

Maximiliano Zorondo Barros

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Languages: Spanish, English

c++, bash, L^AT_EX, python

Education

Jan 2024– Ongoing **Università Cattolica del Sacro Cuore,**
Innovation and Management, Ph.D..

- Research interest: Effects on entrepreneurship and innovation of the introduction of a Universal Basic Income in a community

Mar 2021 **Universidad de Chile,**
Physics, M.Sc..

- Developed a statistical mechanical model of the scattering of electromagnetic waves (Thomson Scattering) from a nonequilibrium plasma
- Designed an experimental setup for Thomson Scattering in a Plasma Focus discharge of hundreds of joules
- Studied feasibility of determining the complete velocity distribution in a Plasma Focus
- Characterized a Plasma Focus discharge at the Research Center on the Intersection in Plasma Physics, Matter and Complexity (P2mc) using refractive optical diagnostics, soft X-rays images and electrical diagnostics

Dec 2015 **Universidad de Chile,**
Physics, B.Sc..

- Studied the solar activity through sunspot evolution using complex networks

Experience

Mar 2015– Ongoing **Research Assistant,** *Research Center on the Intersection in Plasma Physics, Matter and Complexity (P2mc), Chilean Nuclear Energy Commission.*

- Characterized for the first time the complete fast dynamics of Multipurpose Generator in Plasma Focus configuration on a regime of high total neutron output through shadowgraphy
- Implemented simultaneous Mach-Zehnder interferometer and shadowgraphy in Multipurpose Generator Plasma Focus device
- Characterized neutron emission of Multipurpose Generator Plasma Focus device
- Calibrated Rogowski coil through anomalous short circuit $\dot{I}(t)$ signals by automating fitting routine and analysis of large amount of datasets
- Optimized Multipurpose Generator in Plasma Focus configuration for high total neutron output regime
- Modeled analytically and numerically a Plasma Focus electric circuit adding parasitic capacitor
- Tested experimentally and numerically Moiré deflectometry to implement it as optical diagnostic in Plasma Focus device

Mar 2021– Sep 2021 **Research Assistant,** *Faculty of Science, University of Chile.*

- Constructed and validated content of multimodal analytical rubric for assessing the quality of a laboratory physics report

Jan 2015 **Summer Intern,** *Optics and Plasma Physics Group, Institute of Physics, Pontifical Catholic University of Chile.*

- Experimentally studied the effect of transversal magnetic field on laser-generated plasma plume

Aug 2014– Dec 2014 **Intern,** *Non-linear Optics Group, Faculty of Science, University of Chile.*

- Experimentally studied Mach-Zehnder and Michelson interferometers

Mar 2014– Dec 2014 **Intern,** *Group of Complex Systems, Faculty of Science, University of Chile.*

- Developed cellular automaton simulations of cars in a street intersection and of the spread of diseases

Publications

- Pavez, C., Zorondo, M., Pedreros, J., Sepúlveda, A., Soto, L., Avaria, G., Bora, B., & Jain, J. (2022). New evidence about the nature of plasma filaments in plasma accelerators of type plasma-focus. *Plasma Physics and Controlled Fusion*, **65**(1), 015003.
- Zorondo, M., Pavez, C., & Muñoz, V. (2022). Model of Thomson scattering from z-pinch plasma: Application in experimental design for Plasma Focus. *Results in Physics*, **40**, 105831.

- Bruzzone, H., Acuña, H., Barbaglia, M., Clause, A., Milanese, M., Pavez, C., Avaria, G., Pedreros, J., Sepúlveda, A., Rojas, C., Zorondo, M., & Soto, L. (2018). Physical reasoning to synchronize electrical signals and related diagnostics in plasma focus devices. *Journal of Fusion Energy*, **37**, 45-50.

Teaching Experience

Lecturer

- Spr 2022 **Advanced Experimental Methods**, *Faculty of Science, Metropolitan University of Educational Sciences.*
- As a result of the course, two groups of students under my guidance presented posters at the XXIII Simposio de la Sociedad Chilena de Física conference

Teaching Associate

- Spr 2016 **Mathematical Methods for Physics II**, *Faculty of Sciences, University of Chile.*
- Aut 2016 **Advanced Programing and Numerical Methods**, *Faculty of Sciences, University of Chile.*
- Aut 2015 **Advanced Programing and Numerical Methods**, *Faculty of Sciences, University of Chile.*
- Spr 2014 **Programing and Numerical Methods**, *Faculty of Sciences, University of Chile.*
- Spr 2013 **Programing and Numerical Methods**, *Faculty of Sciences, University of Chile.*

Teaching Assistant

- Spr 2020 **Experimental Methods for Electromagnetism**, *Vice presidency of Academic Affairs, University of Chile.*
- Aut 2020 **Experimental Methods for Mechanics**, *Vice presidency of Academic Affairs, University of Chile.*
- Spr 2018 **Experimental Methods for Mechanics**, *Faculty of Sciences, University of Chile.*
- Aut 2018 **Experimental Methods for Optics**, *Faculty of Sciences, University of Chile.*
- Spr 2017 **Experimental Methods for Mechanics**, *Faculty of Sciences, University of Chile.*
- Spr 2017 **Experimental Methods for Mechanics**, *Vice presidency of Academic Affairs, University of Chile.*
- Aut 2017 **Experimental Methods for Mechanics II**, *Faculty of Sciences, University of Chile.*
- Aut 2016 **Calculus of Several Variables**, *Department of Mathematics and Engineering Sciences, Bernardo O'Higgins University.*
- Aut 2016 **Calculus II**, *Department of Mathematics and Engineering Sciences, Bernardo O'Higgins University.*
- Aut 2016 **Algebra I**, *Department of Mathematics and Engineering Sciences, Bernardo O'Higgins University.*

