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Postdoctoral Research Opportunities at the Institute of Physics, Pontificia Universidad Católica de Chile

The Institute of Physics at the Pontificia Universidad Católica de Chile (ranked 1st in the QS Latin American Rankings and top 100 in the QS World University Rankings) invites applications from outstanding researchers in experimental and theoretical physics for the FONDECYT Postdoctoral Research Grant 2027 (see: https://anid.cl/concursos/concurso-fondecyt-de-postdoctorado-2027/). The application call is expected to open in July 2026. Interested applicants should consult the ANID website for the official call schedule and eligibility requirements once the competition is announced.Based on previous calls, applicants are expected to have obtained their PhD within the eligibility period specified by ANID. Final eligibility requirements will be confirmed in the official 2027 call.

We welcome applicants with the ability to work in a multicultural environment and be part of an interdisciplinary team. Knowledge of Spanish is an asset but is not essential. Successful candidates will be expected to conduct high-quality research, publish in peer-reviewed journal articles, present at scientific meetings, and contribute to the preparation of research proposals.

The FONDECYT Postdoctoral Research Grant provides a gross annual salary of approximately USD 28,000, with additional funding of up to USD 4,600 per year for travel and/or operational expenses. For scientists residing abroad at the time the call results are announced, a one-time settlement allowance of approximately USD 3,000 is also included.

Each application must be sponsored by a faculty member from our university. Prospective applicants are encouraged to contact potential faculty sponsors early to discuss research interests and prepare a competitive FONDECYT proposal. While the current research lines are listed below, applicants with original research ideas that align with a faculty member's expertise are also welcome (visit the academic profiles at https://fisica.uc.cl/planta-academica/cuerpo-docente/)The Institute of Physics is committed to supporting successful candidates throughout their transition to Chile. We provide guidance before and after arrival, helping international researchers navigate the relocation process, administrative procedures, and their integration into the University and life in Santiago. Our goal is to ensure that new postdoctoral researchers can quickly become part of our vibrant academic community.

Area	Title and description	Sponsor
Experimental condensed matter	**Experimental Surface and Interface Physics: High-Vacuum Deposition and Multiscale Characterization of Soft-Matter Thin Films** We aim to investigate the fundamental physics and technological applications of soft-matter thin films and interfaces prepared by high-vacuum deposition, combining controlled solvent-free fabrication with multiscale characterization by atomic force microscopy, high-resolution and imaging ellipsometry, scanning electron microscopy, and complementary surface-analysis techniques.	Ulrich Volkmann volkmann@uc.cl https://fisica.uc.cl/en/academico/ulrich-volkmann-2/
	Hybrid nanomaterials and thin layers for technological application Our group works in surface science and nanotechnology, developing hybrid nanomaterials, thin films, and functional surfaces and studying their physical and chemical properties with advanced experimental techniques. We explore their use as photocatalysts for green hydrogen and green ammonia production, as gas sensors, and as electrodes for lithium-ion batteries. This position is open to any of these research lines, though we are particularly interested in advancing the fabrication of perovskite-	Samuel Hevia sheviaz@uc.cl https://fisica.uc.cl/en/academico/samuel-hevia-2/

	based photoanodes for efficient hydrogen production by solar-driven saltwater splitting.	
Theoretical condensed matter	**Computational Modeling and Electrocatalysis for Nitrogen Reduction: Methods and Applications:** This research focuses on leveraging advanced computational tools to investigate and model the catalytic behavior of surfaces and nanostructures, with a strong emphasis on electrocatalysis applications. The project specifically aims to develop and apply cutting-edge methods to simulate ion and electron transport at electrode interfaces, with a particular focus on nitrogen reduction to ammonia. Additionally, the candidate will employ ab-initio techniques to gain deeper insights into catalytic processes across different surfaces. The selected candidate will collaborate closely with leading researchers at the Millennium Institute on Green Ammonia (MIGA), contributing to the modeling and prediction of experimental outcomes related to green ammonia and hydrazine production, which are currently being explored at the institute. This research provides a unique opportunity to integrate computational approaches with	José Mejía jmejia@uc.cl https://fisica.uc.cl/en/academico/jose-mejia-2/

