

MIGUEL ÁNGEL **SÁNCHEZ-MARTÍNEZ**

I completed my Master's degree in Theoretical Physics at the Complutense University of Madrid, specializing in non-abelian gauge theories on high-energy physics.

I joined Dr. Adolfo G. Grushin's group at Néel Institute in Grenoble to do my PhD in Condensed Matter Physics as a Marie Curie fellow, working on theoretical aspects of topological materials. I developed a theoretical characterization of optical responses in multifold semimetals in close collaboration with experimentalists. In 2022, this work received the Springer Theses award and it was published as a book in the Springer Theses series.

I worked as a Research Intern at Microsoft Station Q in Santa Barbara, California, studying non-equilibrium quantum field theory methods to compute the charge state of topological superconducting islands. After this, I studied optical responses of superconducting phases as a postdoctoral researcher at the Donostia International Physics Center in Dr. Fernando de Juan's group. Later, I worked as a Research Associate with Dr. Felix Flicker at the University of Bristol studying topological quasiparticles in quasicrystals and acoustic modes in strongly correlated materials. As a RA, I have supervised a project designed by me on the structure of Majorana modes in quasicrystalline systems. Currently I am a Honorary Research Associate at the University of Bristol and Associate Director of the Master's Degree in Quantum Computing in UNIR.

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Scientific Trajectory

- 2026-Present** ○ **Associate Director of the Master's Degree in Quantum Computing at Universidad Internacional de La Rioja (UNIR).**

Honorary Research Associate at the University of Bristol.
- 2023-2026** ○ **Research Associate at the University of Bristol** in Dr Felix Flicker's Group. Funded by the EPSRC grant *Exact Results in Aperiodic Systems*.

Research topic: Topological properties and interaction effects in aperiodic systems: topologically-protected excitations in quasicrystals.
- 2022-2023** ○ **Postdoctoral Researcher at Donostia International Physics Center (DIPC)** in Dr Fernando de Juan's Group. San Sebastián, Spain.

Research topic: Optical properties and chiral superconductivity in Transition Metal Dichalcogenides.
- 2018-2021** ○ **PhD in Condensed Matter Physics by the Université Grenoble Alpes.** Marie Curie fellow with GreQue PhD fellowship at Néel Institute, CNRS. Thesis advisors: Dr Adolfo G. Grushin and Dr Serge Florens.

Title: [Linear and nonlinear optical responses of chiral multifold semimetals.](#)
Thesis Award: *Springer Theses* 2022.
- 03-06/2020** ○ **Research Intern at Microsoft Station Q, Santa Barbara.**

Research topic: Charge dynamics of a charged superconducting island proximity-coupled to metallic leads. Quantum Transport in Majorana systems.
- 10-12/2019** ○ **Industrial Secondment of GreQue PhD Fellowship. Microsoft Station Q, Santa Barbara.** Supervisors: Dr Andrey Antipov.

Scientific Production

Research papers

- 1: H. Takahashi, J. Murphy, M. Wood-Thanan, P. Puphal, **M. Á. Sánchez-Martínez**, F. Jerzembeck, C.C. Hsu, J. Ward, M. Isobe, Y. Matsumoto, H. Takagi, S. Blundell, M. Norman, F. Flicker, J.C. Séamus Davis. **Spinon Mediation of Witness Spin Dynamics in Herbertsmithite**. *Nature Physics* (2026), doi.org/10.1038/s41567-026-03303-6.
- 2: W. Caiger, F. Flicker, **M. Á. Sánchez-Martínez[†]**. **Fractal Topology of Majorana Bound States in Superconducting Quasicrystals**. *arXiv:2602.02796* (2026), [doi: 10.48550/arXiv.2602.02796](https://doi.org/10.48550/arXiv.2602.02796).
- 3: **M. Á. Sánchez-Martínez**, B. Gouteraux, L. Rademaker, F. Flicker. **Momentum-gapped quasiparticles in disordered metals**. *arXiv:2603.17002* (2026), [doi: 10.48550/arXiv.2603.17002](https://doi.org/10.48550/arXiv.2603.17002).
- 4: **M. Á. Sánchez-Martínez[†]**, D. Muñoz-Segovia, F. de Juan. **Optical probes of unconventional pairing states in transition metal dichalcogenides**. *Physical Review B*, 113, 054528 (2026), <https://doi.org/10.1103/s1wd-25dz>.
- 5: **M. Á. Sánchez-Martínez**, I. C. Fulga, D. Varjas, A. G. Grushin, F. Flicker. **Giant Optical Response of Multi-Weyl fermions stabilized by quasicrystalline symmetries**. *In preparation, submission in Q3 2026*.
- 6: B. Lu, S. Sayyad, **M. Á. Sánchez-Martínez**, K. Manna, C. Felser, A. G. Grushin, D. Torchinski. **Second-harmonic generation in the topological multifold semimetal RhSi**. *Phys. Rev. Research*, 4, L022022 (2022), [doi: 10.1103/PhysRevResearch.4.L022022](https://doi.org/10.1103/PhysRevResearch.4.L022022).
- 7: Z. Ni, B. Xu, **M. Á. Sánchez-Martínez**, Y. Zhang, K. Manna, C. Bernhard, J.W.F. Venderbos, F. de Juan, C. Felser, A.G. Grushin, Liang Wu. **Linear and nonlinear optical responses in the chiral multifold semimetal RhSi**, *npj Quantum Mater*, 5, 96 (2020). [doi:10.1038/s41535-020-00187-y](https://doi.org/10.1038/s41535-020-00187-y).
- 8: B. Xu*, Z. Fang*, **M. Á. Sánchez-Martínez***, J.W.F. Venderbos, Z. Ni, T. Qiu, K. Manna, W. Wang, J. Paglione, C. Bernhard, C. Felser, E.J. Mele, A.G. Grushin, A.M. Rappe, Liang Wu. **Optical signatures of multi fold fermions in the chiral topological semimetal CoSi**, *Proceedings of the National Academy of Sciences*, 202010752 (2020). [doi:10.1073/pnas.2010752117](https://doi.org/10.1073/pnas.2010752117).
- 9: **M.-Á. Sánchez-Martínez***, I. Robredo*, A. Bidaurrezaga, A. Bergara, F. de Juan, A.G. Grushin and M.G. Vergniory. **Spectral and optical properties of $\text{Ag}_3\text{Au}(\text{Se}_2, \text{Te}_2)$ and dark matter detection**. *J. Phys. Mater.*, 3, 014001 (2019). [doi:10.1088/2515-7639/ab3ea2](https://doi.org/10.1088/2515-7639/ab3ea2).
- 10: **M.-Á. Sánchez-Martínez**, F. de Juan, and A. G. Grushin. **Linear optical conductivity of chiral multifold fermions**. *Phys. Rev. B*, 99, 155145 (2019). [doi:10.1103/PhysRevB.99.155145](https://doi.org/10.1103/PhysRevB.99.155145).
- 11: **M.-Á. Sánchez-Martínez**, F. Alzina, J. Oyarzo, C.M. Sotomayor Torres and E. Chavez-Angel, **Impact of the Regularization Parameter in the Mean Free Path Reconstruction Method: Nanoscale Heat Transport and Beyond**, *Nanomaterials*, 9, 414 (2019). [doi:10.3390/nano9030414](https://doi.org/10.3390/nano9030414).

*Equally contributing authors

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Books

- 1: **M. Á. Sánchez-Martínez**. **Linear and nonlinear optical responses of chiral multifold semimetals** (Cham, Switzerland: *Springer Theses Series*, Springer-Nature, 2023).