Curriculum Vitae

Paula Liliana Giraldo Gallo

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Associate Professor
Physics Department, Universidad de Los Andes (Colombia)

ACADEMIC EXPERIENCE & EDUCATION

10/2023 – To date	Associate Professor at the Physics Department, Universidad de Los Andes, Bogotá, Colombia. Principal Investigator of the Quantum Materials Lab at this institution.
01/2019 – 09/2023	Assistant Professor at the Physics Department, Universidad de Los Andes, Bogotá, Colombia. Principal Investigator of the Quantum Materials Lab.
10/2017 – 12/2018	Visiting Professor at the Physics Department, Universidad de Los Andes, Bogotá, Colombia. Teaching and research activities.
07/2015 – 06/2017	Jack E. Crow Postdoctoral Fellow - National High Magnetic Field Laboratory. Projects: *Resonant Ultrasound Spectroscopy in highly correlated materials*; and *Magnetotransport of quantum materials in the ultrahigh field limit.*
09/2009–06/2015	Physics Ph.D - Stanford University. Thesis title: *Phase separation in $BaPb_{1-x}Bi_xO_3$ and Fermiology of hole-doped PbTe: Insights to understand superconductivity in valence-disproportionated systems.*
08/2007–07/2009	Master of Science - Physics, at Universidad de Los Andes, Colombia. Thesis title: *Study of vortex dynamics by means of noise measurement in unconventional superconductors*
01/2002–05/2006	Bachelor in Physics - Universidad de Los Andes, Colombia. Thesis title: *Molecular condensates and their statistical properties (Theory and simulation)*

RESEARCH PROFILE

I lead the Quantum Materials group at Universidad de Los Andes. In our group we are interested in the study of complex and strongly correlated materials for which the competition of different energy scales results in the establishment of novel ground states. We are interested in characterizing and understanding the origin and nature of such ground states, as well as the way of controlling and optimizing their properties by tuning a variety of physical parameters such as temperature, magnetic field, chemical doping, pressure or strain. Some of the phenomena we commonly encounter in the materials we study, that are associated with such novel ground states, are superconductivity, charge density wave disproportionation, valence disproportionation, phase separation (electronic and/or structural), thermoelectricity, ferroic orders, and topological states. We accompany our research program with a material synthesis effort, mainly in the form of single crystals of the highest possible quality, which also gives us the opportunity to chemically manipulate our compounds to optimize their promissing properties.

FELLOWSHIPS AND AWARDS

[1] Elected member of the National High Magnetic Field Laboratory (USA) user's advisory committee, representing the DC facility. 2023 to 2026.

[2] Friends of the Academy (Amigos de la Academia) Award to the Young Colombian Scientist, by the Colombian Academy of Exact, Physical and Natural Sciences. Bogotá, Colombia. August of 2021. Announcement here.

[3] L'oreal-UNESCO For Women In Science- International Rising Talents Award. Paris, France. March of 2020. Announcement here.

[4] Lee-Osheroff-Richardson science award for the Americas, sponsored by Oxford Instruments. USA, March of 2019. Announcement here.

[5] L'oreal-UNESCO For Women In Science Award, Colombia. December of 2018.

[6] Jack E. Crow Postdoctoral Fellowship, National High Magnetic Field Laboratory (NHMFL), Tallahassee, FL, USA. July of 2015.

[7] GCOE - BIEP (Global Center of Excellence - Bilateral International Exchange Program), Kyoto University, Japan. May of 2009.

INVITED TALKS

Here are some selected invited talks:

[1] **ICFO-UNAM-UNIANDES Frontiers Research School, Mexico City, Mexico**. October of 2025. Title: *2D Quantum Materials.*

[2] **100 years of quatum revolution, Medellín, Colombia**. October of 2025. Title: *Fermiology of the charge density wave compound TaTe4 and its signatures of non-trivial topological states.*

[3] **LT30, Bilbao, Spain**. August of 2025. Title: *Fermiology of the charge density wave compound TaTe4 and its signatures of non-trivial topological states.*

[4] **SLAFES XXV, Barranquilla, Colombia**. October of 2024. Title: *Room temperature multiferroicity in solid solutions of TMDs.*

[5] **2D Transition Metal Dichalcogenides Conference, Cambridge, UK**. June of 2023. Title: *Room Teperature Multiferroicity in Transition Metal Dichalcogenides.*

[6] **Mathematical Aspects of Topological Insulators, IMSA, U. of Miami, USA**. April of 2024. Title: *Revealing the electronic structure and topological states of charge density wave compounds.*

