

# Philip Caesar M. Flores, Ph.D.

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🌐 <https://pmflores2.github.io/>



## Experience

- 2023 – present     **Postdoctoral Fellow.** Max Born Institute for Nonlinear Optics and Short Pulse Spectroscopy, Berlin, Germany
- 2022 – 2023       **Teaching Fellow.** National Institute of Physics, University of the Philippines Diliman
- 2019 – 2019       **Science Research Specialist.** National Institute of Physics, University of the Philippines Diliman
- 2017 – 2019       **Instructor.** National Institute of Physics, University of the Philippines Diliman

## Education

- 2019 – 2023       **Ph.D. in Physics, University of the Philippines Diliman** Supervisor: Eric A. Galapon.  
Thesis: *Theory of quantized relativistic time-of-arrival operators for spin- $\frac{1}{2}$  particles and its application in the quantum tunneling time problem.*
- 2017 – 2019       **M.Sc. in Physics, University of the Philippines Diliman** Supervisor: Eric A. Galapon.  
Thesis: *Weak equivalence principle in the quantum regime: Compatibility with quantum mechanics, and tunneling effects via the different quantizations of the time of arrival operator.*
- 2012 – 2017       **B.Sc. in Physics, University of the Philippines Diliman** Supervisor: Eric A. Galapon.  
Thesis: *Synchronization of quantum and classical clocks, and energy translation using resolvent functional calculus for the confined time of arrival operators.*

## Service to the Community

- Referee              EPJP, PRA, Sci. Rep., Proceedings of the Physics Society of the Philippines
- Mentorship          Volunteer mentor at GradMAP Philippines: STEM Mentorship Network
- Science Communication      Liknayan Podcast: Usapang Physics with Pinoy Physicists

## Research Publications

### Journal Articles and Preprints

- 1 **P. C. Flores**, D. A. Pablico, and E. Galapon, “Instantaneous tunneling time within the theory of time-of-arrival operators,” *Physical Review A*, vol. 110, no. 6, p. 062 223, 2024. DOI: <https://doi.org/10.1103/PhysRevA.110.062223>.
- 2 **P. C. Flores**, D. A. Pablico, and E. Galapon, “Partial- and full-tunneling processes across potential barriers,” *Europhysics Letters*, vol. 145, no. 6, p. 65 002, 2024. DOI: [10.1209/0295-5075/ad2e7a](https://doi.org/10.1209/0295-5075/ad2e7a).
- 3 **P. C. Flores** and E. A. Galapon, “Instantaneous tunneling of relativistic massive spin- $\frac{1}{2}$  particles,” *Europhysics Letters*, vol. 141, no. 1, p. 10 001, 2023. DOI: [10.1209/0295-5075/acad9a](https://doi.org/10.1209/0295-5075/acad9a).
- 4 **P. C. Flores** and E. A. Galapon, “Quantized relativistic time-of-arrival operators for spin- $\frac{1}{2}$  particles and the quantum tunneling time problem,” *The European Physical Journal Plus*, vol. 138, no. 5, p. 375, 2023, ISSN: 2190-5444. DOI: [10.1140/epjp/s13360-023-03952-z](https://doi.org/10.1140/epjp/s13360-023-03952-z).
- 5 **P. C. Flores** and E. A. Galapon, “Relativistic free-motion time-of-arrival operator for massive spin- $\frac{1}{2}$  particles with positive energy,” *Phys. Rev. A*, vol. 105, p. 062 208, 6 2022. DOI: [10.1103/PhysRevA.105.062208](https://doi.org/10.1103/PhysRevA.105.062208).

- 6 P. C. Flores and E. A. Galapon, "Quantum free-fall motion and quantum violation of the weak equivalence principle," *Phys. Rev. A*, vol. 99, p. 042113, 4 2019. DOI: 10.1103/PhysRevA.99.042113.
- 7 P. C. Flores, R. C. F. Caballar, and E. A. Galapon, "Synchronizing quantum and classical clocks made of quantum particles," *Phys. Rev. A*, vol. 94, p. 032123, 3 2016. DOI: 10.1103/PhysRevA.94.032123.

