

Sebastián C. Carrasco

CONTACT INFORMATION	DEVCOM Army Research Laboratory 2800 Powder Mill Rd Adelphi, MD 20783	seba.carrasco.m@gmail.com
EDUCATION	Universidad de Chile (Santiago, Chile) Ph.D. in Physics Dissertation: <i>Control of a quantum system using time-dependent potentials</i>	2016 – 2020
	Universidad de Chile (Santiago, Chile) B.S. <i>summa cum laude</i> in Physics	2012 – 2015
EMPLOYMENT	DEVCOM Army Research Laboratory (Adelphi, MD) Postdoctoral Fellow	2021 – Present
HONORS	Best Thesis Award, Universidad de Chile (Ph.D. in Physics) CONICYT Fellowship (Ph.D. in Physics) Ranked #1 among graduating class (B.S. in Physics) Universidad de Chile Scholarship (B.S. in Physics) Ranked #1 in admission process (B.S. in Physics)	
PUBLICATIONS	Michael H. Goerz, Sebastián C. Carrasco , and Vladimir S. Malinovsky, “GRAPE.jl: Gradient Ascent Pulse Engineering in Julia.” <i>The Journal of Open Source Software</i> 10(115), 8813 (2025). Zhifan Zhou, Sebastián C. Carrasco , Christian Sanner, Vladimir S. Malinovsky, and Ron Folman, “Geometric phase amplification in a clock interferometer for enhanced metrology.” <i>Science Advances</i> 11 (18), eadr6893 (2025). Sebastián C. Carrasco , Sean Lourette, Ignacio Sola, Vladimir S. Malinovsky, “Dynamically Enhanced Two-Photon Spectroscopy.” <i>Phys. Rev. Lett.</i> 134, 163601 (2025). Nikolas N. Encina, Sebastián C. Carrasco , Max Ramirez, José Rogan, Juan Alejandro Valdivia, “Unbiased evacuations processes using a reinforcement learning approach.” <i>Chaos, Solitons & Fractals</i> 191, 115924 (2025). Jner Tzern Oon, Sebastián C. Carrasco , Connor A. Hart, George Witt, Vladimir S. Malinovsky, and Ronald Walsworth, “Beyond Average Hamiltonian Theory for Quantum Sensing.” preprint arXiv:2410.04296 (2024). Tomás P. Espinoza, Sebastián C. Carrasco , José Rogan, Juan Alejandro Valdivia, and Vladimir S. Malinovsky, “Quantum enhancement of spoofing detection with squeezed states of light.” <i>Phys. Rev. Research</i> 6, 043214 (2024). Sean Lourette, Andrey Jarmola, Jabir Chathanathil, Sebastián C. Carrasco , Dmitry Budker, Svetlana A. Malinovskaya, A Glen Birdwell, Tony Ivanov, and Vladimir S. Malinovsky, “Ramsey interferometry of nuclear spins in diamond using stimulated Raman adiabatic passage.” <i>Quantum Sci. Technol.</i> 10, 015032 (2024).	

Sebastián Carrasco, Michael H. Goerz, Svetlana Malinovskaya, Vladan Vuletić, Wolfgang Schleich, and Vladimir S. Malinovsky, “Dicke State Generation and Extreme Spin Squeezing via Rapid Adiabatic Passage.” *Phys. Rev. Lett.* 132, 153603 (2024).

Bineet Dash, Michael H. Goerz, Alisher Duspayev, **Sebastián C. Carrasco**, Vladimir S. Malinovsky, and Georg Raithel, “Rotation sensing using tractor atom interferometry.” *AVS Quantum Sci.* 6(1) (2024).

- Featured Article; Issue cover

Nicolás Z. Lizama, **Sebastián C. Carrasco**, José Rogan, and Juan Alejandro Valdivia, “Three-dimensional non-approximate Coulomb interaction between two trapped quantum particles.” *Sci. Rep.* 13 (1), 18210 (2023).

Georg Raithel, Alisher Duspayev, Bineet Dash, **Sebastián C. Carrasco**, Michael H. Goerz, Vladan Vuletic, and Vladimir S. Malinovsky, “Principles of tractor atom interferometry.” *Adv. Quantum Technol.* 8(1), 014001 (2022).