[7] **2D Transition Metal Dichalcogenides Conference, Cambridge, UK**. June of 2023. Title: *Room Teperature Multiferroicity in Transition Metal Dichalcogenides.*

[8] **Workshop: Quantum materials and devices at the nanoscale, 2022**. Organized by the European COST Action "Nanoscale coherent hybrid devices for superconducting quantum technologie". Title: *Charge Density Wave Formation In The Quasi-1D Transition Metal Tetrachalcogenides.*

[9] **Harvey Mudd College, USA, Physics Colloquium**. April of 2022. Title: *High Magnetic Fields: a "magnifying glass" to spy on what electrons do!.*

[10] **Women's perspectives in Quantum Materials Webinar, 2021**. Organized by the Journal of Physics: Materials. Title: *Revealing and optimizing the electronic properties of quantum materials.*

[11] **2021 ICFO-UNAM International School on the Frontiers of light – Quantum Challenges**. Title: *Quantum materials in extreme conditions.*

[12] **2021 American Physical Society - APS March Meeting**. Online event. March of 2021. Invited symposium session: "Strange Metal Transport in Cuprates and Fe-based Superconductors". Title: *Scale Invariant Magnetoresistance in a Cuprate Superconductor.*

[13] **California State University - Long Beach, Physics Colloquium**. February of 2021. Title: *High Magnetic Fields: a "magnifying glass" to spy on what electrons do!.*

[14] **Webinar: Quantum materials and light-matter interactions: Kickoff meeting**. Online event, Organized by the "Light-matter interactions in topological nanomaterials: Towards low-consumption information technologies" program, Chile. November of 2020. Title: *Probing Broken Symmetries of Quantum Materials by Resonant Ultrasound Spectroscopy.*

[15] **Convergence Research at High Magnetic Fields Symposium**. Tallahassee, FL, USA. To be given in January of 2020. Title: *Probing Broken Symmetries of Quantum Materials by Resonant Ultrasound Spectroscopy.*

[16] **2019 Materials Research Society (MRS) Fall Meeting**. Boston, MA, USA. To be given in December of 2019. Title: *Probing Broken Symmetries of Quantum Materials by Resonant Ultrasound Spectroscopy.* Invited talk to the special symposium: Predictive Synthesis and Advanced Characterization of Emerging Quantum Materials.

[17] **International Congress of Materials, CIM2019**. Bucaramanga, Colombia. October of 2019. Title: *Quantum materials in extreme conditions.* Plenary session.

[18] **XIX Young researchers meeting, Instituto Nicolás Cabrera, Universidad Autónoma de Madrid**. Madrid, Spain. December of 2016. Title: *Insights to understand superconductivity in valence disproportionated systems.*

[19] **Condensed Matter Seminar, University of Texas - Austin**. Austin, TX, USA. May of 2016. Title: *Fermiology of hole-doped PbTe: Insights to understand superconductivity in a valence disproportionated compound.*

[20] **Quantum Materials Colloquium, Kyoto University**. Kyoto, Japan. May of 2009. Title: *Vortex noise in high-temperature superconductors.*

AWARDED GRANTS/PROJECTS

[1] **MinCiencias, Colombia, 965-2025 call for International Movility - Ecos Nord**. Start date: in 2026. Project: *Electronic structure, topological states, and correlated electronic phases in quasi-one-dimensional transition metal chalcogenides.* In collaboration with professor Andrés Santander-Syro, Universitè Paris-Saclay.

[2] **Banco de la República, Colombia, FPIT call**. Principal Investigator. Start date: March of 2024. Project: *Study of elastic properties of transition metal tetrachalcogenides through RUS.*

[3] **MinCiencias, Colombia, 028-2022 call**. Start date: Febuary of 2024. Project: *Ampliación del uso de la mecánica cuántica desde el punto de vista experimental y su relación con la teoría, generando desarrollos en tecnologías cuánticas útiles para metrología y computación cuántica a nivel nacional.* In collaboration with professors Hervert Vinck (PI) and William Herrera and team in U. Nacional, and a wide team of researchers from other Universities in Colombia.

[4] **Banco de la República, Colombia, FPIT call**. Principal Investigator. Start date: August of 2022. Project: *Optimization of piezoelectric properties in transition metal dichalcogenides via chemical doping.*

[5] **CSIC, Spain. i-COOP+ 2020**. Principal Foreign Investigator. Start date: January of 2021. Project: *Optoelectronic devices based on doped transition metal chalcogenides.* In collaboration with Dr. Andrés Castellanos-Gómez (local CSIC researcher).