## Conference Proceedings

- 1 P. C. Flores and E. Galapon, "Covariance property of the confined time of arrival operators," in *Proceedings of the Samahang Pisika ng Pilipinas*, 2017. URL: <https://proceedings.spp-online.org/article/view/235>.
- 2 P. C. Flores and E. Galapon, "Violation of the weak equivalence principle via the born-jordan quantized toa operator," in *Proceedings of the Samahang Pisika ng Pilipinas*, 2017. URL: <https://proceedings.spp-online.org/article/view/SPP-2019-2G-05>.
- 3 P. C. Flores and E. Galapon, "Violation of the weak equivalence principle via the time of arrival operator," in *Proceedings of the Samahang Pisika ng Pilipinas*, 2017. URL: <https://proceedings.spp-online.org/article/view/SPP-2018-1D-04>.
- 4 P. C. Flores and E. Galapon, "Synchronizing quantum and classical clocks made of quantum particles up to  $\hbar^2$ ," in *Proceedings of the Samahang Pisika ng Pilipinas*, 2016. URL: <https://proceedings.spp-online.org/article/view/309>.
- 5 P. C. Flores and E. Galapon, "The resolvent operators of the confined time of arrival operators," in *Proceedings of the Samahang Pisika ng Pilipinas*, 2015. URL: <https://proceedings.spp-online.org/article/view/1157>.

## Conferences and Workshops

- Poster, **15<sup>th</sup> European Conference on Atoms Molecules and Photons**, Jun 30 - Jul 4 2025, Congress Innsbruck, Austria
- Talk, **DPG Spring Meeting of the Matter and Cosmos Section**, Mar 31 - Apr 4 2025, University of Goettingen, Germany
- Talk, **DPG Spring Meeting of the Atomic, Molecular, Quantum Optics and Photonics Section**, Mar 9-14 2025, University of Bonn, Germany
- Talk, **Time in Quantum Theory**, Sept 10-13 2024, Smolenice Castle, Slovakia
- Poster, **23rd International Conference on Ultrafast Phenomena**, July 15-19 2024, World Trade Center, Barcelona, Spain
- Participant, **COST/ZCAM School on New Computational Methods for Attosecond Molecular Processes**, May 27-31 2024, Universidad de Zaragoza, Spain
- Poster, **10th ASTHRDP Graduate Scholars' Conference**, Sept 22 - 23 2022, UP Diliman, Philippines
- Poster, **Time in Quantum Theory**, Sept 19 - 23 2022, Technical University of Vienna, Austria
- Participant, **Quantizing Time**, June 14-18, 2021, Perimeter Institute (Virtual Meeting)
- Participant, **7th Les Houches School in Computational Physics: Dynamics of Complex Quantum Systems, from Theory to Computation**, Apr 12-23 2021, Les Houches Physics School (Virtual Meeting)
- Participant, **Conference on Time Crystals**, Mar 8-10 2021, ICTP (Virtual Meeting)
- Poster, **ICTP Asian Network School and Workshop on Complex Condensed Matter Systems**, Nov 4-8 2019, UP Diliman, Philippines
- Poster, **2nd Annual Graduate Students Research Conference**, 2019, UP Diliman, Philippines

## Conferences and Workshops (continued)

- Talk, **37th Samahang Pisika ng Pilipinas International Physics Conference and Annual Meeting**, May 29 - Jun 1 2019, Tagbilaran, Bohol, Philippines
- Poster, **Time and fundamentals of quantum mechanics**, Jan 28 - 31 2019, The David Lopatie Conference Centre, Weizmann Institute of Science, Israel
- Talk, **36th Samahang Pisika ng Pilipinas International Physics Conference and Annual Meeting**, Jun 6 - 9 2018, Puerto Princesa, Palawan, Philippines
- Talk, **35th Samahang Pisika ng Pilipinas International Physics Conference and Annual Meeting**, Jun 7 - 10 2017, Cebu, Philippines
- Talk, **8th Jagna International Workshop: Structure, Functions and Dynamics from nm to Gm**, Jan 4 - 7 2017, Jagna, Bohol, Philippines
- Talk, **34th Samahang Pisika ng Pilipinas International Physics Conference and Annual Meeting**, Aug 18 - 21 2016, UP Visayas, Philippines
- Participant, **CERN School Philippines**, Mar 31 - Apr 8 2015, UP Diliman, Philippines

