

# Omar A. Ashour

## Curriculum Vitae

Physics Department

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## Education

2019 – **Doctor of Philosophy, Physics.**

University of California, Berkeley

Advisors: Sinéad Griffin, James Analytis

2019 – 2020: **Master of Arts, Physics.**

University of California, Berkeley

2017 – 2019: **Master of Science, Applied Science & Technology (Applied Physics).**

University of California, Berkeley (*Berkeley Graduate Fellow*)

GPA: 3.90/4.0

Thesis: The Nonlinear Schrödinger Hierarchy: from Quasi Rogue Waves to Nonlinear Talbot Carpets

2013 – 2017: **Bachelor of Science, Electrical Engineering (Optics).**

Texas A&M University, College Station, TX, *Summa Cum Laude, Undergraduate Research Scholar*

GPA: 4.0/4.0

Honor Roll: 8 Times

Honor Soc.: TBII, HKN, ΦΚΦ

Thesis: Maximal Intensity Higher-Order Breathers of the Nonlinear Schrödinger Equation on Different Backgrounds

Advisors: Siu A. Chin, Milivoj R. Belić

## Publications

- 2022 **Omar A. Ashour**, Siu A. Chin, Stanko N. Nikolić, and Milivoj R. Belić. Higher-order breathers as quasi-rogue waves on a periodic background. *Nonlinear Dynamics*, Jan 2022.
- 2022 Stanko N. Nikolić, Sarah Alwashahi, **Omar A. Ashour**, Siu A. Chin, Najdan B. Aleksić, and Milivoj R. Belić. Multi-elliptic rogue wave clusters of the nonlinear schrödinger equation on different backgrounds. *Nonlinear Dynamics*, Jan 2022.
- 2022 Thais Chagas\*, **Omar A. Ashour**\*, Guilherme Ribeiro, Wendell Silva, Zhenglu Li, Rogério Magalhães-Paniago, Yves Petroff, and Steven G. Louie. Multiple strong topological gaps and hexagonal warping in  $\text{Bi}_4\text{Te}_3$ . *Accepted, Physical Review B*, 2022.
- 2021 **Omar A. Ashour**. Nonlinear Schrödinger: Higher-order algorithms and Darboux transformations for nonlinear Schrödinger equations. *arXiv*, page arXiv:2103.14469, 2021.
- 2019 Stanko N. Nikolić, **Omar A. Ashour**, Najdan B. Aleksić, Yiqi Zhang, Milivoj R. Belić, and Siu A. Chin. Talbot carpets by rogue waves of extended nonlinear schrödinger equations. *Nonlinear Dynamics*, volume 97, pages 1215–1225, 2019.
- 2019 Stanko N. Nikolić, **Omar A. Ashour**, Najdan B. Aleksić, Milivoj R. Belić, and Siu A. Chin. Breathers, solitons and rogue waves of the quintic nonlinear schrödinger equation on various backgrounds. *Nonlinear Dynamics*, volume 95, pages 2855–2865, 2019.

- 2017 Stanko N. Nikolić, Najdan B. Aleksić, **Omar A. Ashour**, Milivoj R. Belić, and Siu A. Chin. Systematic generation of higher-order solitons and breathers of the hirota equation on different backgrounds. *Nonlinear Dynamics*, volume 89, pages 1637–1649, 2017.
- 2017 Runze Li, **Omar A. Ashour**, Jie Chen, H. E. Elsayed-Ali, and Peter M. Rentzepis. Femtosecond laser induced structural dynamics and melting of cu (111) single crystal. an ultrafast time-resolved x-ray diffraction study. *Journal of Applied Physics*, volume 121, page 055102, 2017.
- 2017 Siu A. Chin, **Omar A. Ashour**, Stanko N. Nikolic, and Milivoj R. Belic. Peak-height formula for higher-order breathers of the nonlinear schrodinger equation on non-uniform backgrounds. *Physical Review E*, volume 95, page 012211, 2017.
- 2016 Siu A. Chin, **Omar A. Ashour**, Stanko N. Nikolic, and Milivoj R. Belic. Maximal intensity higher-order akhmediev breathers of the nonlinear schrödinger equation and their systematic generation. *Physics Letters A*, volume 380, pages 3625–3629, 2016.
- 2015 Siu A. Chin, **Omar A. Ashour**, and Milivoj R. Belic. Anatomy of the akhmediev breather: Cascading instability, first formation time, and fermi-pasta-ulam recurrence. *Physical Review E*, volume 92, page 063202, 2015.
- \* These authors contributed equally.

## Research Experience

- 2021 – **Molecular Foundry, Lawrence Berkeley National Lab**, Berkeley, CA.  
*Ab initio* studies of topological systems and direct dark matter detection.  
 PI: Sinéad Griffin
- 2019 – 2021 **Physics Department, UC Berkeley**, Berkeley, CA.  
 DFT and GW calculations of topological insulators and transition metal dichalcogenides.  
 PI: Steven G. Louie
- 2017 – 2018 **NSF Nanoscale Science & Engineering Center, UC Berkeley**, Berkeley, CA.  
 Numerical and experimental studies of transition metal dichalcogenides and photonic waveguides.  
 PI: Xiang Zhang
- 2016 – 2017 **Texas A&M Engineering Experiment Station (TEES)**, College Station, TX.  
 Numerical and experimental studies of ultrafast dynamics in metal thin films  
 PI: Peter Rentzepis
- 2015 **Institute of Electronic Structure and Laser (IESL-FORTH)**, Heraklion, Greece.  
 Femtosecond laser machining of complex waveguide arrays  
 PI: Stelios Tzortzakis
- 2014 – 2017 **Department of Physics and Astronomy, Texas A&M University**, College Station, TX.  
 Studies of periodic solutions of nonlinear Schrödinger equations.  
 PI: Siu A. Chin, Milivoj R. Belić

## Fellowships & Awards

- 2018 – 2019 **Anselmo J. Macchi Graduate Fellowship**, UC Berkeley
- 2017 – 2019 **Berkeley Graduate Fellowship**, UC Berkeley
- 2017 – 2018 **Cornell Graduate Fellowship (declined)**, Cornell University
- 2015, 2017 **Gathright Scholar Award** for outstanding scholastic achievement, Texas A&M University
- 2016 **Richard E. Ewing Award** for excellence in student research, Texas A&M University

- 2016 **Takreem Award** for best student research, Qatar Foundation for Education and Science  
2014 – 2017 **Merit Scholarship**, Qatar Foundation for Education and Science

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### Community Service and Volunteer Work

- 2020 **Scientist Ambassador**, Spent four weeks as an ambassador to a first grade class, teaching them about science and answering any questions they may have about a career in the field.
- 2018 **Be A Scientist**, Worked with students at local middle schools for 6 weeks to design and conduct science experiments and foster critical thinking skills