Pablo Medina, **Sebastián C. Carrasco**, Maria Sara Jofre, José Rogan, and Juan Alejandro Valdivia, “Characterizing diffusion processes in city traffic.” *Chaos, Solitons & Fractals* 165, 112846 (2022).

Pablo Medina, **Sebastián Carrasco**, Paulina Correa-Burrows, José Rogan, and Juan Alejandro Valdivia, “Nontrivial and anomalous transport on weighted complex networks.” *Commun. Nonlinear Sci. Numer. Simul.* 114, 106684 (2022).

Ignacio R. Sola, Bo Y. Chang, Svetlana Malinovskaya, **Sebastián C. Carrasco**, and Vladimir S. Malinovsky, “Stimulated Raman adiabatic passage with trains of weak pulses.” *J. Phys. B: At. Mol. Opt. Phys* 55, 234002 (2022).

Sebastián C. Carrasco, Michael H. Goerz, Zeyang Li, Simone Colombo, Vladan Vuletić, and Vladimir S. Malinovsky, “Extreme spin squeezing via optimized one-axis twisting and rotations.” *Phys. Rev. Appl.* 17 (6), 064050 (2022).

Michael H. Goerz, **Sebastián C. Carrasco**, and Vladimir S. Malinovsky, “Quantum Optimal Control via Semi-Automatic Differentiation.” *Quantum* 6, 871 (2022).

Sebastián Carrasco, José Rogan, Juan Alejandro Valdivia, Bo Y. Chang, Vladimir S. Malinovsky, and Ignacio R. Sola, “Circularly polarized light-induced potentials and the demise of excited states.” *Phys. Chem. Chem. Phys* 24 (5), 2966-2973 (2022).

Sebastián Carrasco, Pablo Medina, José Rogan, and Juan Alejandro Valdivia, “Simulating the city traffic complexity induced by traffic light periods.” *Chaos* 31 (4), 043111 (2021).

Sebastián Carrasco, Pablo Medina, José Rogan, and Juan Alejandro Valdivia, “Simulations suggest that navigation software may not be as efficient as expected for city traffic.” *Chaos* 31 (3), 033103 (2021).

Sebastián Carrasco, José Rogan, Juan Alejandro Valdivia, and Ignacio R. Sola, “Anti-alignment driven dynamics in the excited states of molecules under strong fields.” *Phys. Chem. Chem. Phys* 23 (3), 1936-1942 (2021).

- Selected as “Hot Article”

Pablo Medina, **Sebastián Carrasco**, José Rogan, Felipe Montes, José D. Meisel, Pablo Lemoine, Carlos Lago Peñas, and Juan Alejandro Valdivia, “Is a social network approach relevant to football results?” *Chaos, Solitons & Fractals* 10, 15498 (2021).

Sohyoun Yun-Cárcamo, **Sebastián Carrasco**, José Rogan, Paulina Correa-Burrows, and Juan Alejandro Valdivia, “Stability and robustness of asymptotic autocatalytic systems.” *Sci. Rep.* 10, 15498 (2020).

Sebastián Carrasco, Pablo Medina, José Rogan, and Juan Alejandro Valdivia, “Does following optimized routes for single cars improve car routing?” *Chaos* 30, 063148 (2020).

Sebastián Carrasco, José Rogan, and Juan Alejandro Valdivia, “Speeding up maximum population transfer in periodically driven multi-level quantum systems.” *Sci. Rep.* 9, 16270 (2019).

Sebastián Carrasco, José Rogan, and Juan Alejandro Valdivia, “Simplification of the molecular dynamics that preserves thermodynamics.” *Phys. Rev. E* 98, 063308 (2018).

Sebastián Carrasco, José Rogan, and Juan Alejandro Valdivia, “Controlling the quantum state with a time varying potential.” *Scientific reports* 7 (1), 13217 (2017).

Sebastián Carrasco, Alejandro Varas, José Rogan, Miguel Kiwi, and Juan Alejandro Valdivia, “Multibody expansion of particle interactions: How many-body is a particular element in a cluster.” *Phys. Rev. B* 94, 075435 (2016).