[6] **ALBA Synchrotron, Spain - Beam time assignment**. Beam time date: June of 2021. Project: *Momentum-resolved electronic structure of surface and topological states in the strong spin-orbit coupled quasi-1D charge-density-wave* $Ta_{1-x}Nb_xTe_4$ *series.* In collaboration with professor Andrés Santander-Syro (PI), U. Paris-Saclay.

[7] **MinCiencias, Colombia, 852-2019 call**. Start date: November of 2020. Project: *Thermoelectricity in low-dimensional materials: relationship between electronic and thermoelectric properties at the nanoscale.* In collaboration with professor Jose A. Galvis (PI) and team in U. Central, and professor Camilo Espejo in Uninorte.

[8] **L'oreal-UNESCO "For Women in Science", "International Rising Talents" 2020**. Principal Investigator. Start date: March of 2020. Project: *Optimization of electronic properties of quasi-1D transition metal chalcogenide materials.*

[9] **High Magnetic Field Laboratory, USA - Magnet time assignment**. Principal Investigator. Start date: January of 2020. Project: *High field study of quasi-1D transition metal chalcogenides and related charge-ordered compounds.* In collaboration with professor José A. Galvis, U. Central; Dr. Edwin Herrera and professors Isabel Guillamón and Hermann Suderow, U. Autónoma de Madrid; and professor Ian R. Fisher, Stanford University.

[10] **MinCiencias, Colombia, 808-2018 call**. Start date: June of 2019. Project: *Production and characterization of new low-dimensional quantum materials: quantum criticality and electronic phase transitions.* In collaboration with Dr. Juan José Mendoza, and professors Ferney Rodríguez and Luis Quiroga, in Uniandes; professor José A. Galvis, U. Central; and professor Doris Cadavid, UNAL.

[11] **American Physical Society International Research Travel Award Program 2019, USA**. Principal Investigator. Executed in July of 2019. Project: *Charge Density Wave Quantum Criticality in Transition Metal Dichalcogenides.* In collaboration with professor Ian R. Fisher, Stanford University.

[12] **L'oreal-UNESCO "For Women in Science", Colombia, 2018**. Principal Investigator. Dates: December of 2018 to December of 2019. Project: *Production and characterization of high-quality quantum materials.*

PUBLICATIONS

Featured publications:

[1] D. Silvera-Vega, J. Rojas-Castillo, E. Herrera-Vasco, E. Ramos-Rodríguez, A. F. Santander-Syro, J. A. Galvis, B. Uribe, R. González-Hernández, A. C. García-Castro, and P. Giraldo-Gallo. *"Fermi Surface Reconstruction and Anisotropic Linear Magnetoresistance in the Charge Density Wave Topological Semimetal $TaTe_4$"*. arXiv:2507.08192 (2025). Accepted in *Communication Physics*. Link here.

[2] G. Cardenas-Chirivi, K. Vega-Bustos, H. Rojas-Páez, D. Silvera-Vega, J. Pazos, O. Herrera, M.A. Macías, C. Espejo, W. López-Pérez, J. A. Galvis, and P. Giraldo-Gallo. *"Room temperature multiferroicity in a transition metal dichalcogenide"*. *npj 2D Materials and Applications* **7** (2023) 54. Link here.

[3] J. A. Galvis, A. Fang, D. Jiménez-Guerrero, J. Rojas-Castillo, J. Casas, O. Herrera, A. C. García-Castro, E. Bousquet, I. R. Fisher, A. Kapitulnik, and P. Giraldo-Gallo. *"Nanoscale phase-slip domain walls in the charge density wave state of the Weyl semimetal candidate $NbTe_4$"*. *Phys. Rev. B* **107** (2023) 045120. Link here.

[4] S. Valencia-Ibáñez, D. Jiménez-Guerrero, J. D. Salcedo-Pimienta, K. Vega-Bustos, G. Cárdenas-Chirivi, L. López-Manrique, E. Herrera-Vasco, J. A. Galvis, Y. Hernandez and P. Giraldo-Gallo. *"Raman spectroscopy of few-layers TaS_2 and Mo-doped TaS_2 with enhanced superconductivity"*. *Advanced Electronic Materials* **8** (2022) 2200457. Link here.

