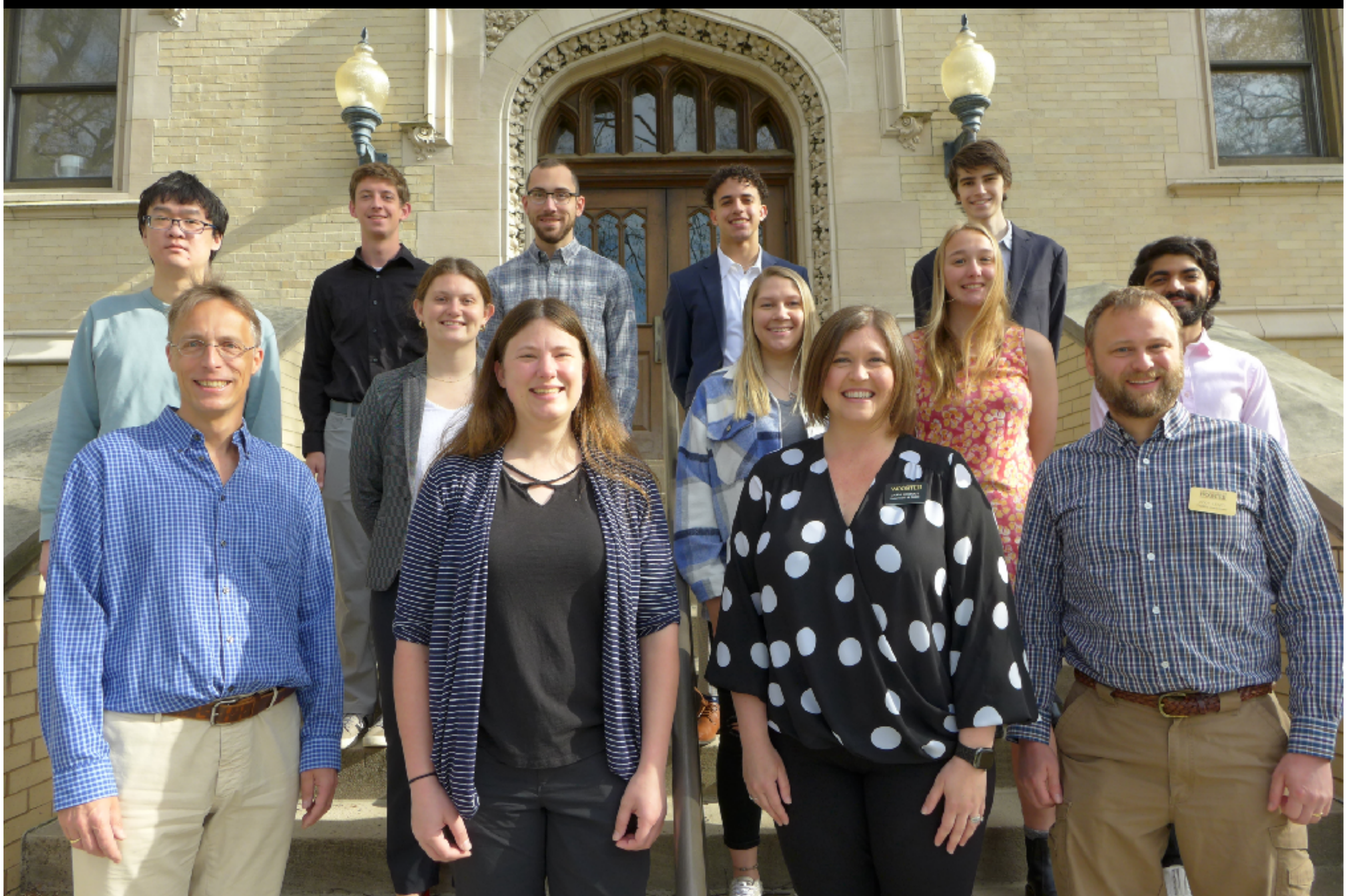
WOOSTER
Physics



2021–2022 Annual Report
physics.wooster.edu

A NOTE FROM DR. NIKLAS MANZ, DEPARTMENT CHAIR

Greetings,

Last academic year started with sad news. Teague Curless ’22 passed away in a motor vehicle accident on his way back to Wooster on August 24 - excited to start his senior year at the College. Several students and faculty attended his Service of Remembrance on Saturday, August 29 in Lexington, Kentucky, and met his family. Several students reflected on Teague in their Senior I.S. thesis. Teague received his B.A. degree posthumously during Commencement, accepted by Pam Pierce.

During Commencement in May, we celebrated the achievement of our newest departmental alumni. Nine students graduated this year. While eight seniors finished their Senior I.S. with us, one student transferred to Case Western Reserve University for the 3-2 Engineering program.

Looking toward the future, the class year of 2025 can become a record-breaking, large class. Before Winter break, this class had already several declared majors and by the end of the Spring semester, had reached 10 physics majors and two chemical physics majors, the first two since 2012.

During the Fall semester, we concluded our search for the new tenure-track position and are extremely happy that Laura DeGroot will join us next year in this line. After several years in various visiting positions, we now have an astrophysicist permanently in our department.

Robin Bjorkquist was our one-year visitor, while Susan Lehman was on leave. It was a really great experience for students to take the Particle Physics elective course, taught by an expert in that field. We are happy that she could transition into a permanent lecturer position at Seattle University.

For the academic year 2022-2023, we welcome Megan Nieberding into our department in a one-year visiting position. She graduated this summer from Ohio State University and her research focuses on Physics Education Research.

Our Administrative Coordinator Dawn Parker retired during the Spring semester and we were fortunate enough that Craig First joined a few weeks later. He transitioned from Admissions to become the AC in Taylor Hall, working with the Physics Department and the Mathematical and Computational Sciences Department.

Due to the ongoing Covid pandemic, we were not able to send students to conferences but look forward to going back to this great tradition next year.

This summer, we were finally able to host our summer REU program again. After two years of canceling the NSF-funded summer research program, we welcomed eleven students, working in five different research groups until end of July.

I am looking forward to my second year as department chair.

Niklas Manz

CLASS OF 2022

Front (L to R): Haoge Yan, Melita Wiles, Sara Wargo ‘23, Lillian Miller, Shivam Bhasin
Back (L to R): Jonathan Logan, Ben Stern, Bennett Anderson, William Hilbert

