

# 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**

## 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**

## Research Publications

### Preprints

- 1 P. C. M. Flores, S. Carlström, S. Patchkovskii, et al., *Enantiosensitive locking of photoelectron spin and cation orientation*, 2025. URL: <https://arxiv.org/abs/2505.22433>.

## Journal Articles

- 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.
- 3 **P. C. Flores** and E. A. Galapon, "Instantaneous tunneling of relativistic massive spin-o particles," *Europhysics Letters*, vol. 141, no. 1, p. 10 001, 2023.  DOI: 10.1209/0295-5075/acad9a.
- 4 **P. C. Flores** and E. A. Galapon, "Quantized relativistic time-of-arrival operators for spin-o 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.
- 5 **P. C. Flores** and E. A. Galapon, "Relativistic free-motion time-of-arrival operator for massive spin-o particles with positive energy," *Phys. Rev. A*, vol. 105, p. 062 208, 6 2022.  DOI: 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. 042 113, 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. 032 123, 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, **Conference on Extreme Light and Chiral Molecular Systems**, Sept 2 - 5 2025, Kassel, Germany
-  Poster, **34<sup>th</sup> International Conference on Photonic, Electronic and Atomic Collisions**, Jul 29 - Aug 5 2025, Sapporo, Japan
-  Poster, **10<sup>th</sup> International Conference on Attosecond Science and Technology**, Jul 6 - 11 2025, Lund, Sweden

## Conferences and Workshops (continued)

- Poster, **15<sup>th</sup> European Conference on Atoms Molecules and Photons**, Jun 30 - Jul 4 2025, Congress Innsbruck, Austria
- Poster, **16<sup>th</sup> Femtochemistry Conference**, Jun 22 - 27 2025, Savoia Hotel, Trieste, Italy
- Talk, **LIGHT-MATTER INTERACTION: Focusing on Polariton Chemistry and Physics**, May 26 - 30 2025, Cultural Centre "Jules Pascin" - the Synagogue, Bulgaria
- 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
- 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

## 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  |
| 2016-2017 | ■ <b>Lecturer, Kapihan sa Diliman.</b> 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 | ■ <b>Toy 4 Totoy.</b> 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      | ■ <b>Medical Mission.</b> Outreach program organized by the UP Alpha Sigma Fraternity aimed at supplying essential medical resources to underprivileged communities.   |

### Admin

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|-----------|---|
| 2017-2019 | ■ <b>Faculty Adviser.</b> <i>Alpha Sigma Fraternity, UP Diliman</i>                         |
| 2017-2018 | ■ <b>Socials Committee.</b> <i>National Institute of Physics Junior Faculty, UP Diliman</i> |
| 2016-2017 | ■ <b>Political Committee Head.</b> <i>Alpha Sigma Fraternity, UP Diliman</i>                |
| 2015-2017 | ■ <b>Master of Finance.</b> <i>Alpha Sigma Fraternity, UP Diliman</i>                       |

## 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,  
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### Eric A. Galapon, PhD

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University of the Philippines Diliman,  
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### Giovanni A. Tapang, PhD

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