[5] P. Giraldo-Gallo, J. A. Galvis, Z. Stegen, K. A. Modic, F. F Balakirev, J. B. Betts, X. Lian, C. Moir, S. C. Riggs, J. Wu, A. T. Bollinger, X. He, I. Bozovic, B. J. Ramshaw, R. D. McDonald, G. S. Boebinger and A. Shekhter. *"Scale-invariant magnetoresistance in a cuprate superconductor"*. *Science* **361** (2018) 479. Link here.

[6] P. Giraldo-Gallo, P. Walmsley, S. C. Riggs, L. Buchauer, B. Fauqué, Chang Liu, B. Sangiorgio, N. Spaldin A. Kaminski, K. Behnia, and I. R. Fisher. *"Evidence of incoherent carriers associated with resonant impurity levels and their influence on superconductivity in the anomalous superconductor $Pb_{1-x}Tl_xTe$"*. *Phys. Rev. Lett.* **121** (2018) 207001. Link here.

[7] P. Giraldo-Gallo, B. Sangiorgio, P. Walmsley, H. J. Silverstein, M. Fechner, S. C. Riggs, T. H. Geballe, N. Spaldin, and I. R. Fisher. *"Fermi surface evolution of Na-doped PbTe studied through density functional theory calculations and Shubnikov-de Haas measurements"*. *Phys. Rev. B* **94** (2016) 195141. *Editors' suggestion.* Link here.

[8] P. Giraldo-Gallo, Y. Zhang, C. Parra, H. C. Manoharan, M. R. Beasley, T. H. Geballe, M. J. Kramer and I. R. Fisher. *"Stripe-like nanoscale structural phase separation in superconducting $BaPb_{1-x}Bi_xO_3$"*. *Nature Commun.* **6** (2015) 8231. Link here.

Other publications:

[7] K. Remund, K. V. Nguyen, P.-H. Chou, P. Giraldo-Gallo, J. A. Galvis, G. S. Boebinger, C.-H. Chung. *"Universality of linear in temperature and linear in field Planckian scattering rate in high temperature cuprate superconductors"*. arXiv:2602.10627 (2026). Link here.

[8] D. Olaya-Cortes, C. Navarrete, T. Rubio, P. Giraldo-Gallo and Y. Hernandez. *"Transition of piezoresistive gauge factor tuned by lateral size in MoS_2 and WS_2 networks"*. *2D Mater.* **12** (2025) 025002. Link here.

[9] V. Gallardo, B. Arce, F. Muñoz, R. San Martín, I. Zubritskaya, P. Giraldo-Gallo, H. Manoharan, and C. Parra. *"Exploring Structural and Electronic Properties of Topological Insulator/Graphene Nano-heterostructures"*. *Results in Physics* **67** (2024) 108058. Link here.

[10] P. Rezende-Gonçalves, M. Thees, J. Rojas Castillo, D. Silvera-Vega, R. L. Bouwmeester, E. David, A. Antezak, A. J. Thakur, F. Fortuna, P. Le Fèvre, M. Rosmus, N. Olszowska, R. Magalhães-Paniago, A. C. Garcia-Castro, P. Giraldo-Gallo, E. Frantzeskakis, and A. F. Santander-Syro. *"Experimental observation of metallic states with different dimensionality in a quasi-1D charge density wave compound"*. *Phys. Rev. B* **110** (2024) 125151. Link here.

[11] J. D. Bermúdez-Perez, E. Herrera-Vasco, J. Casas-Salgado, H. A. Castelblanco, K. Vega-Bustos, O. Herrera-Sandoval, H. Suderow, P. Giraldo-Gallo, and J. A. Galvis. *"High-Resolution Scanning Tunneling Microscope and its Adaptation for Local Thermopower Measurements in 2D Materials"*. *Ultramicroscopy* **261** (2024) 113963. Link here.

[12] R. Albertini, S. Macis, A. A. Ivanov, A. P. Menushenkov, A. Puri, V. Monteseguro, B. Joseph, W. Xu, A. Marcelli, P. Giraldo-Gallo, I. R. Fisher, A. Bianconi, and G. Campi. *"Tensile microstrain fluctuations in the BaPbO units in superconducting $BaPb_{1-x}Bi_xO_3$ by scanning dispersive micro-XANES"*. *Condensed Matter* **8** (2023) 57.

[13] C. Parra, F. C. Niestemski, A. W. Contryman, P. Giraldo-Gallo, T. H. Geballe, Ian R. Fisher, and H. C. Manoharan. *"Signatures of two-dimensional superconductivity emerging within a three-dimensional host superconductor"*. *PNAS* **118** (2021) e2017810118. Link here.

