

# Multimessenger Approach to out-of-equilibrium DYNAMICS in Complex Systems (MADYCS)



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## Spin texture and electron dynamics in chiral crystals.

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Chirality has emerged as a trend topic in condensed matter, as it enforces special symmetries in collective excitations [1, 2] and magnetic ordering [3] and it is responsible for novel quasiparticles beyond Dirac, Weyl and Majorana fermions [4]. The physics of chiral crystals is further enriched by the unique spin arrangements in momentum space [5], by non-linear optical and transport properties that can support large photocurrent and photogalvanic effects [6].

In my talk, I will briefly summarize the results of our research activity on chiral crystals. I will discuss the radial spin texture observed in trigonal tellurium (Te), one of the simplest chiral crystals available [7], and I will explain how the spin texture evolves in the momentum space under the influence of the local point group symmetry [8]. By using time and angle resolved photoemission spectroscopy, we have tracked the dynamical change in the band structure of Te upon excitation of coherent phonons that are capable to alter the crystal symmetry [9]. The same experimental approach has been applied to (TaSe<sub>4</sub>)<sub>2</sub>I, a chiral crystal in which charge ordering and strong electron phonon interaction are responsible for opening gap at the Weyl points [10]. Finally, I will give an outlook of the perspectives and potentialities of chiral crystals for optoelectronics.

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