3/2 Engineering Dual Degree Program

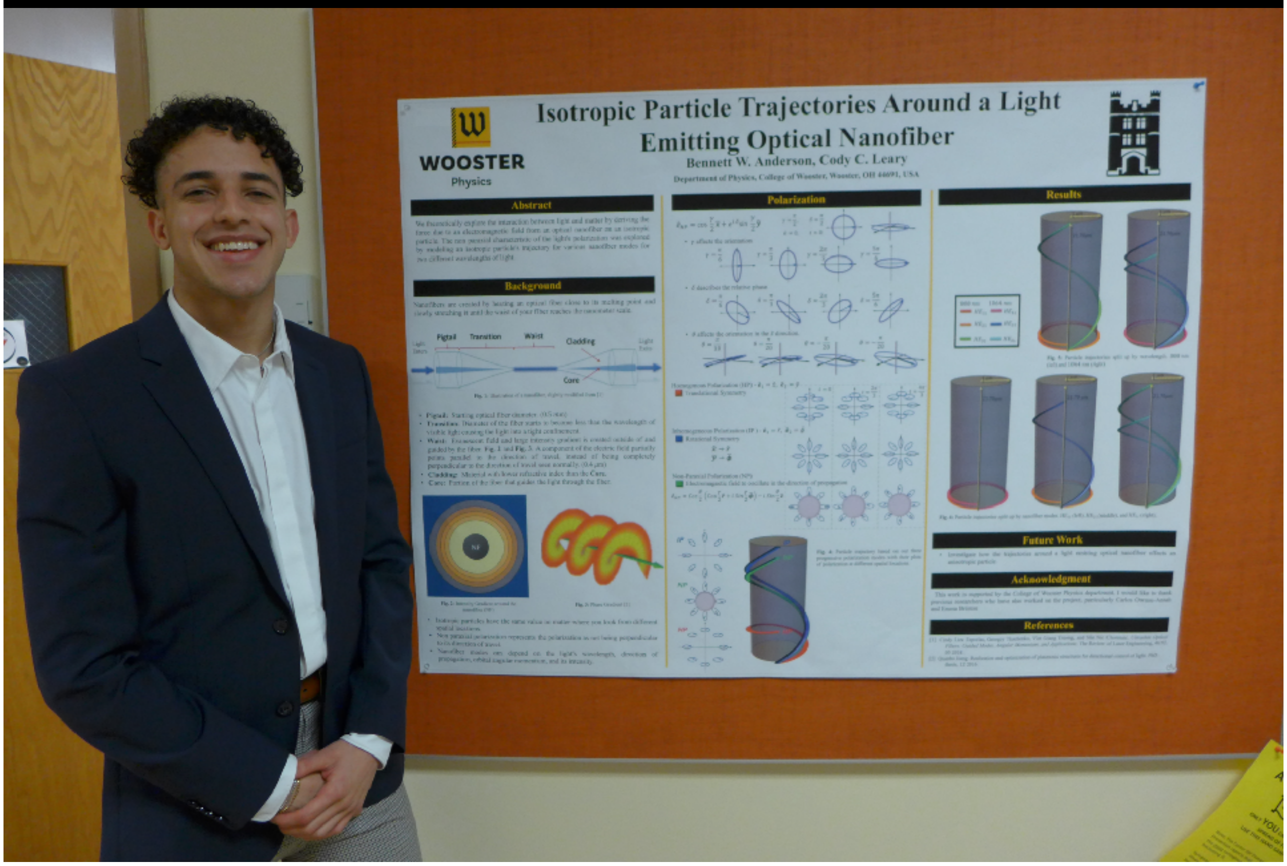
Luke Eisnaugle

In Remembrance

Teague Curless

2022 COMMENCEMENT

SENIOR INDEPENDENT STUDY



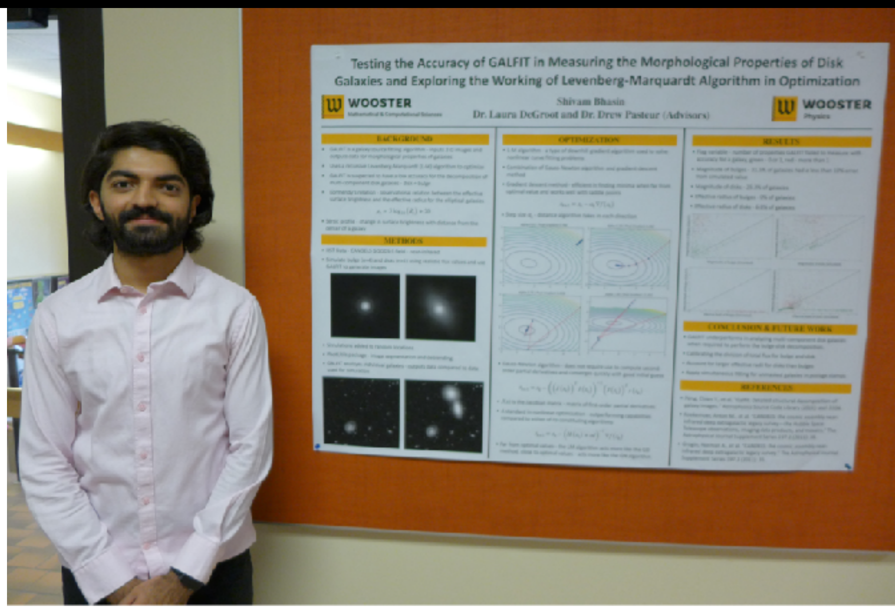
Bennett Anderson

Isotropic Particle Trajectories Around a Light Emitting Optical Nanofiber

Advised by Dr. Cody Leary (Physics)

This thesis theoretically explore's the interaction between light and matter by deriving the force due to an electromagnetic field from an optical nanofiber on an isotropic particle. The non paraxial characteristic of the lights polarization was explored by modeling an isotropic particle's trajectory for various nanofiber modes between two different wavelengths of light.

SENIOR INDEPENDENT STUDY



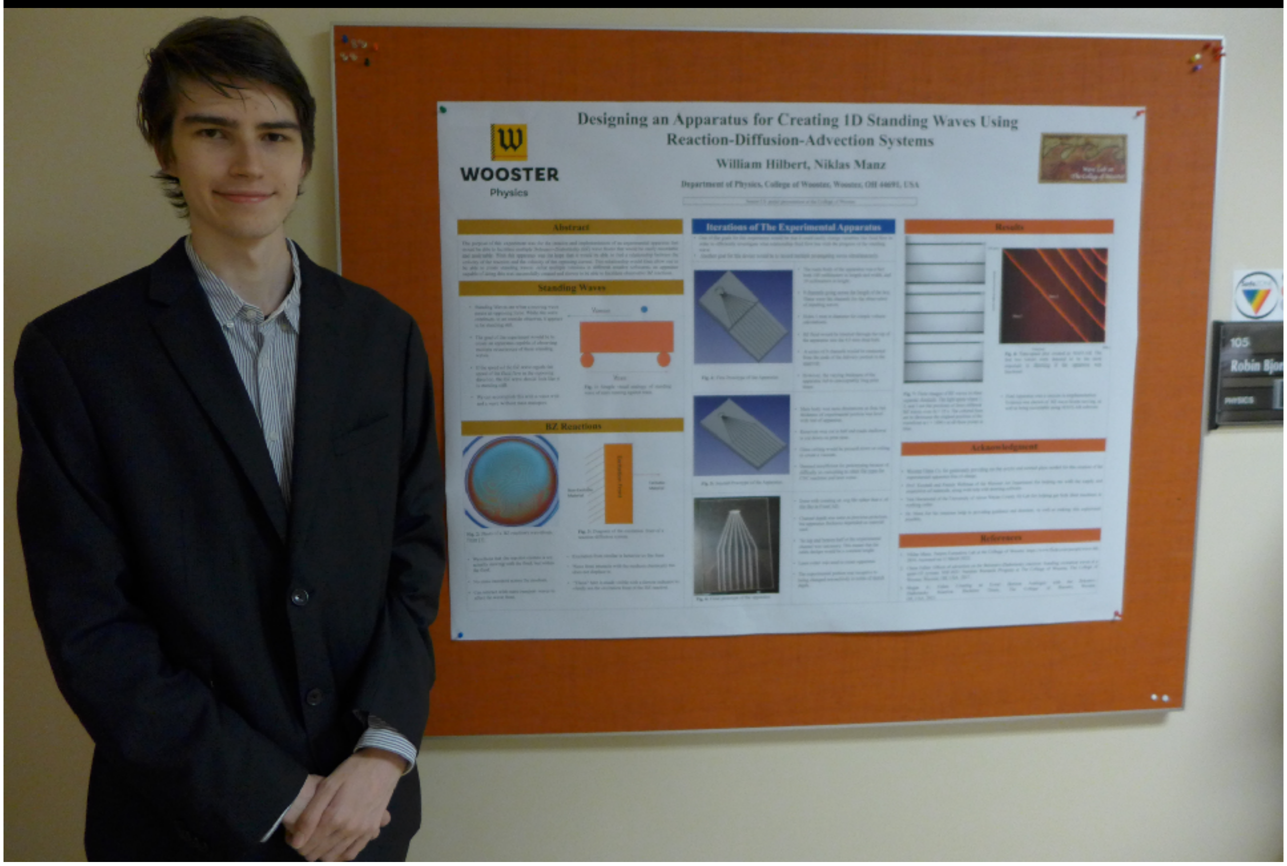
Shivam Bhasin

Testing the Accuracy of GALFIT in Measuring the Morphological Properties of Multi-Component Disk Galaxies and Exploring the Working of the Levenberg-Marquardt Algorithm Used in Optimization