## Awards and Grants

- 2023 ■ **Most Outstanding PhD in Physics Graduate**, UP Diliman
- 2022 ■ **Student Research Support Fund (SRSF) - Research Dissemination Grant**, Department of Science and Technology
- 2018,2019,2022 ■ **Office of the Vice President for Academic Affairs (OVPA) Research Dissemination Grant**, UP Diliman
- 2019 ■ **Office of International Linkages (OIL) Travel Grant**, UP Diliman
- 2017 ■ **Leticia Shahani Award for Best Undergraduate Thesis in Physics**, UP Diliman
- 2016 ■ **Diliman BPI-DOST Science Award**, UP Diliman

## Skills

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| Languages | ■ English, Filipino  |
| Coding    | ■ Python, Mathematica, Matlab, L <sup>A</sup> T <sub>E</sub> X   |
| Misc.     | ■ Academic research, teaching, training, consultation, L <sup>A</sup> T <sub>E</sub> X typesetting and publishing. |

## Teaching

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| Lecturer | ■ Classical Mechanics, Optics and Electricity and Magnetism, Thermodynamics, Special Relativity, and Quantum Mechanics, and Modern Physics |
| Lab      | ■ Classical Mechanics, Optics Electricity and Magnetism, and Thermodynamics, Special Relativity, and Quantum Mechanics                     |
| Grader   | ■ Mathematical Physics, Statistical Physics, and Quantum Mechanics   |

## Miscellaneous Experience

### Volunteer Work

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| 2017-2018 | ■ <b>Lecturer, College Entrance Exam Review</b> . Project by the Office of Cong. Miro Quimbo in partnership with the UP Alpha Sigma Fraternity. Held at Concepcion Integrated School |
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## Miscellaneous Experience (continued)

- 2016-2017     ■ **Lecturer, Kapihan sa Diliman.** An initiative of the UPD University Student Council, together with the UPD Office of the Vice Chancellor for Student Affairs, and Diliman Learning Resource Center. The project aims to provide a study space for students with various free services such as free wifi, free coffee, free printing, free snacks, and free tutorials.
- 2015-2017     ■ **Toy 4 Totoy.** Outreach program organized by the UP Alpha Sigma Fraternity to provide entertainment, organize games, coordinate gift-giving, and host a luncheon for underprivileged communities, fostering a festive and joyful atmosphere during the Christmas season.
- 2015     ■ **Medical Mission.** Outreach program organized by the UP Alpha Sigma Fraternity aimed at supplying essential medical resources to underprivileged communities.

### Admin

- 2017-2019     ■ **Faculty Adviser.** *Alpha Sigma Fraternity, UP Diliman*
- 2017-2018     ■ **Socials Committee.** *National Institute of Physics Junior Faculty, UP Diliman*
- 2016-2017     ■ **Political Committee Head.** *Alpha Sigma Fraternity, UP Diliman*
- 2015-2017     ■ **Master of Finance.** *Alpha Sigma Fraternity, UP Diliman*

## References

### Prof. Dr. Olga Smirnova

Professor, Technische Universität Berlin.  
Head, Strong Field Theory Group,  
Max-Born-Institute,  
Max-Born-Str. 2A 12489 Berlin  
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### Prof. Dr. Misha Ivanov

Professor, Humboldt University.  
Head, Theory Department,  
Max-Born-Institute,  
Max-Born-Str. 2A 12489 Berlin  
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### Eric A. Galapon, PhD

Professor, National Institute of Physics,  
University of the Philippines Diliman,  
Quezon City 1101, Philippines  
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### Giovanni A. Tapang, PhD

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