	experimental advancements in sustainable chemical processes.	
	Confined interacting living liquid crystals We aim to develop computational and analytical models of living liquid crystals (LLCs)—orientationally ordered biological systems such as bacterial colonies and cellular tissues—across multiple scales. By integrating microscopic agent-based simulations, mesoscopic fluid dynamic methods, and macroscopic continuum equations, our goal is to elucidate the emergence of collective phenomena in these systems. These models will be applied to investigate the dynamics of composite systems—specifically, systems comprising multiple interacting species with distinct orientational orders under confinement—which have been shown to exhibit complex patterns and structures. Additionally, we will apply concepts like geometric frustration and topological defects to gain insights into how mechanical forces influence biochemical signals within cellular systems and to better understand cellular behaviors such as extrusion.	Benjamín Loewe baloewe@uc.cl https://fisica.uc.cl/en/academico/benjamin-loewe-2/

	By combining these interdisciplinary perspectives, our project aims to advance the understanding of confined biological systems, offering potential applications in biosensing and the development of responsive biomaterials.	
Plasma physics	**Laboratory Space Plasmas and Scaled Experiments Using Pulsed Power and Laser Systems:** This position focuses on the design, execution, and diagnostic analysis of scaled laboratory experiments for the study of space plasma processes — such as turbulence and shock formation — using pulsed-power and laser-produced plasmas. The project emphasizes experimental design and diagnostic development (e.g., Thomson scattering) to connect lab-scale measurements with astrophysical scenarios. We encourage candidates with a strong background in experimental plasma physics or diagnostic development to apply. **Turbulence and Energy Transport in Z-Pinch and Magnetized Target Fusion Plasmas:** We seek a highly motivated postdoctoral researcher to investigate turbulence and energy dynamics in high-energy-density plasmas, with applications to magnetized target fusion	Julio Valenzuela jcvalen1@uc.cl https://fisica.uc.cl/en/academico/julio-valenzuela-2/

	(MTF) and compressional Z-pinch systems. The project involves developing advanced diagnostics — such as Thomson scattering — and data analysis methods using Bayesian inference and machine learning, with the goal of elucidating the role of turbulence in energy equipartition and pressure balance. Experience with experimental plasma physics or data-driven analysis is highly desirable. **Computational Modeling of Pulsed-Power and Laser-Driven Plasmas: MHD and Kinetic Simulations:** This position focuses on the numerical modeling and simulation of high-energy-density plasmas generated in pulsed-power (Z-pinch) and laser-driven experiments, with applications ranging from magnetized target fusion to scaled astrophysical plasma processes. The project involves developing and applying MHD and particle-in-cell (PIC) codes to interpret experimental diagnostics, guide experimental design, and connect laboratory-scale results to turbulence, shock formation, and energy transport in space and fusion-relevant plasmas. We encourage candidates with a strong background in computational plasma physics, code development, or numerical methods	

	(finite-volume/finite-element MHD solvers, explicit or implicit PIC schemes) to apply. Experience collaborating with experimental groups — translating diagnostic data into simulation inputs/validation, or using simulations to inform experimental campaigns — is highly desirable, though not required.	
	Investigating stellar shock dynamics through laboratory experiments Our group works in high-energy-density physics, using Z-pinch experiments on the Llampudken and Gepopu pulsed-power generators together with laser-produced plasmas. This project studies shock formation and plasma outflows from wire-based Z-pinch configurations as well-diagnosed, scalable laboratory analogues of astrophysical shocks, connecting laboratory measurements to phenomena such as supernova remnants and Herbig-Haro objects. We welcome candidates with a background in experimental plasma physics, pulsed power, or plasma diagnostics. **Investigating plasma–liquid interactions and its relevance in the formation of reactive species** This project develops and characterises different non-thermal plasma sources to	Felipe Veloso fveloso@uc.cl https://fisica.uc.cl/en/academico/felipe-veloso-2/

