

J ISAAC GARCIA

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EDUCATION

Auburn University

Ph.D., Physics
Department of Physics

August 2019 – December 2025

Overall GPA: 3.78

University of Texas - San Antonio

B.S., Physics
Department of Physics and Astronomy

August 2017 – May 2019

Overall GPA: 3.81

San Antonio Community College

A.S., General Science

August 2015 – May 2017

RESEARCH EXPERIENCE

Auburn University,

Atomic, Molecular and Optical Physics Group

Auburn, Alabama

May 2020 – December 2025

- **PI:** Dr. Stuart Loch
- **Project:** An Algorithmic Approach to Ion Structure and Dynamics in Astrophysical and Laboratory Plasmas
- **Contributions:**
 1. Development of a decision tree learning algorithm for dimensional reduction of the configuration interaction method of computing atomic structure.
 2. Derivation and development of analytical methods for supporting the algorithm including a criterion for the validity of Fermi's Golden Rule, a method for N-particle angular momentum coupling, and a theorem showing invariance of optimum configuration sets within an isoelectronic sequence.
 3. Collaboration with the experimental group CRYRING@ESR for benchmark data

University of Texas - San Antonio,

MEMS Lab

San Antonio, Texas

January 2019 – July 2019

- **PI:** Dr Arturo Ayon
- **Project:** Characterization and chemisorption of silicon based quantum dots onto a silicon substrate
- **Contributions:**
 1. Determining the chemical structure of silicon based quantum dots using spectroscopic methods.
 2. Development of a practical method of adsorption onto a silicon substrate for use in solar cells.

University of Texas - San Antonio,

Nanophotonics and Plasmonics Group

San Antonio, Texas

January 2018 – May 2019

- **PI:** Dr Nicolas Large
- **Project:** Time Domain χ^2 model for second harmonic generation in plasmonic metals
- **Contributions:**
 1. Extended the Lumerical FDTD Maxwell solver to model second harmonic generation via a time-domain χ^2 formulation.

PUBLICATIONS

Garcia, J. I., Chilen, C., Garbe, E. F., Stancil, P. C., Fontes, C. J., Fogle, M., Loch, S. D.
"A configuration interaction decision tree algorithm to improve dielectronic recombination rates in low temperature photoionized plasmas"
Astrophysical Journal (in review, expected 2026)

CONFERENCE CONTRIBUTIONS

ICPEAC2025, Poster: J Isaac Garcia, Clayton Chilen, M Fogle, C J Fontes, S D Loch, "A decision tree algorithm to improve core-excited autoionizing levels for computing dielectronic recombination rates"

AAS246, Poster: J Isaac Garcia, Clayton Chilen, M Fogle, C J Fontes, S D Loch, "A decision tree optimization algorithm for improving low temperature DR rates in astrophysical plasmas"

DPP2024, Contributed Talk; J Isaac Garcia, Stuart Loch, Michael Fogle, Clayton Chilen, Phillip Stancil, Evan Garbe, "A decision tree algorithm for calculating dielectronic recombination rates in low temperature astrophysical plasmas"

AAS244, Poster: J Isaac Garcia, S D Loch, M Fogle, N Sterling, "A decision tree algorithm for calculating low temperature DR rates in photoionized astrophysical plasmas"

AAS242, Poster: J Isaac Garcia, Stuart Loch, Michael Fogle, Nicholas Sterling, "Improved algorithms for calculating low temperature dielectronic recombination rate" coefficients in photoionized astrophysical plasmas

GEC2021, Presentation: J Isaac Garcia, Stuart Loch, Michael Fogle, "The Problem of Low Temperature Dielectronic Recombination: A joint theoretical and experimental approach"

ICPEAC2021, Poster: J Isaac Garcia, Stuart Loch, Michael Fogle, "An investigation into low temperature dielectronic recombination rate coefficients"

INSTRUMENTATION AND CODING

Programming languages: Python, Fortran, Bash, C, Matlab, Tcl, LaTeX

Spectroscopy: FTIR, UV-Vis, NMR

Other Instrumentation: Atomic Force Microscope, Plasma Etching, RCA Cleaning Silicon Wafers, Spin Coating

LEADERSHIP AND SERVICE

President, Society of Physics Students, San Antonio Community College *Fall 2016 – Spring 2017*
Reestablished an inactive SPS chapter through coordination with faculty and the national SPS organization.

HONORS AND AWARDS

Auburn University Outstanding Graduate Research Assistant	<i>Spring 2024</i>
UTSA College of Sciences Honors	<i>Spring 2019</i>
UTSA Magna Cum Laude Graduate	<i>Spring 2019</i>
University of Texas at San Antonio General Scholarship	<i>Spring 2018</i>
Retaining Emerging Alamo College Talent in STEM (REACT-STEM)	<i>Fall 2017</i>
San Antonio Community College: Outstanding Leadership	<i>Spring 2017</i>
San Antonio Community College: Excellence in Writing	<i>Spring 2017</i>
3rd Place Internationally Shell Eco Marathon, Hydrogen Fuel Cell Category	<i>Spring 2017</i>