William E. Murillo

CONTACT INFORMATION

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RESEARCH INTERESTS

· Gravitational-wave data analysis and parameter estimation
· Black hole Physics, strong gravity, and spacetime structure
· Seeking to learn more about quantum computation applications in black hole physics

EDUCATION

California State University, Los Angeles — M.S. Physics(APS)Bridge program
Los Angeles, CA · Anticipated May 2027
Thesis: Estimating Blackhole Spin and Mass from Gravitational Wave Signal Parameters
Advisor: Dr. Harry Themann

Augustana College — B.A. Engineering Physics
Rock Island, ILL · May 2024
Thesis: High-resolution diffraction grating filter holder design
Advisor: Dr. William M. Peterson

RESEARCH EXPERIENCE

LIGO VIRGO Collaboration (LVC) Dec '24–present
Graduate Research Student
Pi: Dr. Harry Themann
· Reduced the heat distortion from the 750Kw laser at the LIGO detector for higher-quality data collection on gravitational waves by conducting experiments on blackbody radiation to effectively extract heat from the center of a reflective mirror, simulating the LIGO detector.
· Analyzing LIGO data to constrain source properties such as compact binary mergers– such as masses, spins, and sky location–using tools such as GWpy and PyCBC to evaluate the signal models across a wide range of binary black hole configurations.

Collaborator — 2025 MACRO Summer Program (Virtual) June '25–July '25
Pi: Dr. John Cannon
· Investigate the presence of radio variability in the eclipsing cataclysmic variable LX Serpens using the NRAO high-performance computing cluster.
· Processed the interferometric data using TCLEAN, a tool in CASA that applies deconvolution algorithms to reduce artifacts that impair analysis.

Macalester-Augustana-Coe Remote Observatory Feb '22–May '24
Undergraduate Research student
Pi: Dr. William B. Peterson
· Created and implemented the latest generation of the miniature diffraction grating spectrometer (US Patent No.US20170357038A1) with a high-efficiency volume-phase holographic grating, using Python for measuring H-α Doppler broadening from Be stars; conducted bench tests to characterize spectral resolution and compatibility with filter wheels.
· Installed the grism on the *Robert L. Mutel* telescope (RLMT) at Winer Observatory as part of the *MACRO Consortium*

Augustana college Quantum Optics Lab Group Aug '23–May '24
Undergraduate Research Student – Augustana College
Pi: Dr. James Van Howe
· Designed a spontaneous parametric down-conversion (SPDC) source using a nonlinear BBO crystal to generate entangled photon pairs for experimental and pedagogical applications.
· Modeled spatial distribution of entangled photon pairs by solving conservation equations for energy and momentum using Newton's optimization method.

Teaching Experience

PHYS-1570: Physics for the 21st Century — Spring '25
Graduate Lab Assistant – California State University Los Angeles
Professor: Dr. Karine LeBris
· Assisted a class of 20 students with completing their labs as well as graded lab reports.

PHYS-212: Foundational Physics II (Intro to Electrostatics) — Fall '23
Undergraduate Teaching Assistant – Augustana College
Professor: Dr.James Van Howe
· Assisted individuals and small groups in a class of 26 students with in-class assignments and Lab exercises.

Selected Awards & Grants

Augustana College Distinguished Service Award	May '24
Undergraduate NSF LSAMP IINSPIRE grant ($1,500)	Feb '24
Augustana Conference Travel grant ($1000)	Mar '24
(APS) Bridge program Conference Travel grant ($1000)	May '24
SPS Chapter Award	Nov '23

Professional Development

8th Gravitational Wave Open Science center workshop, Virtual Attendee	May 12–14, 2025
JIVE VLBI Summer School, Virtual Attendee	Sep 15–19, 2025

Technical Skills

Programming & Data Analysis:
Python(SciPy, MatPlotlib, NumPy, Astropy, GWpy, PyCBC); C++, Shell/Scripting
Experimental & Instrumentation:
Optical spectroscopy (500-656nm), SPDC design, 3d printing, mechanical design (Onshape, Inventor) basic CNC and Arduino
Computational Methods:
HPC workflows, interferometric calibration (basic familiarity)

Talks & Presentations

Talks

Radiative Cooling solution for Thermal Expansion in LIGO detectors
California State University Los Angeles Research Symposium — Mar '25

Updated High-Resolution Diffraction Grating Holder
Augustana College spring Research Symposium — May '24

Poster Presentations

High-Resolution Diffraction Grating Filter Holder Design
American Physical Society (APS) March Meeting — Mar '24

Simulating Time-Energy Entangled Photon Sources
Augustana College spring Research Symposium — May '24

Conference Attendance

Society of Physics Students National Council Meeting, Washington, D.C.	September '23
National Physics Congress, Washington, D.C.	October '22

Professional Memberships

American Physical Society · American Astronomical Society
LIGO Scientific Collaboration · NSBP · (oSTEM) Member
Society of Physics Students · Astronomy & Astrophysics Outlist

Work Experience

Medici on 57th — Hyde Park, Chicago Illinois — June '22-Present
· Demonstrated teamwork, and customer oriented communication, while maintaining consistent productivity under real world time constraints by balancing employment with advanced coursework.