

Gustavo Valdivia-Mera

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EDUCATION

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| University of Houston | 2023–Present |
| Ph.D. in Physics | <i>GPA: 4.0 (All courses graded A)</i> |
| • Core courses: Methods of Mathematical Physics, Quantum Mechanics I & II, Advanced Mechanics, Classical Electrodynamics, Statistical Physics | |
| • Electives: Quantum Field Theory I & II, General Relativity and Cosmology, Quantum Information, Advanced Statistical Mechanics | |
| ICTP-EAIFR/University of Rwanda | 2020–2022 |
| M.Sc. in High Energy Physics | <i>Ranked 1st in cohort</i> |
| • <i>Thesis:</i> Bounds on eV-scale sterile neutrinos from neutrinoless double-beta decay | |
| Universidad Nacional Mayor de San Marcos | 2018–2019 |
| Professional Degree in Physics | <i>Grade: 18/20 (Outstanding)</i> |
| • <i>Thesis:</i> On the underlying relation between Quantum Entanglement and Wormholes | |
| Universidad Nacional Mayor de San Marcos | 2012–2017 |
| B.Sc. in Physics | <i>Graduated 1st in Class</i> |
| • Advanced coursework: Quantum Field Theory, General Relativity, Nuclear Physics | |

RESEARCH EXPERIENCE

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| University of Houston | 2024–Present |
| Research Assistant | |
| • Quantum field theory in curved spacetime | |
| • Black hole thermodynamics | |
| • Quantum information | |
| Theoretical Physics Group, UNMSM | 2015–2019 |
| Undergraduate Research Affiliate | |
| • AdS/CFT correspondence | |
| • Black hole thermodynamics | |

PUBLICATIONS

- (2025) **Horizon brightened acceleration radiation entropy in causal diamond geometry: A near-horizon perspective.**
Physical Review D 112, 085030 (2025).
- (2025) **Thermal nature of the causal diamond horizon: A hidden property of the inertial propagator.**
Physical Review D (in press).
- (2025) **On the Unruh effect and the thermofield double state.**
International Journal of Modern Physics D 34, 2530002 (2025).

- (2024) **Path integral derivation of the thermofield double state in causal diamonds.**
Classical and Quantum Gravity 42, 025015 (2024).

PRESENTATIONS

Conference Presentations

- **Towards HBAR in the causal diamond near horizon**
IQSE Summer School on Quantum Science, Texas A&M University, Casper, WY *Jul 2025*
- **Path integral derivation of the thermofield double state in causal diamonds**
APS Global Physics Summit, Anaheim, CA *Mar 2025*
- **Quantum Algorithms I & II**
Quantum Scholars Program, QuantumQuipu (Online) *Aug 2023*
- **Bounds on eV-scale sterile neutrinos from neutrinoless double-beta decay**
Summer School on Particle Physics, ICTP, Trieste *Jun 2023*
- **Numerical simulations of particle orbits in Schwarzschild-like spacetime**
II Summer School of Computational Physics (Online) *Mar 2021*

Earlier Presentations

- **ER = EPR: Quantum entanglement and wormholes**
Physics Week, UNMSM, Lima *Nov 2017*
- **Introduction to the AdS/CFT correspondence**
XXV Peruvian Symposium of Physics, PUCP, Lima *Oct 2016*
- **QFT in non-inertial reference frames: Unruh effect**
X Theoretical Physics at the Rimac River, UNI, Lima *Jan 2016*
- **Black hole thermodynamics**
XXIV Peruvian Symposium of Physics, UNMSM *Nov 2015*

TEACHING EXPERIENCE

- **University of Houston**
 - Quantum Mechanics (Undergraduate)
 - Quantum Mechanics II (Graduate)
 - Physics Laboratory (Undergraduate)*Fall 2025*
Spring 2025
Fall 2023
- **TECSUP, Lima**
 - General Physics*2018*

AWARDS AND HONORS

- **Lydia Mendoza Fellowship**
University of Houston *2024–2026*
- **Presidential Fellowship**
University of Houston *2023–2025*
- **1st Place, Quantum Computing Fall Fest**
University of Houston *2023*
- **Research Scholarship**
UNMSM Vice-Chancellor's Office *2018*

TECHNICAL SKILLS

- **Programming:** Python, Fortran, L^AT_EX, Mathematica