

Resolving and Controlling Spin Textures in Altermagnetic MnTe

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The main interest in altermagnetic materials lies in their unconventional spin texture of the electronic bands close to the Fermi level. Besides the non-relativistic band splitting, the inclusion of spin-orbit interaction (SOI) leads to additional spin splitting which forms the basis for any future applications of altermagnets. Whereas the band splitting itself has now been measured for various materials, the spin texture has proven to be more elusive. The main problems are the 3D nature of the bands, the need to have single Néel domains, and spin signals induced by the photoemission process itself. Building on our previous work on altermagnetic MnTe which showed the degeneracy lifting [1] and the possibility to manipulate domains [2] I will highlight recent progress in measuring the spin texture in more detail. Particular focus will be placed on the influence of photoemission effects on the measured spin signal [3] and the observation of the SOI induced d-wave spin order in high symmetry planes [4].

1. Altermagnetic lifting of Kramers spin degeneracy, J. Krempaský et al. Nature 626, 517 (2024)
2. Nanoscale imaging and control of altermagnetism in MnTe, O. J. Amin et al. Nature 636, 348 (2024)
3. Discerning ground state and photoemission-induced spin textures in altermagnetic α -MnTe, D. A. Usanov et al. arXiv:2603.16635
4. Unconventional relativistic spin polarization of electronic bands in an altermagnet, A. Dal Din et al. arXiv:2511.01690