Advised by Dr. Laura DeGroot (Physics) and Dr. Drew Pasteur (Mathematics)

The goal of this study was to determine the accuracy of GALFIT in measuring the morphological properties of disk galaxies like magnitude, effective radius, axis ratio, and flux after performing bulge-disk decomposition. Additionally, this research project also explores the working of the Levenberg-Marquardt algorithm, which is used by GALFIT to perform optimization. The Levenberg-Marquardt algorithm is an optimization algorithm that is a combination of the Gauss-Newton algorithm and the gradient descent method. The thesis includes a computational example for the working of the gradient descent method. The GALFIT algorithm is suspected to have a low accuracy to perform the bulge-disk decomposition for disk galaxies. We approached the goal by first simulating realistic multi-component disk galaxies using CANDELS GOODS-S data gathered by the Hubble Space Telescope. The simulated galaxies were then added to the original HST image at random locations. This was done to account for the background noise in our simulations to make them more realistic. The individual simulated galaxies were analyzed by a GALFIT code consisting of initial guesses for some galaxy properties. The output data presented large errors in the analyzed galaxy properties from GALFIT when compared to their simulated values. GALFIT had a maximum accuracy of 30% in measuring the magnitude values of bulges within a 10% error from the ideal linear relation. The results of this experiment concluded that GALFIT has a sub-par accuracy when determining the morphological properties of multi component disk galaxies after performing bulge-disk decomposition.

SENIOR INDEPENDENT STUDY



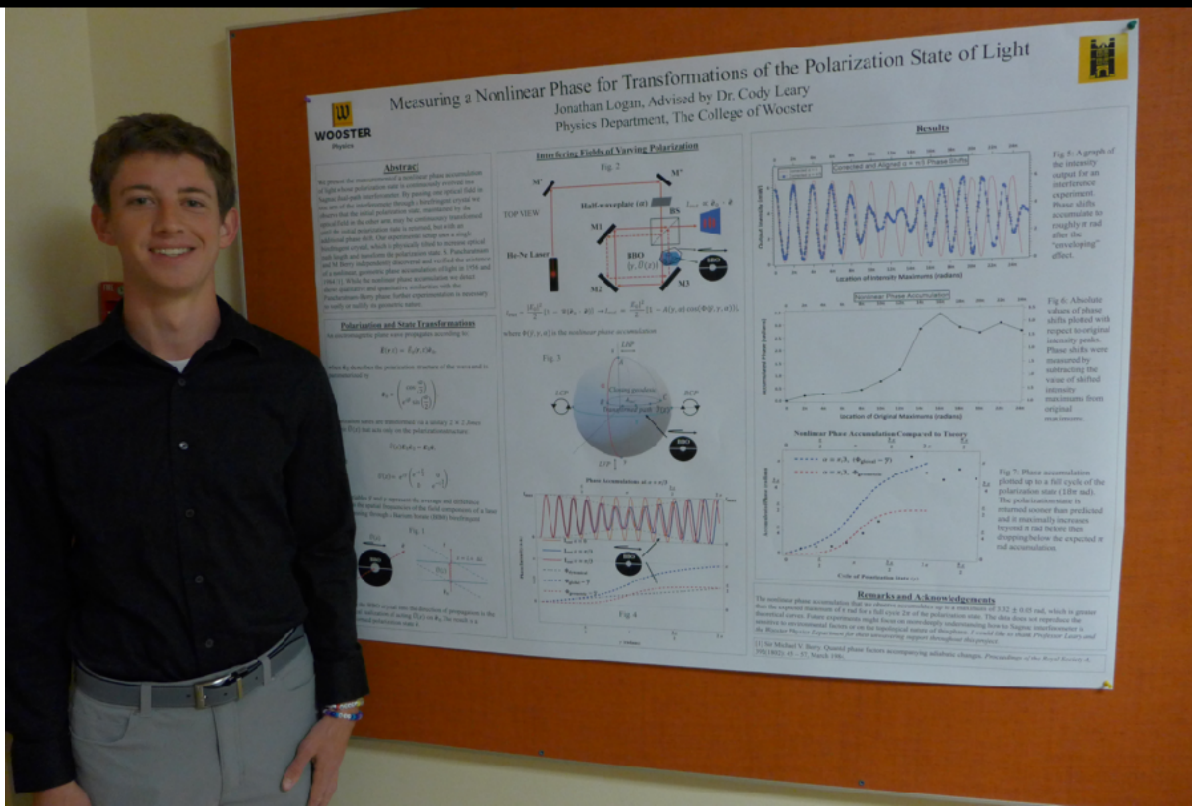
William Hilbert

Designing an Apparatus for Creating 1D Standing Waves Using Reaction-Diffusion-Advection Systems

Advised by Dr. Niklas Manz (Physics)

The purpose of this experiment was for the creation and implementation of an experimental apparatus that would be able to facilitate multiple Belousov-Zhabotinsky (BZ) wave fronts that would be easily recordable and analyzable. With this apparatus was the hope that it would be able to find a relationship between the velocity of the reaction and the velocity of the opposing current. This relationship would then allow one to be able to create standing waves. After multiple versions in different creative softwares, an apparatus capable of doing this was successfully created and shown to be able to facilitate observable BZ reactions.

SENIOR INDEPENDENT STUDY



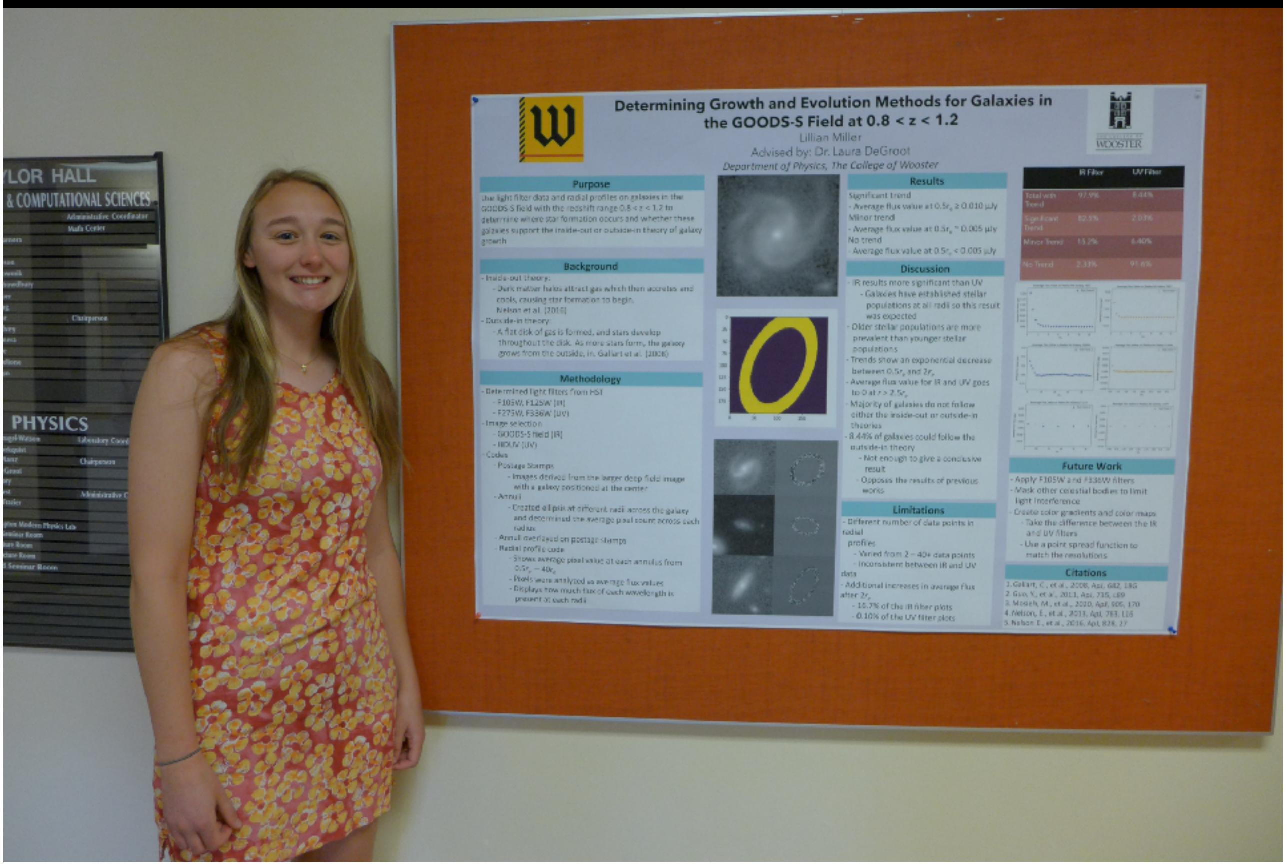
Jonathan Logan

Measuring a Nonlinear Phase Accumulation for Cyclic and Non-cyclic Adiabatic Transformations of the Polarization State of Light