[14] M. Trigo, P. Giraldo-Gallo, J. N. Clark, M. E. Kozina, T. Henighan, M. P. Jiang, M. Chollet, I. R. Fisher, J. M. Glownia, T. Katayama, P. S. Kirchmann, D. Leuenberger, H. Liu, D. A. Reis, Z. X. Shen, and D. Zhu. *"Ultrafast formation of domain walls of a charge density wave in $SmTe_3$". Phys. Rev. B.* **103** (2021) 054109. Link here.

[15] C. Parra, J. Aristizabal, B. Arce, F. Montero-Silva, S. Lascano, R. Henriquez, P. Lazcano, P. Giraldo-Gallo, C. Ramírez, T. Henrique Rodrigues da Cunha, and A. Barrera de Brito. *"Graphene Coating as an Effective Barrier to Prevent Bacteria-Mediated Dissolution of Gold". Metals* **11** (2021) 147. Link here.

[16] P. Walmsley, S. Aeschlimann, J. A. W. Straquadine, P. Giraldo-Gallo, S. C. Riggs, M. K. Chan, R. D. McDonald, and I. R. Fisher. *"Magnetic breakdown and charge density wave formation: a quantum oscillation study of the rare-earth tritellurides". Phys. Rev. B.* **102** (2020) 045150. *Editors' suggestion.* Link here

[17] M. Trigo, P. Giraldo-Gallo, M. E. Kozina, T. Henighan, M. P. Jiang, H. Liu, J. N. Clark, M. Chollet, J. M. Glownia, D. Zhu, T. Katayama, D. Leuenberger, P. S. Kirchmann, I. R. Fisher, Z. X. Shen, and D. A. Reis. *"Coherent order parameter dynamics in $SmTe_3$". Phys. Rev. B.* **99** (2019) 104111. Link here

[18] C.M. Moir, Scott C. Riggs, J.A. Galvis, X. Lian, P. Giraldo-Gallo, Jiun-Haw Chu, P. Walmsley, Ian R. Fisher, A. Shekhter and G.S. Boebinger. *"Mass enhancement in multiple bands approaching optimal doping in a high-temperature superconductor". Npj Quantum Mat.* **4** (2019) 8. Link here

[19] P. Walmsley, D. M. Abrams, J. Straquadine, M. K. Chan, R. D. McDonald, P. Giraldo-Gallo, and I. R. Fisher. *"Sharp increase in the density of states in PbTe upon approaching a saddle point in the band structure". Phys. Rev. B.* **99** (2019) 035105. Link here

[20] H. Mukuda, M. Yashima, T. Matsumura, S. Maki, Y. Kitaoka, K. Miyake, H. Murakami, P. Giraldo-Gallo, T. H. Geballe and I. R. Fisher. *"^{125}Te-NMR Study in Novel Superconductor $Pb_{1-x}Tl_xTe$ with Valence Skipping Dopants". J. Supercond. Nov. Magn.* **32** (2019) 1629. Link here

[21] P. Walmsley, C. Liu, A. D. Palczewski, P. Giraldo-Gallo, C. G. Olson, I. R. Fisher, and A. Kaminski. *"Direct spectroscopic evidence for mixed-valence Tl in the low carrier-density superconductor $Pb_{1-x}Tl_xTe$". Phys. Rev. B.* **98** (2018) 184506.

[22] H. Mukuda, T. Matsumura, S. Maki, M. Yashima, Y. Kitaoka, K. Miyake, H. Murakami, P. Giraldo-Gallo, T. H. Geballe and I. R. Fisher. *"Anomalous ^{125}Te Nuclear Spin Relaxation coincident with Charge Kondo Behavior in Superconducting $Pb_{1-x}Tl_xTe$". J. Phys. Soc. Jpn.* **87** (2018) 023706.

[23] D. Nicoletti, E. Casandruc, D. Fu, P. Giraldo-Gallo, I. Fisher and A. Cavalleri. *"Anomalous relaxation kinetics and charge density wave correlations in underdoped $BaPb_{1-x}Bi_xO_3$". PNAS* **114** (2017) 9020.

[24] C. Parra, T. H. Rodrigues da Cunha, A. W. Contryman, D. Kong, F. Montero-Silva, P. H. Rezende Gonçalves, D. Duarte Dos Reis, P. Giraldo-Gallo, R. Segura, F. Olivares, F. Niestemski, Y. Cui, R. Magalhaes-Paniago, and H. C. Manoharan. *"Phase separation of Dirac electrons in topological insulators at the spatial limit". Nano Lett.* **17** (2017) 97-103.

