Francis A. Bayocboc, Jr.

School of Mathematics and Physics, The University of Queensland, St. Lucia, Queensland 4072, Australia
fbayocbocjr@gmail.com • +61 424 134 638 • fabayocbocjr.github.io

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

School of Mathematics and Physics, The University of Queensland, St. Lucia, Queensland, Australia
- Research Assistant — Jan 2022 – Present; 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. and K. V. Kheruntsyan, "Frequency beating and damping of breathing oscillations of a harmonically trapped one-dimensional quasicondensate," arXiv:2207.00209.

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

Karén V. Kheruntsyan, Ph.D.
Professor of Theoretical Physics
School of Mathematics and Physics
The University of Queensland
St. Lucia, Queensland, Australia
karen.kheruntsyan@uq.edu.au ▪ +61 7 336 53420

Francis Norman C. Paraan, Ph.D.
Professor of Physics
National Institute of Physics
University of the Philippines
Diliman, Quezon City, Philippines
fparaan@nip.upd.edu.ph ▪ +63 (2) 981-8500 local 3701-03

Matthew J. Davis, Ph.D.
Professor of Theoretical Physics
School of Mathematics and Physics
The University of Queensland
St. Lucia, Queensland, Australia
mdavis@physics.uq.edu.au ▪ +61 7 334 69824