

## Education

2022 - Present	<b>Doctor of Philosophy in Condensed Matter Physics</b> Physics department, University of Alberta, Canada Supervisor: Prof. Frank Hegmann	GPA <b>4/4</b>
2017 - 2020	<b>Master of Science in Optics and Laser</b> Physics department, Shiraz University, Iran Thesis: Experimental investigation of nonlinear effects in random lasers and possibility of producing the resonant feedback in them. Supervisor: Prof. Abbas Ghasempour Ardakani	GPA 17.17/20   <b>3.72/4</b> last year 4/4
2013 - 2017	<b>Bachelor of Science in Physics</b> Physics department, Shiraz University, Iran	GPA 16.80/20   <b>3.51/4</b> last two years 3.73/4

## Awards and Honors

2022	Awarded Fully Funded Ph.D. Admission in Condensed Matter Physics	University of Alberta
2019	Ranked 2 <sup>nd</sup> among the graduate students in Optics and Laser	Shiraz University
2019	Ranked 3 <sup>rd</sup> among the graduate students in Physics	Shiraz University
2017	Admission to M.Sc. Program in Optics and Laser as an Elite Student	Shiraz University
2017	Awarded scholarship (tuition-waiver)   M.Sc. in Solid State	Shahid Beheshti University
2017	Ranked within the top 2%   The University Entrance Exam for M.Sc.	
2017	Ranked 2 <sup>nd</sup> among the undergraduate students in Physics	Shiraz University
2013	Awarded scholarship (tuition-waiver)   B.Sc. in Physics	Shiraz University
2013	Ranked within the top 3%   The University Entrance Exam for B.Sc.	

## Selected Courses

• Nanotechnology		A+	• Spectroscopy	19.80/20	A+
• Advanced Laser	18.70/20	A+	• Optics Lab	19.60/20	A+
• Quantum Electronics	18.90/20	A+	• Solid State Physics	16.50/20	A
• Applied Optics	17/20	A	• Optics	18.40/20	A+
• Laser Physics	18.50/20	A+	• Modern Physics Lab	19.30/20	A+
• Computational Physics	20/20	A+			
MATLAB					

## Research Experience

University of Alberta (**PhD**)

Scanning Tunneling Microscopy and Spectroscopy

Taking IV, dIdV, IZ

Terahertz Scanning Tunneling Microscopy and Spectroscopy  
Terahertz Generation and Detection

Taking IE, EV

Tip preparation: chemical etching process, field electron emission, electron bombardment

Materials: Functionalized Silicon Nanocrystals, Silicon (100), Gallium Arsenide, Gold, HOPG

Experience working with Ultra High Vacuum system and cooling the system with liquid Nitrogen or Hydrogen

Shiraz University (**MSc** and **BSc**)

Z-scan Technique

Measurement of Nonlinear Refractive Index and Nonlinear Absorption Coefficients

Random Lasers (RLs)

Fabrication | Study of Emission Spectra | Resonant and non-resonant RLs

Optical Measurement

Transport mean free path | Coherent Backscattering Technique

Refractive index | Michelson Interferometer

Absorption Coefficient | Beer-Lambert law and UV-vis Spectrum

Materials

Molybdenum Oxide | Zinc Oxide | Graphene Oxide | Graphene Quantum Dots

Titanium Dioxide | Rhodamine B and 6G

Fabrication

Electrodeposition | Pyrolysis

Characterization

Scanning Electron Microscopy (SEM) | X-ray Diffraction (XRD)

UV-vis Spectrophotometry

Hands-on Experience:

Class III and IV Lasers | Laser Alignment | Sample Preparation | Clean-room

## Publications

### Journal Papers

- 2021 A. Ghasempour Ardakani and **N. Sadeghi**, "Fabrication of molybdenum oxide thin films with different Kerr nonlinearities and using them in random lasers," *Applied Optics* 60(2), 367-374 (2021). [Abstract]

