



Prof. Rafael González Hernández Universidad del Norte (Colombia)



October 1st



11:30 h



SS6 (Seminario)

Biography

Topological Phases in Altermagnets UNINORTE & MPIPKS

Altermagnets are a recently discovered class of collinear magnets that exhibit momentum-dependent spin splitting despite having zero net magnetization. In this talk, I will explore how this unconventional magnetic order gives rise to nontrivial topological phases. Using Hamiltonian models and first-principles calculations, we uncover a unified picture of topology in two- and three-dimensional altermagnets. We show that the spin Chern number provides a robust topological fingerprint of these systems, which allows us to identify topologically protected 2D altermagnetic insulators and 3D Weyl altermagnetic semimetals. Beyond classification, our results reveal how the momentum-dependent spin structure of altermagnets can reshape topological band physics, opening new possibilities for topological phenomena in d-wave altermagnetic materials.

[1] Libor Šmejkal, Jairo Sinova and Tomas Jungwirth, Phys. Rev. X 12, 031042 (2022)

[2] Libor Šmejkal, Rafael González-Hernández, T. Jungwirth and J. Sinova, Sci. Adv. 6, 23 (2020)

[3] R González-Hernández, H Serrano, B Uribe. Phys. Rev. B 111, 085127 (2025)

Biography

Rafael González Hernández is an Associate Professor at Universidad del Norte (Colombia). He holds a PhD in Physical Sciences from the National University of Colombia and completed a postdoctoral fellowship at Johannes Gutenberg University Mainz (Germany), supported by the Alexander von Humboldt Foundation.

He is a Corresponding Member of the Colombian Academy of Exact, Physical and Natural Sciences and a recipient of the ICTP Walter Kohn Prize (Italy). His research focuses on the computational investigation of quantum materials using state-of-the-art theoretical and computational methods.