

Field-free Switching of Altermagnetic Heterostructure

Changyoung KIM

Department of Physics and Astronomy, Seoul National University, South Korea

Email: changyoung@snu.ac.kr

The third class of magnetism, dubbed as altermagnetism, has been a recent hot topic in the field of magnetism. Altermagnets have characteristics of both ferro- (FM) and antiferro-magnetism (AFM): spin split bands (thus broken time reversal symmetry) and zero net magnetization. These traits are considered important not only in the fundamental scientific point of view but also for spintronic applications. In fact, a lot of efforts have been made to realize altermagnet-based devices.

In this presentation, I would like to introduce our recent work on field-free switching of altermagnetic heterostructure. We earlier reported direct evidence for spin split bands in MnTe thin films based on temperature dependent ARPES work [1]. We also grew heterostructures of MnTe and Bi₂Te₃. We observe that the heterostructure shows a finite anomalous Hall effect from MnTe. The heterostructure shows a switching behavior upon application of an electric pulses without any external magnetic fields [2]. Surprisingly, it is found that the field-free switching is much stronger than the switching by magnetic field. This opens the possibility for memory device application of altermagnetic materials.

References:

[1] S.Y. Lee et al., Phys. Rev. Lett. 132, 036702 (2024)

[2] S.Y. Lee et al., in preparation