Tuning the magnetism and band topology through antisite defects in Sb doped MnBi4Te7

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The fine control of magnetism and electronic structure is crucial since the interplay between magnetism and band topology can lead to various novel magnetic topological states including axion insulators, magnetic Weyl semimetals, and Chern insulators, etc. In this talk, I will show that a continuous fine control of the magnetism in the newly-discovered Z2 intrinsic topological antiferromagnetic insulator MnBi4Te7 can be made by Sb doping so that an antiferromagnetic to ferromagnetic switching emerges. I will also show that this evolution arises from the formation of the Mn/Sb antisite disorders whose presence was revealed by our neutron diffraction scattering experiments[1]. I will further discuss the impact of the sample defects on the topological properties based on the first-principles calculations, which results in a kaleidoscope of magnetic topological phases.

[1]Hu, Chaowei, et al. "Tuning the magnetism and band topology through antisite defects in Sb doped MnBi4Te7." arXiv preprint arXiv:2008.09097 (2020).