

# Gustavo Valdivia-Mera

Department of Physics · University of Houston · Houston, TX, USA  
gvphysik@gmail.com

## EDUCATION

---

<b>University of Houston</b>	<b>2023–Present</b>
<b>Ph.D. in Physics</b>	<i>GPA: 4.0 (All courses graded A)</i>
<ul style="list-style-type: none"><li>• <b>Core courses:</b> Methods of Mathematical Physics, Quantum Mechanics I &amp; II, Advanced Mechanics, Classical Electrodynamics, Statistical Physics</li><li>• <b>Electives:</b> Quantum Field Theory I &amp; II, General Relativity and Cosmology, Quantum Information, Advanced Statistical Mechanics</li></ul>	
<b>ICTP-EAIFR/University of Rwanda</b>	<b>2020–2022</b>
<b>M.Sc. in High Energy Physics</b>	<i>Ranked 1<sup>st</sup> in cohort (HEP section)</i>
<ul style="list-style-type: none"><li>• <i>Thesis:</i> Bounds on eV-scale sterile neutrinos from neutrinoless double-beta decay.</li><li>• During the second year of this program, I also completed the ICTP Diploma Programme in High Energy Physics (online).</li></ul>	
<b>Universidad Nacional Mayor de San Marcos</b>	<b>2018–2019</b>
<b>Professional Degree in Physics</b>	<i>Grade: 18/20 (Outstanding)</i>
<ul style="list-style-type: none"><li>• <i>Thesis:</i> On the underlying relation between Quantum Entanglement and Wormholes</li></ul>	
<b>Universidad Nacional Mayor de San Marcos</b>	<b>2012–2017</b>
<b>B.Sc. in Physics</b>	<i>Graduated 1<sup>st</sup> in Class</i>
<ul style="list-style-type: none"><li>• <b>Advanced coursework:</b> Quantum Field Theory, General Relativity, Nuclear Physics</li></ul>	

## RESEARCH EXPERIENCE

---

<b>University of Houston</b>	<b>2024–Present</b>
<b>Research Assistant</b>	
<ul style="list-style-type: none"><li>• Quantum field theory in curved spacetime</li><li>• Black hole thermodynamics</li><li>• Quantum information</li></ul>	
<b>Theoretical Physics Group, UNMSM</b>	<b>2015–2019</b>
<b>Undergraduate Research Affiliate</b>	
<ul style="list-style-type: none"><li>• AdS/CFT correspondence</li><li>• Black hole thermodynamics</li></ul>	

## 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<sup>A</sup>T<sub>E</sub>X, Mathematica