Advised by Dr. Cody Leary (Physics)

We present the measurement of a nonlinear phase accumulation of light whose polarization state is continuously evolved in a Sagnac dual-path interferometer. By passing one optical eld in one arm of the interferometer through a birefrin-gent crystal we observe that the initial polarization state, maintained by the optical eld in the other beam, may be continuously transformed until the initial polarization state returns, but with an additional phase shift. Previous experiments have used a series of linearly and circularly polarizing elements to trans- form the polarization states in both cyclic and non-cyclic transformations. Our experimental setup uses a single birefringent crystal, which is physically tilted to increase optical path length and transform the polarization state on ner levels than what is achievable with only linearly and circularly polarizing elements. Our theoretical approach applies the classical treatment of light wherein we con- sider variations to optical path length due to the birefringent crystal as well as its e ect on an initial polarization state in an interference experiment. S. Pancharatnam and M. Berry independently discovered and veri ed the existence of a nonlinear, geometric phase accumulation of light in 1956 and 1984 respectively. While the nonlinear phase accumulation we detect shows qualitative and quantitative similarities with the nonlinear, geometric Pancharatnam-Berry phase, further experimentation is necessary to verify or nullify its geometric nature.

SENIOR INDEPENDENT STUDY



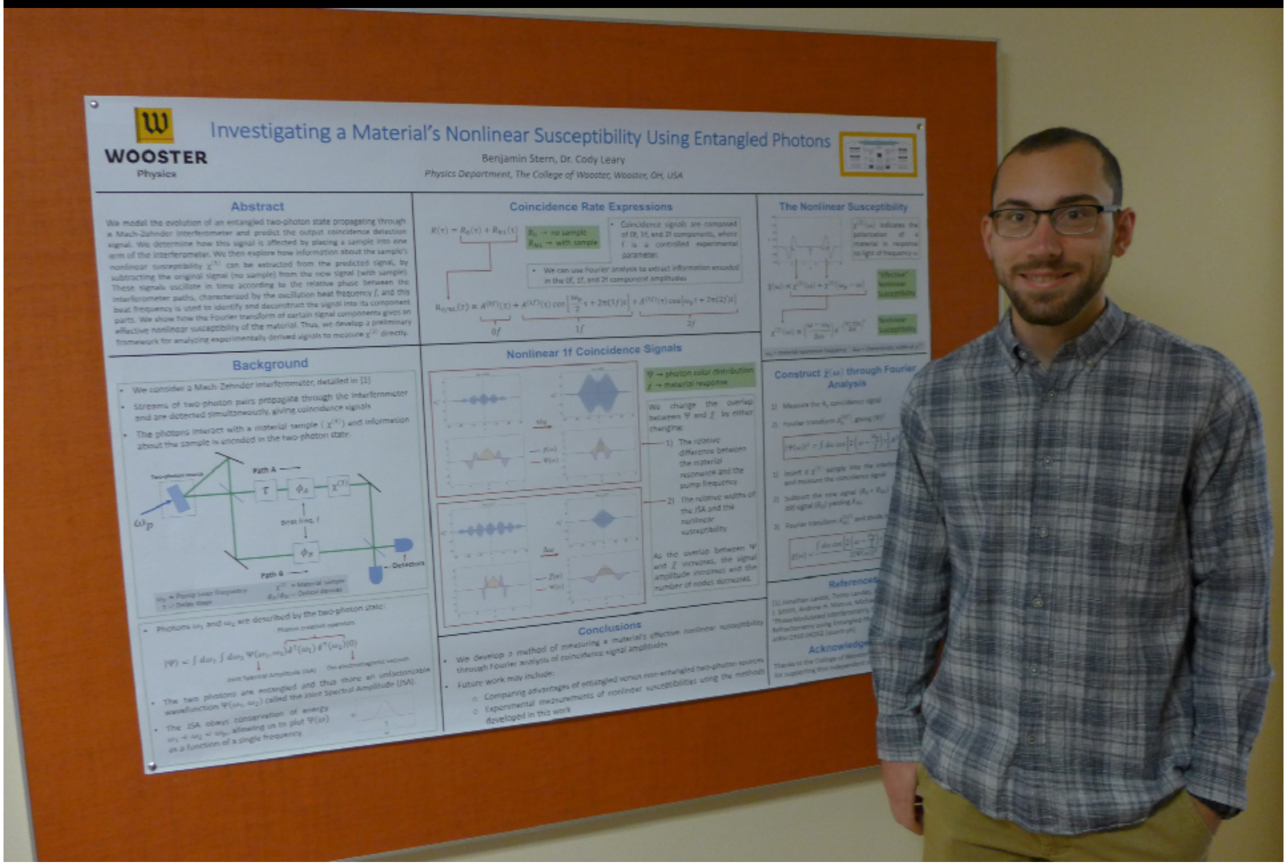
Lillian Miller

Determining Growth and Evolution Methods for Galaxies in the GOODS-S Field at 0.8<z<1.2

Advised by Dr. Laura DeGroot

In this study, galaxies observed in the CANDELS and HDUV GOODS-S field at a redshift range of 0.8< z <1.2 were analyzed to determine if their development followed either the inside-out or outside-in theory of galaxy growth and evolution. By analyzing the radial profiles of 2,015 galaxies, it was found that 97.7% of the galaxies had a trend in the IR filter with their average flux at 0.5re being greater than or equal to 0.005µJy. The majority of galaxies(82.5%) showed a significant trend with the IR filter where the average flux at 0.5re was greater than or equal to 0.010µJy. Fewer galaxies (15.2%) showedminor trends with the IR filter, their average flux at 0.5re being approximately 0.005µJy. Only 2.33% of galaxies had no trend or inconclusive results in the IRfilter. The UV filter showed that only 8.44% of galaxies had a trend where their average flux at 0.5re was greater than or equal to 0.005µJy. Very few galaxies (2.03%) had a significant trend in the UV filter where the average flux at 0.5re was greater than or equal to 0.010µJy. Minor trends in the UV filter were seen in 6.40% of galaxies in the data set, while the remaining 91.6% had no trend. The data does show a slight increase in UV light at 0.5re–2re for 8.44% of the galaxies which could indicate a possible correlation with the outside-in theory. However, this relationship is only with a small population of the data set so no conclusion can be made about the entirety of the 2,015 galaxies studied.