Conferences

Oral

- Dec 2021 **Thomson Scattering Model for Z-pinch Plasma: Experimental Design for Implementation in Plasma Focus**, M. Zorondo, C. Pavez, and V. Muñoz. *14th International Conference on Plasma Science and Applications*, Online.
- Dec 2021 **Dynamic characteristics of a low-energy plasma focus discharge on a regime of high total neutron output**, C. Pavez, M. Zorondo, A. Sepúlveda, J. Pedreros, G. Avaria, J. Moreno, B. Bora, S. Davis, J. Jain, and L. Soto. *14th International Conference on Plasma Science and Applications*, Online.
- Dec 2021 **Low energy Plasma focus discharges in a high efficient neutron production regime**, C. Pavez, J. Pedreros, M. Zorondo, A. Sepúlveda, L. Orellana, J. Jain, J. Moreno, S. Davis, G. Avaria, B. Bora, L. Soto, F. Molina, B. Parra, J. Romero-Barrintos, and A. Tarifeño-Saldivia. *IEEE Pulsed Power Conference & Symposium of Fusion Engineering*, Online.
- Nov 2020 **Modelo de dispersión de radiación de Thomson para Plasma Focus [Thomson Scattering Model for Plasma Focus]**, M. Zorondo, C. Pavez, and V. Muñoz. *XXII Simposio de la Sociedad Chilena de Física*, Online.
- Nov 2020 **Efectos refractivos de objetos de axisimétricos: Estudio comparativo usando teoría de rayos y teoría de difracción [Refractive effects of axisymmetric objects: Comparative study using ray and diffraction theories]**, J. Pedreros, C. Pavez, M. Zorondo, G. Avaria, J. Moreno, B. Bora, S. Davis, J. Jain, and L. Soto. *XXII Simposio de la Sociedad Chilena de Física*, Online.

- Nov 2020 **Neutron spectroscopy of a pulsed (d,d) reaction in the Multipurpose Plasma Generator device at CCHEN**, [F. Molina](#), B. Parra, A. Tarifeño-Saldivia, C. Pavez, P. Aguilera, L. Orellana, M. Zorondo, G. Avaria, F. López-Usquiano, J. Romero-Barrientos, A. Ruiz, M. Zambra, B. Bora, S. Davis, J. Jain, J. Moreno, L. Soto, and H. F. Arellano. *XXII Simposio de la Sociedad Chilena de Física*, Online.
- Nov 2020 **Caracterización de la dinámica de una lámina de corriente en un acelerador coaxial de plasma: Simulaciones y experimentos [*Dynamic characterization of a current sheet in a coaxial plasma accelerator: Simulation and experiments*]**, [C. Pavez](#), A. Sepúlveda, J. Pedreros, M. Zorondo, G. Avaria, J. Moreno, B. Bora, S. Davis, J. Jain, L. Soto, and A. Clause. *XXII Simposio de la Sociedad Chilena de Física*, Online.
- Nov 2018 **Filamentaciones de Plasma en Aceleradores de Plasma Tipo Plasma Foco: Origen y Evolución [*Plasma filaments in plasma accelerators of the Plasma Focus type: Origin and Evolution*]**, [C. Pavez](#), A. Sepúlveda, J. Pedreros, M. Zorondo, G. Avaria, J. Moreno, B. Bora, S. Davis, J. Jain, and L. Soto. *XXI Simposio de la Sociedad Chilena de Física*, Antofagasta, Chile.
- Dec 2016 **Characterization of a plasma focus discharge under different regimes of input power density**, [A. Sepúlveda](#), C. Rojas, M. Zorondo, J. Pedreros, C. Pavez C, H. Bruzzone, J. Moreno, B. Bora, S. Davis, M. Inestrosa-Izurieta, and L. Soto. *XX Simposio de la Sociedad Chilena de Física*, Santiago, Chile.
- Dec 2016 **Three-frame Digital Interferometry Using a Single Digital Record System**, [J. Pedreros](#), M. Zorondo, C. Pavez, G. Avaria, and L. Soto. *XX Simposio de la Sociedad Chilena de Física*, Santiago, Chile.
- Poster
- Nov 2023 **Mirando el mundo a través de un pequeño agujero: Experimento ilustrativo para educación media de formación de imágenes a través de una cámara oscura [*Looking at the world through a pinhole: Camera obscura illustrative experiment for high school students*]**, [S. Carrasco Basso](#), [F. Pardo Aránguiz](#), M. Zorondo, C. Pavez, and D. López. *XXIII Simposio de la Sociedad Chilena de Física*, Valparaíso, Chile.
- Nov 2023 **Experimento ilustrativo para educación media de las características refractivas de elementos translúcidos [*Illustrative experiment for high school students on the refractive characteristics of translucent materials*]**, [A. López Monsalve](#), [D. Valenzuela Abarca](#), M. Zorondo, and C. Pavez. *XXIII Simposio de la Sociedad Chilena de Física*, Valparaíso, Chile.
- Nov 2018 **Dinámica y emisión de una descarga Plasma Focus: Escalamiento en rango extendido de densidad de potencia de entrada [*Dynamic and Emission of a Plasma Focus Discharge: Scaling on Extended Range of Power Input*]**, [M. Zorondo](#), C. Pavez, A. Sepúlveda, J. Pedreros, G. Avaria, J. Moreno and L. Soto. *XXI Simposio de la Sociedad Chilena de Física*, Antofagasta, Chile.
- Nov 2014 **Estudio de actividad solar usando redes complejas [*Study of Solar Activity Using Complex Networks*]**, [M. Zorondo](#) and V. Muñoz. *XIX Simposio de la Sociedad Chilena de Física*, Concepción, Chile.