

Gustavo Valdivia-Mera

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EDUCATION

University of Houston	2023–Present
Ph.D. in Physics	<i>GPA: 4.0 (All courses graded A)</i>
<ul style="list-style-type: none">• 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>
<ul style="list-style-type: none">• <i>Thesis:</i> Bounds on eV-scale sterile neutrinos from neutrinoless double-beta decay.• During the second year of this program, I also completed the ICTP Diploma Programme in High Energy Physics (online).	

Universidad Nacional Mayor de San Marcos	2018–2019
Professional Degree in Physics	<i>Grade: 18/20 (Outstanding)</i>
<ul style="list-style-type: none">• <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>
<ul style="list-style-type: none">• Advanced coursework: Quantum Field Theory, General Relativity, Nuclear Physics	

RESEARCH EXPERIENCE

University of Houston	2024–Present
Research Assistant	
<ul style="list-style-type: none">• Quantum field theory in curved spacetime• Black hole thermodynamics• Quantum information	

Theoretical Physics Group, UNMSM	2015–2019
Undergraduate Research Affiliate	
<ul style="list-style-type: none">• 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
- **Near-horizon (conformal) aspects of black holes and the universality (robustness) of HBAR entropy**
AMO/IQSE Seminar, Texas A&M University, College Station, TX Apr 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)
- **TECSUP, Lima**
General Physics Fall 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