

# 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

**Deutsche Physikalische Gesellschaft** (German Physical Society)

Member 2024 – 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 OVPAAL Balik PhD Grant No. OVPAAL-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,” *Phys. Rev. B*, **109**, 064501 (2024).

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).

	<p>F. A. Bayocboc, Jr., M. J. Davis, and K. V. Kheruntsyan, “Dynamics of thermalization of two tunnel-coupled one-dimensional quasicondensates,” <i>Phys. Rev. A</i>, <b>106</b>, 023320 (2022).</p> <p>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?,” <i>Phys. Rev. Lett.</i>, <b>125</b>, 180401 (2020).</p> <p>Eduardo C. Cuansing, Francis A. Bayocboc, and Christian M. Laurio, “Dynamics of electron currents in nanojunctions with time-varying components and interactions,” in <i>AIP Conference Proceedings</i>, <b>1871</b>, 030003, ( 2017 ).</p> <p>Francis A. Bayocboc, Jr. and Francis N. C. Paraan, “Work statistics in a quenched anisotropic XY model,” <i>Phys. Rev. E</i>, <b>92</b>, 032142, ( 2015 ).</p>												
CONFERENCE & WORKSHOP PRESENTATIONS	<p>F. A. Bayocboc, Jr., M. J. Davis, and K. V. Kheruntsyan, <b>Dynamics of thermalisation of two tunnel-coupled quasicondensates</b>, 23<sup>rd</sup> Australian Institute of Physics Congress, Perth, Western Australia, Dec 2018.</p> <p>F. A. Bayocboc, Jr. and K. V. Kheruntsyan, <b>Non-equilibrium transport in two tunnel-coupled 1D quasicondensates</b>, <i>Finite Temperature Nonequilibrium Superfluid Systems 2018</i>, Wanaka, New Zealand, Feb 2018.</p> <p>F. A. Bayocboc, Jr., and E. C. Cuansing, <b>Effects of time-varying couplings to the heat baths and time-dependent electron-phonon interactions to the transport of electrons in a nanoscale device</b>, 34<sup>th</sup> Samahang Pisika ng Pilipinas Physics Conference, Iloilo City, Philippines, Aug 2016.</p> <p>F. A. Bayocboc, Jr., and E. C. Cuansing, <b>Electron transport in a nanoscale junction with time-varying couplings to the heat baths and time-dependent electron-phonon interactions</b>, 2<sup>nd</sup> Workshop on theories in quantum phenomena and condensed matter physics, Los Baños, Laguna, Philippines, Apr 2016.</p> <p>F. A. Bayocboc, Jr., and F. N. C. Paraan, <b>Exact expression for the work fluctuation in a quenched transverse field Ising chain</b>, 33<sup>rd</sup> Samahang Pisika ng Pilipinas Physics Conference, Vigan City, Philippines, Jun 2015.</p> <p>F. A. Bayocboc, Jr., and F. N. C. Paraan, <b>Work statistics in quantum quenches in the Heisenberg XY model</b>, <i>Workshop on Quantum Many-Body Systems Far From Equilibrium</i>, Stellenbosch, South Africa, Mar 2015.</p> <p>F. A. Bayocboc, Jr., and F. N. C. Paraan, <b>Work fluctuations in quantum quences in the XY model</b>, 14<sup>th</sup> Asian Quantum Information Science Conference, Kyoto, Japan, Aug 2014.</p>												
EXTENSION WORK	<b>Proceedings of the Samahang Pisika ng Pilipinas – Referee</b>												
SCHOLARSHIPS & CERTIFICATES	<table> <tr> <td>The University of Queensland Research Training Scholarship (Tuition fee offset)</td> <td>2017</td> </tr> <tr> <td>The University of Queensland Research Training Program (Living allowance stipend)</td> <td>2017</td> </tr> <tr> <td>Career Service Eligibility (Professional level)</td> <td>May 2014</td> </tr> <tr> <td>▪ Passed the Civil Service Examination professional level</td> <td></td> </tr> <tr> <td>ASTHRDP Graduate Scholarship, Department of Science and Technology, Philippines</td> <td>2013</td> </tr> <tr> <td>RA 7687 Undergraduate Scholarship, Department of Science and Technology, Philippines</td> <td>2009</td> </tr> </table>	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
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LANGUAGES	<p>Filipino: Native language.</p> <p>English: Fluent (IELTS score 7.5/CEFR level C1).</p>												
SKILLS	MATLAB, Mathematica, Julia, L <sup>A</sup> T <sub>E</sub> X, XMDS, Linux, Microsoft Office proficient, Python, Fortran.												
REFERENCES	<p><b>Prof. dr hab. Jacek Dziarmaga</b>  Professor  Institute of Theoretical Physics  Jagiellonian University  Kraków, Poland  jacek.dziarmaga@uj.edu.pl ▪ +48 12 664 4726</p> <p><b>Karén V. Kheruntsyan, Ph.D.</b>  Professor of Theoretical Physics  School of Mathematics and Physics  The University of Queensland</p>												

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[CV compiled on 2024-06-13]