[25] U. Ralevič, N. Lazarevič, A. Baum, H.-M. Eiter, R. Hackl, P. Giraldo-Gallo, I. R. Fisher, C. Petrovic, R. Gajič, and Z. V. Popovič. *"Charge density wave modulation and gap measurements in $CeTe_3$". Phys. Rev. B* **94** (2016) 165132.

[26] V. Brouet, J. Mansart, L. Perfetti, C. Piovera, I. Vobornik, P. Le Fevre, F. Bertran, S. C. Riggs, M. C. Shapiro, P. Giraldo-Gallo and I. R. Fisher. *"Transfer of spectral weight across the gap of Sr_2IrO_4 induced by La doping". Phys. Rev. B* **92** (2015) 081117(R).

[27] D. Leuenberger, J. A. Sobota, S.-L. Yang, A. F. Kemper, P. Giraldo-Gallo, R. G. Moore, I. R. Fisher, P. S. Kirchmann, T. P. Devereaux, and Z.-X. Shen. *"Classification of Collective Modes in a Charge Density Wave by Momentum-Dependent Modulation of the Electronic Band Structure". Phys. Rev. B* **91** (2015) 201106(R).

[28] M. Maschek, S. Rosenkranz, R. Heid, A. H. Said, P. Giraldo-Gallo, I. R. Fisher, and F. Weber. *"Wave vector dependent electron-phonon coupling drives charge-density-wave formation in $TbTe_3$". Phys. Rev. B* **91** (2015) 235146.

[29] Scott C. Riggs, M. C. Shapiro, Akash V. Maharaj, S. Raghu, E. D. Bauer, R. E. Baumbach, P. Giraldo-Gallo, Mark Wartenbe and I. R. Fisher. *"Evidence for a nematic component to the Hidden Order parameter in URu_2Si_2 from differential elastoresistance measurements". Nature Commun.* **6** (2015) 6425.

[30] K. Luna, P. Giraldo-Gallo, T. H. Geballe, I. R. Fisher and M.R.Beasley. *"Disorder Driven Metal-Insulator Transition in $BaPb_{1-x}Bi_xO_3$ and Inference of Disorder-Free Critical Temperature". Phys. Rev. Lett.* **113** (2014) 177004.

[31] P. Giraldo-Gallo, Hanoh Lee, M. R. Beasley, T. H. Geballe, and I. R. Fisher. *"Inhomogeneous superconductivity in $BaPb_{1-x}Bi_xO_3$". J. Supercond. Nov. Magn.* **26** (2013) 2675.

[32] T. Mertelj, P. Kusar, V. V. Kabanov, P. Giraldo-Gallo, I. R. Fisher, and D. Mihailovic. *"Incoherent Topological Defect Recombination Dynamics in $TbTe_3$". Phys. Rev. Lett.* **110** (2013) 156401.

[33] P. Giraldo-Gallo, Hanoh Lee, Y. Zhang, M. J. Kramer, M. R. Beasley, T. H. Geballe, and I. R. Fisher. *"Field Tuned Superconductor-Insulator Transition in $BaPb_{1-x}Bi_xO_3$". Phys. Rev. B* **85** (2012) 174503.

[34] P. Giraldo, E. Farber and H. Castro. *"Non-monotonic driven noise in HTSC". Physica B* **404** (2009) 3099.

THESIS ADVISING

Graduate thesis:

[1] Ph.D. in physics thesis adviser of Universidad de Los Andes student, Harold Rojas Páez. Thesis title: *"Multiferroicity in alloys of 2D Transition-Metal Dichalcogenides"*. Currently being developed, since August 2022.

[2] Ph.D. in physics thesis adviser of Universidad de Los Andes student, Diego Silvera Vega. Thesis title: *"Charge Density Wave phases and topological states in quasi-1D Transition Metal Tetrachalcogenides"*. Currently being developed, since January 2022.

[3] Ph.D. in physics thesis co-adviser of Universidad del Rosario student, Jose Bermúdez. Thesis title: *"Thermoelectric and new electronic properties of transition metal dichalcogenide solid solutions"*. Currently being developed, since January 2023.

[4] Ph.D. in physics thesis co-adviser of Universidad Nacional de Colombia student, Astrid Camila Riveros. Thesis title: *"Nanostructures of 2D materials for metrological applications"*. Currently being developed, since January 2025.

[5] Master thesis adviser of Master in Physics student of Universidad de Los Andes, Brayan Walteros. Thesis title: *"Optical properties of transition metal dichalcogenides solid solutions"*. Currently being developed, since January 2026.