INVITED PRESENTATIONS	“Dynamical population suppression for quantum computing and sensors.” Universidad de Chile, Seminar	11/2025
	“Two-Photon Excitation and Perfectly Entangling Gates via Dynamical Elimination.” Quantum Optics and Solid State, QUOST IX	11/2025
	“Enhanced Two-Photon Excitation via Dynamical Elimination.” Hot topic session , Quantum Control of Light and Matter, Gordon Research Conference	08/2025
	“Enhancing Quantum Sensing using Quantum Control Techniques.” Jorge O. Sofo’s Group, Penn State, Seminar	03/2025
	“Unlocking Peak Performance in Quantum Sensing via Quantum Control.” University of Michigan, Ann Arbor, Seminar	10/2024
	“Quantum control for atomic clocks and interferometers.” QuSantiago II	01/2024
	“Fast Tractor Atom Interferometry Enhanced by Optimal Quantum Control.” The 53rd Winter Colloquium on the Physics of Quantum Electronics	01/2024
	“Quantum control of Dicke states.” SPIE Quantum West	01/2023
	“Quantum Optimal Control of the Tractor Atomic Interferometer Tractor Atomic Interferometer.” Universidad de Chile, Seminar	11/2022

“Schrödinger-cat state generation and generalized Ramsey interferometry.” The 51st Winter Colloquium on the Physics of Quantum Electronics	01/2022
“Schrödinger-cat state generation and generalized Ramsey interferometry.” SPIE Quantum West	01/2022
“Dynamical trapping through harmonic breathing.” Quantum Control Group Seminar, Universidad Complutense de Madrid, Spain	12/2019

TEACHING

Teaching assistant at Universidad de Chile

Electromagnetism	Fall 2014
Programming and Numerical Methods	Spring 2014
Electromagnetism	Fall 2015
Mathematical Methods for Physics (PgDip: Fundamentals of Physics)	Fall 2015
Programming and Numerical Methods	Spring 2015
Classical Mechanics (PgDip: Fundamentals of Physics)	Spring 2015
Electromagnetism (PgDip: Fundamentals of Physics)	Spring 2015
Mechanics	Fall 2016
Classical Mechanics (graduate level)	Spring 2016
Programming and Numerical Methods	Spring 2016
Electrodynamics (graduate level)	Fall 2017
Electromagnetism	Fall 2017
Mathematical Methods for Physics (PgDip: Fundamentals of Physics)	Fall 2017
Mathematical Methods for Physics II (PgDip: Fundamentals of Physics)	Spring 2017
Classical Mechanics (graduate level)	Spring 2017
Programming and Numerical Methods	Spring 2017
Electromagnetism (PgDip: Fundamentals of Physics)	Spring 2018
Quantum Mechanics I (graduate level)	Spring 2019
Quantum Mechanics II (graduate level)	Fall 2019
Electromagnetism	Spring 2020
Electromagnetism (PgDip: Fundamentals of Physics)	Spring 2020

Lecturer at Universidad de Chile

Electrodynamics (graduate level, substituting 25% of the class)	Fall 2017
Mathematical Methods for Physics (PgDip: Fundamentals of Physics)	Fall 2021
Programming and Numerical Methods (guest lecture)	Spring 2022
Optics (PgDip: Fundamentals of Physics)	Fall 2024

Co-advisor at Universidad de Chile

N.Z. Lizama, “Study of two quantum particles in ultra cold optical traps.” M.S. in Physics.	2022 – 2024
T.P. Espinoza, “Quantum advantage for spoofing detection.” M.S. in Physics.	2023 – 2025

SERVICE

Reviewer for *Nature*, *Quantum*, *SciPost Physics*, *Phys. Rev. X*, *Phys. Rev. Lett.*, *Phys. Rev. Research*, *Phys. Rev. A*, *Chaos: An Interdisciplinary Journal of Nonlinear Science*, *Quantum Machine Intelligence*, *Journal of Physics D: Applied Physics*, and *Physica A*.