Omar A. Ashour

Curriculum Vitae

Physics Department
Birge Hall
ashour@berkeley.edu
www.omarashour.com
oashour *oashour*

Education

2019 – **Doctor of Philosophy, Physics**.
University of California, Berkeley

Advisor: Sinéad Griffin

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.: TBΠ, HKN, ΦΚΦ

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

Advisors: Siu A. Chin, Milivoj R. Belić

Publications

2021 **Omar A. Ashour**, Siu A. Chin, Stanko N. Nikolić, and Milivoj R. Belić. Higher-order breathers as quasi-rogue waves on a periodic background. *arXiv*, page arXiv:1810.02887v2, 2021.

2021 **Omar A. Ashour**. NonlinearSchrodinger: Higher-order algorithms and Darboux transformations for nonlinear Schrödinger equations. *arXiv*, page arXiv:2103.14469, 2021.

2021 Thais Chagas*, **Omar A. Ashour***, Guilherme Ribeiro, Wendell Silva, Zhenglu Li, Rogério Magalhães-Paniago, and Yves Petroff. Multiple strong topological gaps and hexagonal warping in Bi_4Te_3. *Under Review*, 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

2019 – 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. Cin, 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

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