[6] Master thesis adviser of Master in Physics student of Universidad de Los Andes, Juan David Santacruz. Thesis title: *"RUS and RPS techniqued to study Van der Waals piezoelectrics"*. Currently being developed, since January 2026.

[7] Master thesis adviser of Master in Physics student of Universidad de Los Andes, Ramón Támara. Thesis title: *"RAM memories based in transition metal dichalcogenides solid solutions"*. Currently being developed, since January 2025.

[8] Master thesis adviser of Master in Physics student of Universidad de Los Andes, Juan Pablo Cruz Castiblanco. Thesis title: *"Resonance ultrasound spectroscopy in transition metal tetrachalcogenides"*. Graduated in April of 2024.

[9] Master thesis adviser of Master in Physics student of Universidad de Los Andes, Julian Rojas Castillo. Thesis title: *"Electronic and topological properties of $TaTe_4$ and Cu-doped $TaTe_4$"*. Graduated in April of 2024.

[10] Master thesis adviser of Master in Physics student of Universidad de Los Andes, Cristian Borja Peña. Thesis title: *"Superconductivity and Charge Density Wave in the Extended Fermi-Hubbard Model with Disorder"*. Graduated in December of 2022.

[11] Master thesis adviser of Master in Physics student of Universidad de Los Andes, Karen Vega Bustos. Thesis title: *"Variation of electronic properties of the transition metal dichalcogenide WSe_2 through chemical doping"*. Thesis finished in August of 2022.

[12] Master thesis adviser of Master in Physics student of Universidad de Los Andes, Jose Danilo Salcedo. Thesis title: *"Charge density wave and superconductivity in $Ta_{1-x}Mo_xS_2$: Evolution of structural and electronic properties"*. Graduated in June of 2021.

[13] Master thesis co-adviser of Master in Physics student of Universidad de Los Andes, Juan Sebastian Calderón García. Thesis title: *"Theoretical and experimental study of topological invariants in crystalline topological insulators"*. Graduated in March of 2019.

Undergraduate thesis:

[1] Undergraduate thesis adviser of Physics student of Universidad de Los Andes, Sofía Lizarazo. Thesis title: *"Study of charge density wave phases in transition metal tetrachalcogenides using ultrasonic resonance spectroscopy"*. Finished in December of 2025.

[2] Undergraduate thesis adviser of Physics student of Universidad de Los Andes, Josue Carrero. Thesis title: *"Ferroic orders in solid solutions of Mo-based dichalcogenides"*. Finished in December of 2025.

[3] Undergraduate thesis adviser of Physics student of Universidad de Los Andes, Pablo Yepes. Thesis title: *"Fabrication of nanodevices for the measurement of the Quantum Hall Effect in graphene"*. Finished in December of 2025.

[4] Undergraduate thesis adviser of Physics student of Universidad de Los Andes, Valentina Posada. Thesis title: *"Electrical properties of multiferroic transition metal dichalcogenide nanostructures based on W(Se,Te)2"*. Finished in December of 2025.

[5] Undergraduate thesis adviser of Physics student of Universidad de Los Andes, Juan David Santacruz. Thesis title: *"Piezoelectricity measurements in two-dimensional ferroelectric materials using resonance ultrasound spectroscopy and resonant piezoelectric spectroscopy"*. Finished in December of 2025.

[6] Undergraduate thesis adviser of Physics student of Universidad de Los Andes, Gabriel Villabón. Thesis title: *"Optimization of thermoelectric properties in transition metal dichalcogenides through chemical doping"*. Finished in December of 2024.

[7] Undergraduate thesis adviser of Physics student of Universidad de Los Andes, Cristian Rey. Thesis title: *"Ferroic orders in solid solutions of Mo-based dichalcogenides"*. Finished in December of 2024.

[8] Undergraduate thesis adviser of Physics student of Universidad de Los Andes, Luciano Bastidas. Thesis title: *"Study of piezoelectric materials through resonant ultrasound spectroscopy"*. Finished in June of 2023.

[9] Undergraduate thesis adviser of Physics student of Universidad de Los Andes, Duvan Martínez. Thesis title: *"Multifunctional properties of multiferroic transition metal dichalcogenides"*. Finished in June of 2023.

[10] Undergraduate thesis adviser of Physics student of Universidad de Los Andes, Julian Rojas Castillo. Thesis title: *"Electronic properties of Weyl-semimetal candidate TaTe4"*. Graduated in December of 2021.