SENIOR INDEPENDENT STUDY



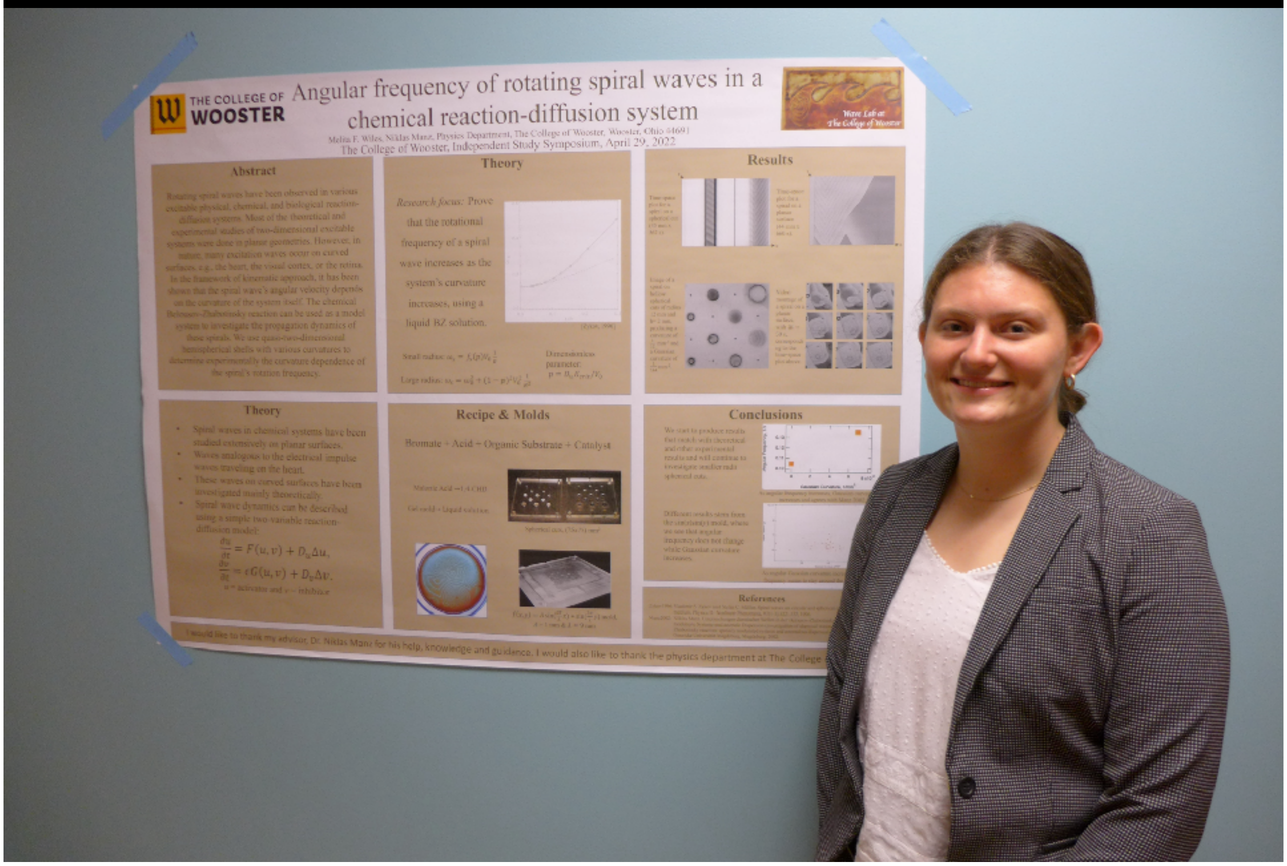
Ben Stern

Investigating a Material's Nonlinear Susceptibility Using Entangled Photons

Advised by Dr. Cody Leary (Physics)

We model the evolution of an entangled two-photon state propagating through a Mach-Zehnder interferometer and predict the output coincidence detection signals. We investigate four cases, where photons enter the interferometer along two possible input paths and exit along two possible output paths. We thendetermine how this signal is affected by placing a sample into one arm of the interferometer, where the sample is modeled as a centrosymmetric material so that the two-photon state undergoes a third-order nonlinear interaction with the sample. We then explore how information about the sample's nonlinear susceptibility $\chi(3)$ can be extracted from the predicted signal, by subtracting the original signal (no sample) from the new signal (with sample). These signals oscillate in time according to the relative phase between the interferometer paths, imparted by acousto-optic modulators, and this oscillation frequency is used to identify and deconstruct the signal into its component parts. We show how the Fourier transform of a certain signal component gives an effective non-linear susceptibility of the material. Thus, we develop a preliminary framework for analyzing experimentally derived signals to measure $\chi(3)$ directly.

SENIOR INDEPENDENT STUDY



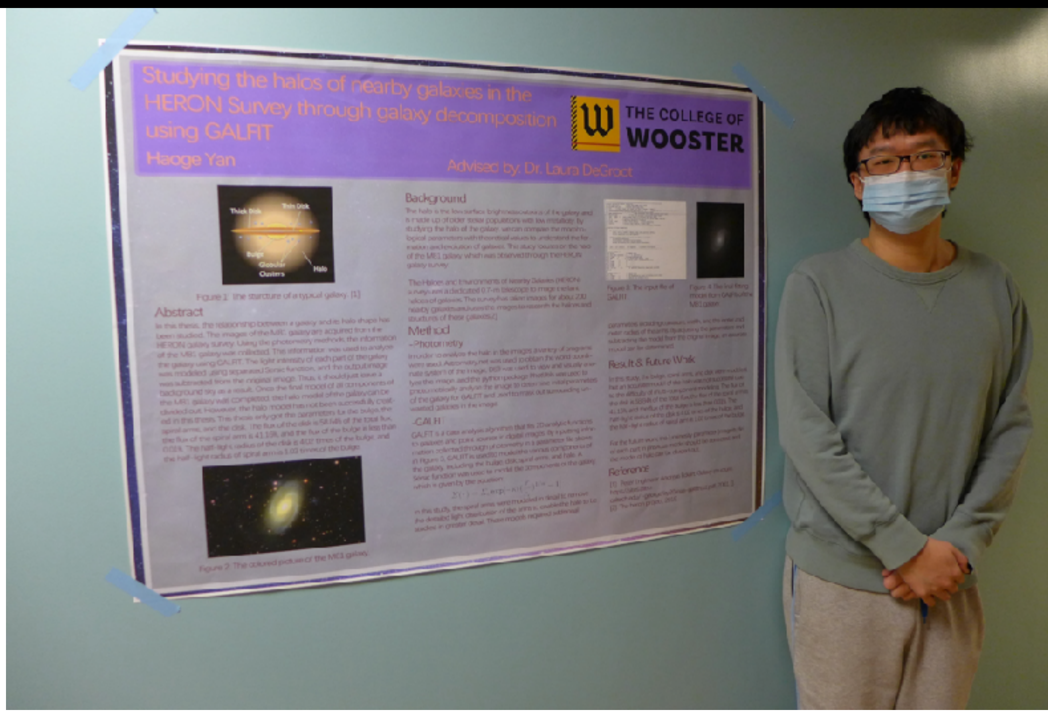
Melita Wiles

Angular Frequency of Rotating Spiral Waves in a Chemical Reaction-Diffusion System

Advised by Dr. Niklas Manz (Physics)

Rotating spiral waves have been observed in various excitable physical, chemical,and biological reaction-diffusion systems. Most of the theoretical and experimental studies of two-dimensional excitable systems were done in planar geometries. However, in nature, many excitation waves occur on curved surfaces, e.g., the heart, the visual cortex, or the retina. In the framework of kinematic approach, it has been shown that the spiral wave's angular velocity depends on the curvature of the system itself. The chemical Belousov-Zhabotinsky reaction can be used as a model system to investigate the propagation dynamics of these spirals. We use quasi-two-dimensional hemispherical shells and curved molds with various curvatures to determine experimentally the curvature dependence of the spiral's rotation frequency.

