Alejandro R. Urzúa

Curriculum Vitæ

Personal Data

Place and Date of Birth:	Cuautla, Morelos. México | 02 July 1989
Professional Address:	Luis Enrique Erro #1, Tonantzintla, Puebla. México
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Education

November 2020	Doctor of Philosophy in Physics **National Institute of Astrophysics, Optics and Electronics** Thesis: "Analysis of classical and quantum time-dependent systems" | Advisor: Héctor Manuel Moya-Cessa
January 2016	Master of Science in Physical Sciences **Autonomus National University of México** Thesis: "Rotations and gyrations in Cartesian rectangular screens" | Advisor: Kurt Bernardo Wolf
December 2011	Bachelor in Mechanical Engineering **Universidad Autónoma del Estado de Morelos** Thesis: "Signal analysis in phase-space" | Advisor: Kurt Bernardo Wolf

Publications

[1] Alejandro R. Urzúa and Kurt Bernardo Wolf. Unitary rotation and gyration of pixelated images on rectangular screens. *Journal of the Optical Society of America A*, 33(4):642, March 2016. doi:10.1364/josaa.33.000642.

[2] Alejandro R. Urzúa and Kurt Bernardo Wolf. The u(2) fourier group for rectangular pixellated images. In *Physical and Mathematical Aspects of Symmetries*, pages 367–373. Springer International Publishing, 2017. doi:10.1007/978-3-319-69164-0_55.

[3] Irán Ramos-Prieto, Alejandro R. Urzúa-Pineda, Francisco Soto-Eguibar, and Héctor M. Moya-Cessa. KvN mechanics approach to the time-dependent frequency harmonic oscillator. *Scientific Reports*, 8(1), May 2018. doi:10.1038/s41598-018-26759-w.

[4] Alejandro R. Urzúa, Irán Ramos-Prieto, Manuel Fernández-Guasti, and Héctor M. Moya-Cessa. Solution to the time-dependent coupled harmonic oscillators hamiltonian with arbitrary interactions. *Quantum Reports*, 1(1):82–90, July 2019. doi:10.3390/quantum1010009.

[5] Alejandro R. Urzúa, Irán Ramos-Prieto, Francisco Soto-Eguibar, Víctor Arrizón, and Héctor M. Moya-Cessa. Light propagation in inhomogeneous media, coupled quantum harmonic oscillators and phase transitions. *Scientific Reports*, 9(1), November 2019. doi:10.1038/s41598-019-53024-5.

[6] Alejandro R. Urzúa, Irán Ramos-Prieto, Francisco Soto-Eguibar, and Héctor Moya-Cessa. Dynamical analysis of mass–spring models using lie algebraic methods. *Physica A: Statistical Mechanics and its Applications*, 540:123193, February 2020. doi:10.1016/j.physa.2019.123193.

[7] I Ramos-Prieto, A R Urzúa, M Fernández-Guasti, and H M Moya-Cessa. Ermakov-lewis invariant for two coupled oscillators. *Journal of Physics: Conference Series*, 1540:012009, April 2020. doi:10.1088/1742-6596/1540/1/012009.

Research interests

Finite and discrete optical systems, harmonic analysis, phase-space distributions, time frequency signal analysis, Lie algebras and groups, Fourier analysis, quantum optics, special functions and integral transforms, quantum-classical analogies, time-dependent systems

Work Experience

May 2011 - December 2013	Undergraduate Research Assistant *Instituto de Ciencias Físicas, UNAM*
August 2014 - June 2016	Classroom Teacher *Facultad de Ciencias Químicas e Ingenería* Differential equations for Engineers
September 2019 -	Classroom Teacher *Tec de Oriente* Introductory Physics for Forensic Sciences

Languages

Spanish: Native
English: Advanced | TOEFL ITP 579 points, 2019

Computational Skills

Julia	Advanced Expertise *Development of codes, script and algorithms with improved performance*
Mathematica	Advanced Expertise *Development of codes, script and algorithms with middle performance*
Python	Medium Expertise *Development of codes, script and algorithms with middle performance*
Linux	Advanced Expertise *Setup of running PC with Linux OS and computational packages*

Associations and affiliations

- Student member of the Americal Physical Society
  February 2010 - February 2011
- Student member of the Sociedad Mexicana de Física
  September 2014 - December 2020
- Student member of the SPIE
  January 2016 - January 2019
- Student member of the Optical Society of America
  Mayo 2016 -

Divulgation

- Krötzsch, Guillermo; Uriostegui, Kenan; **Urzúa, Alejandro**; Wolf, Bernardo. *R*otando imágenes pixeladas sin perder información. Revista Hypatia del CCyTEM,**12**, pp. 30-32. (2014)
- Krötzsch, Guillermo; **Urzúa, Alejandro**. *L*as vibraciones como fuentes de información. Revista Hypatia del CCyTEM,**13** (2014)

Web Profiles