[11] Undergraduate thesis adviser of Physics student of Universidad de Los Andes, Juan Felipe Rodríguez. Thesis title: *"Measurements of the mechanical resonance spectrum of quantum materials through RUS"*. Graduated in December of 2021.

[12] Undergraduate thesis adviser of Physics student of Universidad de Los Andes, Felipe Giraldo. Thesis title: *"Numerical techniques applied to resonant ultrasound spectroscopy analysis"*. Graduated in June of 2021.

[13] Undergraduate thesis adviser of Physics student of Universidad de Los Andes, Santiago Valencia. Thesis title: *"Electronic properties of transition metal dichalcogenides and their modification through chemical doping"*. Graduated in June of 2020.

[14] Undergraduate thesis adviser of Physics student of Universidad de Los Andes, Diana Jimenez. Thesis title: *"Search for Superconductivity in quasi-1D transition metal chalcogenides through chemical doping"*. Graduated in June of 2020.

[15] Undergraduate thesis adviser of Physics student of Universidad de Los Andes, Yvan Hernandez Thesis title: *"Implementation of a Resonant ultrasound spectroscopy experimental setup in Universidad de Los Andes"*. Graduated in June of 2020.

[16] Undergraduate thesis adviser of the physics student of Universidad Distrital Francisco José de Caldas, Luis Eduardo Rivera Guerrero. Thesis title: *"AC susceptibility and third harmonic detection for studying superconductors and magnetic materials"*. Graduated in April of 2019.

[17] Undergraduate thesis adviser of the physics student of Universidad Distrital Francisco José de Caldas, Miguel Angel Roncancio Herrera. Thesis title: *"Electrochemical single crystal growth of superconducting $Ba_{1-x}K_xBiO_3$"*. Graduated in December of 2018.

GRADUATE THESIS EVALUATION

[1] Evaluator in doctoral thesis dissertation. Universidad de Los Andes, Physics Department. Bogotá, Colombia. January of 2026. Thesis evaluated: *"Fast thermal equilibration and control protocols in colloidal systems". Student: Diego Rengifo.*

[2] Evaluator in doctoral thesis dissertation. Universidad de Los Andes, Physics Department. Bogotá, Colombia. January of 2024. Thesis evaluated: *"Light-Matter Interactions and Inhomogeneities in Correlated Systems: Topological, Superconducting, and Magnetic Properties". Student: Fabio Pablo Miguel Méndez-Córdoba.*

[3] Evaluator in master thesis dissertation. Universidad Nacional de Colombia, Physics Department. Bogotá, Colombia. November of 2023. Thesis evaluated: *"Exploring Dirac Materials and Two-Dimensional Magnet Using Green's Function Method and Quantum Magnetic Imaging". Student: Jeyson de Jesús Támara Isaza.*

[4] Evaluator in master thesis dissertation. Universidad Nacional de Colombia, Physics Department. Bogotá, Colombia. May of 2023. Thesis evaluated: *"Fabrication and characterization of intermetallic systems of the family RT_2Al_10 based on rare earths, thorugh the flux technique". Student: Juan Camilo Delgado Saavedra.*

[5] Evaluator in doctoral thesis proposal. Universidad Industrial de Santander, Physics Department. Bucaramanga, Colombia. June of 2020. Thesis evaluated: *"Chirality-induced multifunctional properties in crystalline materials". Student: Daniel David Torres Amaris.*

[6] Evaluator in master thesis dissertation. Universidad de Los Andes, Physics Department. Bogotá, Colombia. December of 2019. Thesis evaluated: *"Study of liquid phase exfoliated crystals of MoS_2 as an active piezoelectric layer". Student: Maria Cristina Navarrete.*

[7] Evaluator in doctoral thesis dissertation. Universidad de Los Andes, Physics Department. Bogotá, Colombia. June of 2019. Thesis evaluated: *"Quantum non-equilibrium many-body spin-photon systems". Student: Fernando Javier Gómez Ruiz.*

[8] Evaluator in master thesis dissertation. Universidad de Los Andes, Physics Department. Bogotá, Colombia. May of 2018. Thesis evaluated: *"Control of multiferroic properties in $BiFeO_3$ nanoparticles". Student: Diego Andrés Carranza.*

[9] Evaluator in doctoral thesis dissertation. Universidad Autónoma de Madrid, Condensed Matter Physics Department. Madrid, Spain. December 15th of 2016. Thesis evaluated: *"Visualizing the influence of the Fermi surface on Superconductivity". Student: Edwin Herrera Vasco.*

Bogotá, Colombia, February 16, 2026.