### Conference Papers

- 2021 **N. Sadeghi** and A. Ghasempur Ardakani, "Investigation of Random Lasers Consisting of Scattering Particles with Nonlinear Effects," ICOP & ICPET. 2021.
- 2019 A. Ghasempur Ardakani and **N. Sadeghi**, "Fabrication of random lasers with a resonant feedback based on a thin film including Molybdenum Oxide nanorods grown by electrochemical method," ICOP & ICPET. 2019; 25 :709-712.
- 2019 A. Ghasempur Ardakani, **N. Sadeghi**, H. Haghighi and Z. Hasani, "Measurement of linear and nonlinear optical properties of a thin film including Molybdenum Oxide nanorods grown by electrochemical deposition method," ICOP & ICPET. 2019; 25 :705-708.
- 2018 A. Ghasempour Ardakani, F. Keshavarznasab, **N. Sadeghi**, M. Ebrahimi and A. Zakery, "Measurement of linear and nonlinear optical properties of Zinc Oxide sheets grown by electrochemical deposition method," ICOP & ICPET. 2018; 24 :421-424

## Presentations

- 2024 “Terahertz Scanning Tunneling Microscopy of Functionalized Silicon Nanocrystals”  
GPSA Symposium (Poster), UAlberta
- “Ultrafast Electron Dynamics of Functionalized Silicon Nanocrystals ”  
ATUMS Annual Meeting in Venice, Italy
- 2023 “Terahertz Scanning Tunneling Microscopy of Functionalized Silicon Nanocrystals ”  
ATUMS Annual Meeting in Canmore, AB
- 2021 “Investigation of Random Lasers Consisting of Scattering Particles with Nonlinear Effects”  
The 27<sup>th</sup> Iranian Conference on Optics and Photonics (ICOP)
- 2019 “Random Lasers and Applications” | Seminar, Shiraz University
- “Measurement of linear and nonlinear optical properties of a thin film including Molybdenum Oxide nanorods grown by electrochemical deposition method”  
The 25<sup>th</sup> Iranian Conference on Optics and Photonics (ICOP)

## Teaching Experience

- Teaching Assistant** | University of Alberta
- 2024 PHYS Lab 126
- 2023 PHYS Lab 124                      2022      PHYS 124 | PHYS 130
- 2018 **Modern Physics Laboratory Workshop** for High School Physics Teachers  
19<sup>th</sup> National Conference on Physical Education | Shiraz University, Iran
- Teaching Assistant** | Shiraz University
- 2019 Physics 1
- 2018 Physics Laboratory 4      |      Modern Physics Laboratory      |      Mathematical Physics 3

## Workshops

- 2020 Radiation Protection | Radiation Research Center                      Shiraz University, Iran
- 2019 LabVIEW | Training Center                      Shiraz Technology University, Iran
- Zemax OpticStudio | Physics department                      Shiraz University, Iran
- 2018 MATLAB | Open and Specialized Training Center                      Shiraz University, Iran
- 2017 LaTeX | Physics department                      Shiraz University, Iran

## Community Services

- 2019 Executive committee member of **Iranian Conference on Optics and Photonics (ICOP)**.
- 2016 Executive committee member of **The Annual Physics Conference of Iran**.

## Skills

### Computer

Python | MATLAB | C++ | LabVIEW  
Wolfram Mathematica | LaTeX

### Languages

Persian                      |                      English                      |                      French  
Native    Advanced    Basic

## References

- Prof. Frank **Hegmann** <sup>†</sup> | Professor                      [hegmann@ualberta.ca](mailto:hegmann@ualberta.ca)
- Prof. Abbas **Ghasempour Ardakani** <sup>‡</sup> | Associate Professor                      [aghasempour@shirazu.ac.ir](mailto:aghasempour@shirazu.ac.ir)
- Prof. Abdolnasser **Zakery** <sup>‡</sup> | Professor                      [zakery@physics.susc.ac.ir](mailto:zakery@physics.susc.ac.ir)

<sup>†</sup> Physics Department, UAlberta, Canada

<sup>‡</sup> Physics Department, Shiraz University, Iran