	study plasma-liquid interactions and the formation of reactive oxygen and nitrogen species (RONS), with applications spanning agrifood, environmental, and biomedical processes. The work is strongly interdisciplinary, with collaborations across chemistry and food science. We welcome candidates interested in low-temperature plasma sources, plasma diagnostics, or plasma chemistry.	
	Modeling and control of edge plasma instabilities for high-performance fusion reactors The project aims to investigate the complex interplay between RMPs, plasma rotation, impurity seeding, and MHD stability. The goal is to develop and validate predictive models to guide impurity mitigation strategies for future high-performance fusion reactors. This research will be conducted in collaboration with international experimental tokamak data, connecting simulations directly to experimental observations.	Germán Vogel gvogel@uc.cl https://fisica.uc.cl/en/academico/german-vogel-2/
Mathematics and nonlinear physics	**Ultracold atoms and their applications** We develop and theoretically investigate novel quantum technologies based on ultracold atomic systems and Bose-Einstein	Luis Morales Molina lmoralesl@uc.cl https://fisica.uc.cl/en/academico/luis-morales-2/

	condensates. Our research focuses on emerging applications in atomtronics, quantum sensing, and quantum simulation, advancing both the fundamental understanding of these systems and the design of next-generation quantum devices. We welcome candidates with a background in theoretical or computational quantum and nonlinear physics.	
	Stady of topological phases in interacting (spin or fermionic) systems.	Giuseppe De Nittis https://fisica.uc.cl/en/academico/giuseppe-de-nittis-2/
	Complex Photonic Systems We work in mathematical and nonlinear physics, studying synthetic condensed-matter and photonic systems where **nonlinearity, topology, and dynamical complexity**interact. This project investigates emergent phenomena in nonlinear photonic lattices, including topological states, solitons, and geometric frustration, combining analytical and numerical modelling. We welcome candidates with a background in nonlinear dynamics, photonics, or condensed-matter theory.	Edward Arévalo https://fisica.uc.cl/en/academico/edward-arevalo-2/
Medical physics	Utilization of In Vitro and In Silico Tumor Models to	Beatriz Sánchez Nieto

	Optimize Radiation Therapy Responses: Addressing Hypoxia Challenges and Advancing Personalized Medicine. We work in the field of **radiobiology, tumor hypoxia, and computational modeling of radiation response**. Our research focuses on understanding, both **in vitro and in silico,** how **controlled oxygen production from photosynthetic bioreactors can modulate cellular responses to irradiation under conditions of chronic and acute hypoxia**. The laboratory is equipped with the X-RAD 320 preclinical irradiator (with optical and bioluminescent imaging capabilities) and dedicated laboratory infrastructure for measuring, culturing, and irradiating biological samples under precisely controlled oxygenation conditions. The project will combine quantitative radiobiology, experimental studies in cancer cell models, and mathematical/computational modeling to characterize the impact of photosynthetically generated oxygen on radiation response and tumor reoxygenation dynamics.	https://fisica.uc.cl/en/academico/beatriz-sanchez-2/ Ignacio Espinoza https://fisica.uc.cl/en/academico/ignacio-espinoza-2/