SENIOR INDEPENDENT STUDY



Haoge Yan

Studying the Halos of Nearby Galaxies in the HERON Survey through Galaxy Decomposition Using GALFIT

Advised by Dr. Laura DeGroot (Physics)

In this thesis, the relationship between a galaxy and its halo shape has beenstudied. The images of the M81 galaxy are acquired from the HERON galaxy survey. Using the photometry methods, the information of the M81 galaxy was collected. This information was used to analyze the galaxy using GALFIT. The light intensity of each part of the galaxy was modeled using separated S´ersic function, and the output image was subtracted from the original image. Thus, it should just leave a background sky as a result. Since a spiral galaxy is very complex, a simple fitting model is difficult to describe all the components of the galaxy. By examining the result residual map, the areas where light intensity is overestimated (dark regions) and underestimated (light regions) can be found. The multi-component fit input parameters are adjusted to minimize the overestimated and underestimated regions in overall model of the galaxy. Once the final model of all components of the M81 galaxy was completed, the halo model of the galaxy can be divided out. However, the halo model has not been successfully created in this thesis. This thesis only got the parameters for the bulge, the spiral arms, and the disk. The flux of the disk is 58.84% of the total flux, the flux of the spiral arm is 41.16%, and the flux of the bulge is less than 0.01%. The half-light radius of the disk is 4.02 times of the bulge, and the half-light radius of spiral arm is 1.03 times of the bulge. For further study, the parameters like flux, S´ersic function, and radius of the halo of the M81 galaxy can be calculated by using the fitting parameters from GALFIT. The relation between the halo and other components of the M81 galaxy can be acquired during this process. By studying the relation between the halo model and the whole model, the method of halo fitting can be inferred to other HERON galaxies. The relationship between the halo and the galaxy itself can be applied to nearby galaxies by comparing the relationship of GALFIT models.

2021-2022 COLLOQUIUM SERIES

- Christopher Shame, VP Hybrid Drives, eAxle, and PMO at Schaeffler; The Science of eMobility, Thursday, March 3, 2022
- Research Opportunities with CoW Physics Faculty, featuring Dr Cody Leary, Dr Laura DeGroot, and Dr Niklas Manz, Thursday, February 10, 2022
- Dr. Emily Safron, Star Formation and Long-Period Exoplanets, Wednesday, December 8, 2021
- Senior IS Fall Semester Presentations, Session 2, featuring William Hilbert, Lillian Miller, Shivam Bhasin, and Bennett Anderson, Tuesday, December 7, 2021
- Dr. David Stark, Illuminating Galactic Fuel Supplies & Star Formation Efficiencies with MaNGA, HI-MaNGA, & Future Surveys, Monday, December 6, 2021
- Senior IS Fall Semester Presentations, Session 1, featuring Melita Wiles, Ben Stern, Jonathan Logan, and Haoge Yan, Tuesday, November 30, 2021
- Dr. Eli Visbal, Uncovering the First Billion Years of the Universe, Tuesday, October 26, 2021
- Preston Pozderac ’17, Relativistic Laser Plasma Interaction, Tuesday, October 19, 2021
- Studying Engineering: The Dual Degree Program at Washington University in St. Louis, Tuesday, September 28, 2021
- I don't know what you did last summer: Summer Experiences in Physics, Tuesday, September 7, 2021

HONORS & AWARDS

FOR PHYSICS MAJORS

The Arthur H. Compton Prize in Physics
Ben Stern

The Mahesh K. Garg Prize in Physics
Raisa Raofa

Ann C. Mowery Endowed Scholarship
Jonathan Logan

Joseph Albertus Culler Prize in Physics
Luke Wilson

Karl T. Compton Scholarship
Kelsey McEwen
Luke Wilson

Summa cum laude
Ben Stern

Magna cum laude
Shivam Bhasin
Melita Wiles

Cum laude
Bennett Anderson
Lillian Miller

JUNIOR INDEPENDENT STUDY SELF-DESIGNED

Whitford (Dean) Brown '23
Hitting Baseballs: It's not Rocket Science

Harrison Clayman '23
Measuring Resistance Through Temperature

Daniel Cohen Cobos '23
Simulating a Die to Explore Chaos Theory

Olivia Green '23
A Deeper Look into the Weakly Damped Oscillator: Exploring the Properties of Galileo's Physical Pendulum

Davis Patterson '24
The Mechanics of Pole Vaulting

Raisa Raofa '23
Investigating Displacement Sensitivity of Michelson Interferometer

Michael Scarberry '23
The Chaotic Candle Seesaw

John Schmidt '23
An Experimental Determination of the Kinetic Friction Coefficient of a Miniature Pool Table

Connor Streeter '23
Corroborating the inside-out formation of disk galaxies at $z \approx 1$ through detailed decomposition of their UV and Hα emission spectra

Sara Wargo '23
Use of a Nikon DSLR Camera to Evaluate the Effect of Moonlight on Nighttime Visibility

FACULTY

Niklas Manz, Associate Professor of Physics and Chair

TEACHING

Calculus Physics I
Mechanics
Modern Physics Lab
Junior Independent Study
2 Senior IS Advisees

****

According to Dr. Manz, one of his biggest highlights was, “This was my first year as a tenured professor!”

During the most recent academic year, Dr Manz states that he “survived my first year as the chairperson while making some (big) mistakes but also was successful in requesting a one-year visitor position for the 2022-23 academic year and a tenure-track position shared between the departments of physics and earth sciences potentially starting 2024-25.”
Dr. Manz was approved for a one-semester leave for spring 2024 to, “mainly, pursue my BZ-history project”.
The article “Science, serendipity, coincidence, and the Oregonator at the University of Oregon, 1969–1974” published in Chaos: An Interdisciplinary Journal of Nonlinear Science in May 2022 is an historical reflection about the exciting time in the field of nonlinear (chemical) dynamics around 1970 (https://aip.scitation.org/doi/10.1063/5.0087455). Dr. Manz co-authored the article with, Dick Field, the only living scientist of the Oregon group. Dr. Manz quips, “The average author age of 75 reflects this.” More in the blog on https://woosterphysicists.scotblogs.wooster.edu/2022/05/23/science-serendipity-and-coincidence/
Dr. Manz was also able to visit one author (Bob Mazo) for the first time in January: https://woosterphysicists.scotblogs.wooster.edu/2022/01/07/50-years-later/. With co-author, Dick Field, Dr. Manz continues work on writing a book about the BZ history.

In April, Dr. Manz also started a one-year term as the chair of the Eastern Great Lakes section of APS.

FACULTY

Robin Bjorkquist, Visiting Assistant Professor of Physics

TEACHING

Calculus Physics Lab I
Calculus Physics II
Calculus Physics Lab II
Electronics for Scientists
Math Methods for Scientists
Particle Physics

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Dr. Bjorkquist states, “I had a fabulous time teaching at the College of Wooster for the 2021-2022 academic year. I’ve moved on to new adventures, but will always have fond memories of Taylor Hall, the physics department, and all the wonderful people there. If you’re ever passing through the Pacific Northwest, do stop by and visit me at Seattle University!”

FACULTY

Laura DeGroot, Assistant Professor of Physics

TEACHING

Algebra Physics I
Algebra Physics II
Astrophysics
Calculus Physics I Lab
First Year Seminar
3 Senior IS Advisees

****

Dr. DeGroot was thrilled to return to Wooster in Fall 2021, especially with in-person classes. In particular, she was very excited to teach Algebra Physics in the classroom, teach Astrophysics again after many years, and to have the opportunity to teach First Year Seminar for the first time. The topic for Dr. DeGroot's FYS was "Future Tech? Sci-fi vs. Reality," which led to many great discussions with a great group of students.

In the spring semester, Expanding Horizons, a workshop for young women exploring STEM, returned to campus for the first time since 2019, and Dr. DeGroot teamed up with Dr. Bjorkquist to lead the "Humpty Dumpty Experiment."

Dr. DeGroot attended the 240th meeting of the American Astronomical Society in Pasadena, where she was able to reconnect with colleagues and collaborators and learn greater detail about current astrophysics research. She is ecstatic to be continuing at Wooster in the fall as a tenure-track assistant professor.

