



« Strongly correlated systems at equilibrium and away from equilibrium »

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My works mainly address systems in which the electronic interaction is strong, giving rise to emergent properties. In my talk, I will start by discussing theoretical results we obtained in the context of high-temperature superconductors, as copper oxides. For large interactions, as we dope the system, it goes from a pseudo-gap phase (where there is loss of spectral weight in regions of the momentum space) to a conventional Fermi metal, concomitantly with a change in the Fermi surface from hole- to electron-like [Phys. Rev. Lett. 120, 067002 (2018)]. Close to this transition, the density-of-states at the Fermi level and the B1g nematic susceptibility extracted from Raman response data show an asymmetric, discontinuous evolution as a function of doping [Braz. J. Phys. 56, 48 (2026)].

If time allows it, I will always present our works on out of equilibrium dynamics generated by a quantum quench: the system is prepared in an initial state, and we then vary one parameter of the model describing it, letting it evolve in time according to the model. We observed and studied in this context, a sudden coupling of a magnetic impurity to interacting chains and showed that the electronic interactions in the chains favour the formation of the Kondo effect [Phys. Rev. B 103, 125152 (2021); Phys. Rev. B 107, 075110 (2023)].

More recently, we have also observed that the impurity magnetization decays faster when one of the chains is replaced by a topological superconductor that hosts a Majorana fermion.