	In silico model to predict cell survival: We develop computational models that predict cell survival by integrating Monte Carlo simulations of radiation transport and DNA damage with machine-learning algorithms, as an alternative strategy to optimise radiotherapy treatment planning. We welcome candidates with a background in medical physics, Monte Carlo methods, or computational modelling.	Andrea Russomando https://fisica.uc.cl/en/academico/andrea-russomando-2/
	Enhancing Therapeutic Response in Photodynamic Therapy: In Vitro and In Vivo Studies We work in biophotonics, the application of light in the life sciences, in the BIOPI laboratory. This project focuses on photodynamic therapy (PDT) and photosynthesis-based therapeutic strategies to improve treatment efficacy against tumour cells and microorganisms through in vitro and in vivo studies. Experimental models include mammalian cell cultures, bacterial and yeast systems, and preclinical animal models such as the chorioallantoic membrane. The position offers opportunities to contribute to multidisciplinary projects at the interface of biophotonics, cancer	Hilde Harb Buzzá https://fisica.uc.cl/en/academico/hilde-buzza-2/

	research, and antimicrobial therapies. We welcome candidates with a background in biophotonics, radiobiology, microbiology, or a related experimental field.	
Quantum optics	**Ultrafast Nonlinear Optical Characterization of Nanomaterials for Photonic Applications** This postdoctoral position focuses on the experimental and theoretical study of the nonlinear optical response of nanomaterials using laser pulses in the femtosecond, picosecond, and nanosecond regimes. The project includes a variety of advanced characterization techniques—such as Z-scan, Optical Kerr Gate (OKG), photoacoustic Z-scan (PAZ-scan), among others—with applications in photoacoustic imaging, random lasers, and optical sensing. The selected candidate will explore the dynamics of nonlinear absorption and refraction in plasmonic and other nanostructured materials, aiming to understand the underlying mechanisms and enhance their performance in nanophotonic systems. The project has a strong experimental focus, but also welcomes applicants with interest or background in modeling nonlinear optical	Melissa Maldonado Melissa.maldonado@uc.cl https://fisica.uc.cl/en/academico/melissa-maldonado-2/

	phenomena, particularly those involving nonlinear propagation in nanostructured media and complex light–matter interactions.	
	Ultrafast Lasers, Nonlinear Optics, and Terahertz Photonics Our experimental research combines ultrafast lasers, nonlinear optics, and quantum optics. Current topics include femtosecond pulse shaping, ultrashort-pulse characterization, spectral broadening, supercontinuum generation, and squeezed light. We develop novel nonlinear materials, including metal–organic framework crystals, for efficient frequency conversion and terahertz generation. We also explore emerging THz applications and ultrafast surface-enhanced Raman spectroscopy.	Birger Seifert bseifert@uc.cl https://fisica.uc.cl/en/academico/birger-seifert-2/ https://fisica.uc.cl/planta-academica/cuerpo-docente/
	Ultra cold atoms for quantum metrology and quantum computation Our experimental program harnesses the unique properties of ultracold atoms to pioneer next-generation quantum technologies, with a dual focus on quantum metrology and quantum information processing. We utilize magneto-optical traps as the foundational platform	Jeronimo Maze jmaze@uc.cl https://fisica.uc.cl/en/academico/jeronimo-maze-2/ https://fisica.uc.cl/planta-academica/cuerpo-docente/

	for producing dense samples of ultracold atoms, which we then transfer into highly configurable optical dipole traps, including optical lattices and tweezers, to achieve single-atom control and tailored potentials.	
	Quantum Information Theory and Quantum Computing We pursue fundamental and applied challenges at the frontiers of quantum information science, spanning quantum measurements, entanglement, quantum state tomography, circuit design, error mitigation, and quantum algorithms, combining analytical theory, numerical simulation, and implementation on quantum computing platforms. A particularly exciting focus is QuAntü, the first quantum computer built in Chile and housed at our Faculty, for which we develop testing and benchmarking protocols, algorithms, applications, and quantum error-correcting codes. We welcome candidates with a background in quantum information theory, quantum computing, or numerical methods.	Dardo Goyeneche https://fisica.uc.cl/en/academico/dardo-goyeneche-2/

We strongly encourage applications from women and underrepresented groups in physics.

Interested candidates should contact the relevant faculty sponsor directly or email postdoc.facfis@uc.cl for assistance.