FACULTY

Cody Leary, Associate Professor of Physics

TEACHING

Calculus Physics I
Calculus Physics I Lab
Calculus Physics II
Calculus Physics II Lab
Modern Physics
Quantum Mechanics
3 Senior IS Advisees

****

Throughout the 2021-22 academic year, Dr. Leary has enjoyed the opportunity to engage in a number of research projects. He enjoyed working with five sophomore research students (a record number for him!) in addition to three Senior Independent study students, making progress on a number of research projects involving the interaction of light with matter. He is also grateful for the opportunity to reengage in summer research with three students through our department's NSF-sponsored REU program, after two years of pandemic-related program cancellation.

Dr. Leary was awarded a research leave for the fall of 2023, and is looking forward to having focused time to write up some research results in the areas of nonlinear quantum optics, optical nanofibers, and geometric phases of light.

FACULTY

Susan Lehman, Victor J. Andrew Professor of Physics

""

Dr. Lehman was on research leave during 2021-22. Although the on-going pandemic limited the travel that she had planned to other labs, she was able to make good progress on upgrading the video analysis for her bead pile research project. Some highlights of the year included giving a colloquium on her work at Kenyon College and collaborating with colleague Bhakti Mamtora (Religious Studies) and Emily Mariola (owner of Flex Yoga) to present on The Science of Yoga at the Wooster Science Cafe.

In addition, Dr. Lehman published a major article on her bead pile work, the culmination of multiple years of research adding cohesion into the bead pile system. The paper included eight Wooster undergraduates as co-authors, as well as emeritus professor Don Jacobs and collaborators from the University of Illinois. This milestone paper also led to Dr. Lehman and Dr. Jacobs' long work on the bead pile with generations of students being featured in the summer issue of the Wooster magazine. Thank you to all the marvelous alumni out there who have contributed to the bead pile project over the years — your papers, notes, and lab notebooks continue to inspire the current students!

With Dr. Lindner's retirement, Dr Lehman also became the leader for Wooster's NSF REU grant. It was a rewarding year to take over the REU leadership as the department was able to welcome the REU researchers to campus for the first time since 2019.

STAFF

Manon Grugel-Watson '99
Physics Laboratory Coordinator & Instructor, B-WISER Camp Project Director

TEACHING

Algebra Physics Lab
Algebra Physics II Lab
****

Manon Grugel-Watson is the Physics Department Laboratory Coordinator, Laboratory Instructor, and Project Director for B-WISER science camp for middle school girls. Manon is responsible for the Physics Department's laboratory and demonstration equipment as well as the setup for introductory and advanced lab courses. In addition, Manon taught the Alberga Physics Introductory Lab sections again this past year. She also spent a considerable part of her time working to secure funding for and managing the logistics of running the Buckeye Women in Science Engineering and Research (B-WISER) camp which took place on campus from June 12-17, 2022. B-WISER residential camp provides young women with an intensive, cooperative lab-based experience in physics, chemistry, biology, geology, coding, robotics, and engineering.

STAFF

Craig First
Administrative Coordinator,
Physics and Mathematical & Computational Sciences

Timothy Siegenthaler
Instrument and Lab Tech/Machinist,
Biology, Chemistry, Earth Sciences, Physics

PHYSICS CLUB

OFFICERS

President: Shivam Bhasin
Vice-President: Ben Stern
Treasurer: Michael Scarberry
Secretary: Raisa Raofa
Faculty Advisor: Dr. Laura DeGroot

PHYSICS CLUB T-SHIRT

Designed by Ben Stern '22

In Memory of Teague Curless '22

ASTRONOMY CLUB

Independent Eyes, Observing Together

OFFICERS

President: Raisa Raofa
Vice President: Melita Wiles
Treasurer: Sara Wargo
Secretary: Lillian Miller
Faculty Advisor: Dr. Laura DeGroot

ASTRONOMY CLUB T-SHIRT

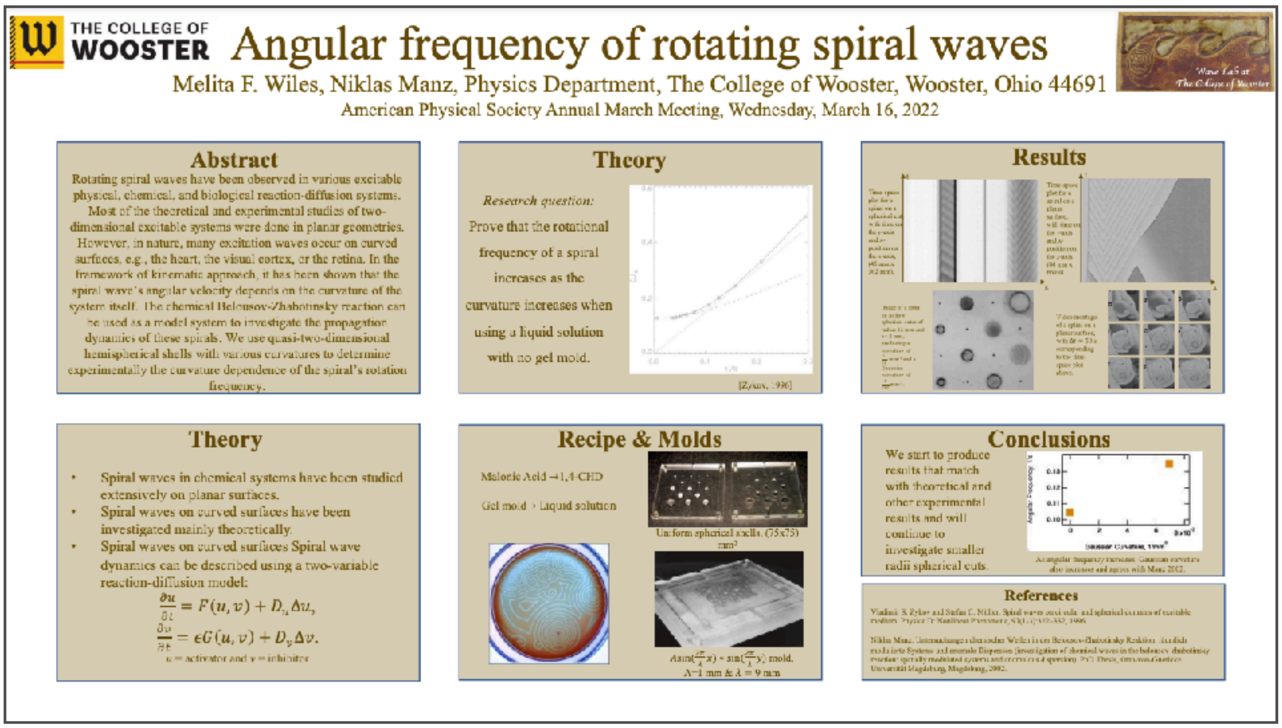
Designed by Sara Wargo ‘23

CONFERENCES

STUDENT PRESENTATIONS

** denotes Wooster student; † denotes summer research student*

- Melita Wiles*, Niklas Manz, *Angular frequency of rotating spiral waves in a chemical reaction-diffusion systems*, American Physical Society, virtual (March 2022).



COMPETITIONS

The 2021 University Physics Competition

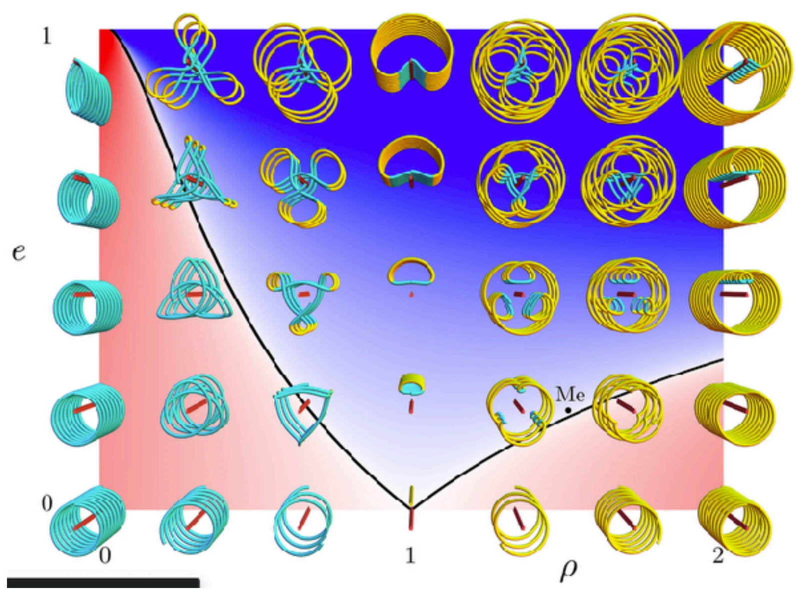
The University Physics Competition is an international contest for undergraduate students, who worked in teams of up to three students at their home colleges and universities all over the world, and spent 48 hours during the weekend of November 5, 6, & 7, 2021, analyzing a scenario using the principles of physics, and writing a formal paper describing their work.

