof. Francis Norman C. Paraan

Ateneo de Manila University, Loyola Heights, Quezon City, Philippines

- Bachelor of Science (Physics) — Jun 2009 – Mar 2013
  - Thesis: Hilbert space analysis of electromagnetic plane waves: oblique superposition and energy-momentum computations
  - Adviser: Asst. Prof. Quirino M. Sugon, Jr.

MEMBERSHIPS

Samahang Pisika ng Pilipinas (Physics Society of the Philippines)
Associate Member — 2015 – Present

EXPERIENCE

Institute of Theoretical Physics, Jagiellonian University, Kraków, Poland

- Postdoctoral Researcher — Mar 2023 – Present
  - Working in the Quantum Many-Body Department of the Institute of Theoretical Physics, Jagiellonian University.
  - Supervisor: Prof. dr hab. Jacek Dziarmaga

School of Mathematics and Physics, The University of Queensland, St. Lucia, Queensland, Australia

- Research Assistant — Jan 2022 – Oct 2022; Oct 2020 – Feb 2021
  - Conducted theoretical and numerical research on thermalisation and nonequilibrium thermodynamics of ultracold quantum gases under the Australian Research Council funded Discovery Project DP190101515 entitled *Quantum thermodynamics of ultra-cold atoms*.
  - Supervisor: Prof. Karén V. Kheruntsyan

Institute of Mathematical Sciences and Physics, University of the Philippines, Los Baños, Laguna, Philippines

- Assistant Professor 1 — Aug 2015 – Mar 2017
  - Taught introductory college Physics courses (classical mechanics and electromagnetism).

National Institute of Physics, University of the Philippines, Diliman, Quezon City, Philippines

- Project Graduate Assistant — Jan 2015 – May 2015
  - Project: *Quenches in solvable spin-chain models*, U.P. Diliman OVCRD Ph.D. Incentive Award Project No. 141420 PhDIA.
  - Principal Investigator: Prof. Francis Norman C. Paraan
- Project Staff — Jun 2014 – Jul 2014
  - Project: *Quantum entanglement in low-dimensional systems: quantum spin chains and continuum systems*, U.P. System OVPAA Balik PhD Grant No. OVPAA-BPhD-2015-05.
  - Principal Investigator: Prof. Francis Norman C. Paraan
- Research Intern, Condensed Matter Physics Laboratory – Semiconductor Group — Apr 2012 – May 2012
  - Project: Fabrication of highly ordered anodic alumina nano-templates
  - Supervisor: Prof. Armando S. Somintac

PUBLICATIONS

F. A. Bayocboc, Jr., J. Dziarmaga, and W. H. Zurek, "Biased dynamics of the miscible-immiscible quantum phase transition in a binary Bose-Einstein condensate," arXiv:2310.07679.

F. A. Bayocboc, Jr. and K. V. Kheruntsyan, "Frequency beating and damping of breathing oscillations of a harmonically trapped one-dimensional quasicondensate," *Comptes Rendus Physique*, **24**, 1 (2023).

F. A. Bayocboc, Jr., M. J. Davis, and K. V. Kheruntsyan, "Dynamics of thermalization of two tunnel-coupled one-dimensional quasicondensates," *Phys. Rev. A*, **106**, 023320 (2022).

S. A. Simmons, F. A. Bayocboc, Jr., J. C. Pillay, D. Colas, I. P. McCulloch, and K. V. Kheruntsyan, "What is a quantum shock wave?," *Phys. Rev. Lett.*, **125**, 180401 (2020).

Eduardo C. Cuansing, Francis A. Bayocboc, and Christian M. Laurio, "Dynamics of electron currents in nanojunctions with time-varying components and interactions," in *AIP Conference Proceedings*, **1871**, 030003, (2017).

Francis A. Bayocboc, Jr. and Francis N. C. Paraan, "Work statistics in a quenched anisotropic XY model," *Phys. Rev. E*, **92**, 032142, (2015).

CONFERENCE & WORKSHOP PRESENTATIONS

F. A. Bayocboc, Jr., M. J. Davis, and K. V. Kheruntsyan, **Dynamics of thermalisation of two tunnel-coupled quasicondensates**, 23^{rd} *Australian Institute of Physics Congress*, Perth, Western Australia, Dec 2018.

F. A. Bayocboc, Jr. and K. V. Kheruntsyan, **Non-equilibrium transport in two tunnel-coupled 1D quasicondensates**, *Finite Temperature Nonequilibrium Superfluid Systems 2018*, Wanaka, New Zealand, Feb 2018.

F. A. Bayocboc, Jr., and E. C. Cuansing, **Effects of time-varying couplings to the heat baths and time-dependent electron-phonon interactions to the transport of electrons in a nanoscale device**, 34^{th} *Samahang Pisika ng Pilipinas Physics Conference*, Iloilo City, Philippines, Aug 2016.

F. A. Bayocboc, Jr., and E. C. Cuansing, **Electron transport in a nanoscale junction with time-varying couplings to the heat baths and time-dependent electron-phonon interactions**, 2^{nd} *Workshop on theories in quantum phenomena and condensed matter physics*, Los Baños, Laguna, Philippines, Apr 2016.

F. A. Bayocboc, Jr., and F. N. C. Paraan, **Exact expression for the work fluctuation in a quenched transverse field Ising chain**, 33^{rd} *Samahang Pisika ng Pilipinas Physics Conference*, Vigan City, Philippines, Jun 2015.

F. A. Bayocboc, Jr., and F. N. C. Paraan, **Work statistics in quantum quenches in the Heisenberg XY model**, *Workshop on Quantum Many-Body Systems Far From Equilibrium*, Stellenbosch, South Africa, Mar 2015.

F. A. Bayocboc, Jr., and F. N. C. Paraan, **Work fluctuations in quantum quences in the XY model**, 14^{th} *Asian Quantum Information Science Conference*, Kyoto, Japan, Aug 2014.

EXTENSION WORK

Proceedings of the Samahang Pisika ng Pilipinas – Referee

SCHOLARSHIPS & CERTIFICATES

The University of Queensland Research Training Scholarship (Tuition fee offset) 2017

The University of Queensland Research Training Program (Living allowance stipend) 2017

Career Service Eligibility (Professional level) May 2014
- Passed the Civil Service Examination professional level

ASTHRDP Graduate Scholarship, Department of Science and Technology, Philippines 2013

RA 7687 Undergraduate Scholarship, Department of Science and Technology, Philippines 2009

LANGUAGES

Filipino: Native language.
English: Fluent (IELTS score 7.5/CEFR level C1).

SKILLS

MATLAB, Mathematica, Julia, LaTeX, XMDS, Linux, Microsoft Office proficient, Python, Fortran.

REFERENCES

Prof. dr hab. Jacek Dziarmaga
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