Ebram Youssef

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EDUCATION

University of Rochester Aug 2019 – May 2023 (Anticipated)
Bachelor of Science in Physics Rochester, NY

Major: Physics **Cumulative GPA:** 3.78/4.00 **Awards:** Dean's List

- **Minors**: Computer Science and Math
- **Relevant Coursework**: Quantum Mechanics and Modern Physics, Advanced E&M, Classical Mechanics, Statistical and Thermo Mechanics, Advanced Experimental Techniques, Multivariable Calculus, Linear Algebra, Partial Differential Equations, Data Structures and Algorithms, Computational Neuroscience, Computational Physics.

RESEARCH EXPERIENCE

University of Rochester – Institute of Optics May 2022 – Present
Research Assistant, Prof. Robert Boyd's Group (Quantum Photonics and Nonlinear Optics lab) Rochester, NY

- Worked on a project aimed at exciting and observing spatial surface solitons at a linear-nonlinear interface; performed analytical derivations; created a numerical simulation for beam propagation to find excitation parameters. *(Ongoing)*
- Worked on a project aimed at observing optical bistability in ITO utilizing spectral shearing interferometry (SSI); helped align various components of SSI setup; performed temporal characterization of optical parametric generator pulses. *(Ongoing)*
- Worked on a project aimed at measuring enhanced nonlinear optical response of silver at ENZ wavelength; performed group-velocity mismatch calculations for SHG crystal; aligned Ti:S femtosecond laser and THG crystals. *(Ongoing)*
- Wrote numerical simulations to reproduce results by Akhmediev et al. (1984) and Moloney (1987) utilizing split-step Fourier transform (SSFM) algorithm. *(Completed)*
- Performed computational Effective Medium Approximation calculations for layered Ag-SiO2 and nanoparticle-doped Au-SiO2 composites to find optimal fill fractions and laser wavelengths for enhanced optical properties. *(Completed)*

SELECTED LABS AND PROJECTS

https://ebramyoussef.github.io/projects

Period Doubling and Chaotic behavior in an RLD Circuit Oct 2022 – Nov 2022
Advanced Experimental Techniques Lab, Prof. Nicholas Bigelow Rochester, NY

- Performed an experiment studying the period doubling and chaotic behavior of an RLD electrical circuit.
- Developed an algorithm to identify period doubling and chaotic behavior of circuit; plotted a bifurcation diagram.
- Calculated the experimental values of Feigenbaum constants and compared them to theoretical ones.

Doppler-free Saturated Absorption Spectroscopy of Rubidium D2 Transitions Sep 2022 – Oct 2022
Advanced Experimental Techniques Lab, Prof. Nicholas Bigelow Rochester, NY

- Implemented an experiment studying the saturated absorption of rubidium vapor in a pump-probe optical setup utilizing a diode laser to produce Doppler-free absorption spectra with identifiable hyperfine transitions.
- Used computational methods to analyze and calibrate spectra via Fabry-Perot resonances.
- Got acquainted with a variety of optical techniques and components.

SKILLS

Programming: MATLAB, Python, Mathematica, Java, JavaScript
Technical skills: Operating and aligning different lasers, designing optical setups, mathematical and computational modeling, numerical simulations
Languages: Arabic (Native), English (Fluent), German (Intermediate).