In this year's competition 324 teams submitted papers for judging. 127 teams selected "Problem A – A Thicker Martian Atmosphere" and 197 teams selected "Problem B – Asteroid Ocean Impact."

The Wooster Team of Haoge Yan '22 and Rica Tang '24 earned the rank of Accomplished Competitor.

PUBLICATIONS

- Richard J. Field, Robert M. Mazo, Niklas Manz, Science, serendipity, coincidence, and the Oregonator at the University of Oregon, 1969 – 1974 (**Editor's Pick**), *Chaos: An Interdisciplinary Journal of Nonlinear Science* **32**, 052101(1-10) (2022).



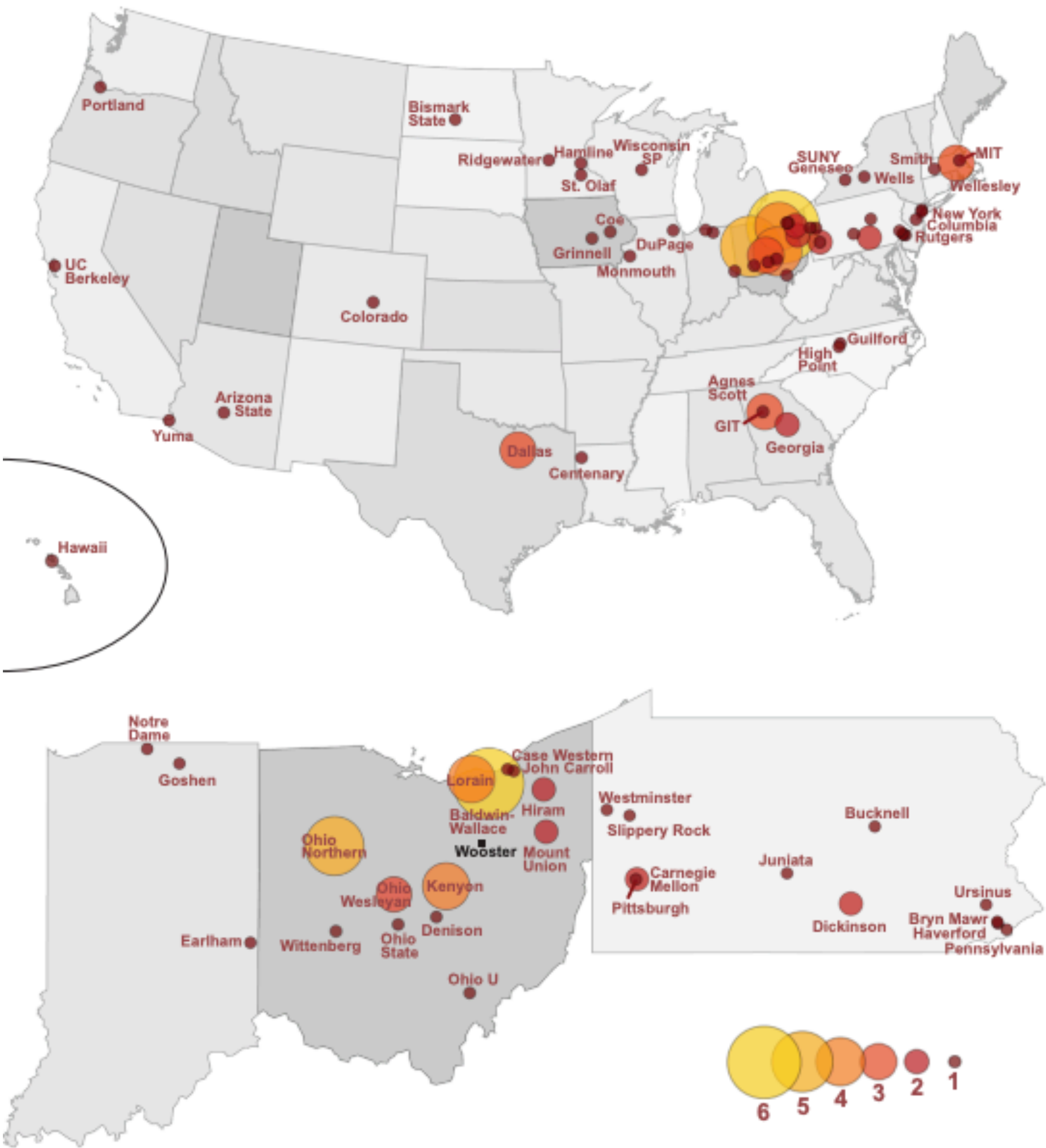
- Xinchen Xie*, Hwan Bae*, John F. Lindner, Alien suns reversing in exoplanet skies, Scientific Reports 12, 8426 (2022)
- Margaret K. McGuire*, Chase A. Fuller*, John F. Lindner, Niklas Manz, Geographic Tongue as a Reaction-Diffusion System, *Chaos: An Interdisciplinary Journal of Nonlinear Science* **31**, 033118(1-9) (2021).

SUMMER RESEARCH

WOOSTER NSF-REU

Wooster Physics NSF REU

has integrated people from 57 colleges & universities with more to come!



SUMMER RESEARCH

WOOSTER NSF-REU

Karmellah Buttler (Wooster ’25) (Advised by Laura DeGroot)
“Using Color Gradients to Study the Inside-Out Formation of Disk Galaxies at $0.8 \leq z \leq 1.0$”

Olivia Green (Wooster ’23) (Advised by Cody Leary)
“A Two-Photon Investigation of Nonlinear Sample Properties”

Olivia Heinen (St. Olaf College ’23) (Advised by Susan Lehman)
“Video Analysis Parameter Optimization for Avalanching Beads on a Conical Pile”

Aman Jissa (Wooster ’24) (Advised by Cody Leary)
“Measuring the Phase Accumulation of a Changing Polarization State of Light”

Eric Johnson (Wooster ‘ 25) (Advised by Susan Lehman)
“Avalanches on a Conical Bead Pile: Improving Video Acquisition and Analyzing Inter-event Time”

Kyla Koos (Baldwin Wallace University ’24) (Advised by Cody Leary)
“Modeling Two-Photon Interference Using Optical Pulses”

Debra Lacey (Wellesley College ’24) (Advised by Laura DeGroot)
“Using Simulated Images to Test Galfit’s Parameter Analysis”

Kiyomi Sanders (University of Hawai’i ’22) (Advised by Niklas Manz)
“Table-top Analogues Using Chemical Waves: Gravitational Lensing Effect”

Michael Scarberry (Wooster ’23) (Advised by Paul Bonvallet)
“Temperature Effects on the Young’s Modulus of SOMS”

John Schmidt (Wooster ’23) (Advised by Paul Bonvallet)
“An Experimental Determination of the Young’s Modulus for Compression of Swellable Organically Modified Silica”

Mahala Wanner (Ohio University ’24) (Advised by Niklas Manz)
“Table-top Analogues Using Chemical Waves: Electron Drift Velocity”

ALUMNI

Wooster Physics Alums! We are always excited to see you when you are in town. The next time you are on campus, please stop by Taylor Hall to pay us a visit!

John Redfield ’77 and Dr. Susan Lehman during Alumni Weekend