

Transport measurements and technology of Sb, Ge doped magnetic topological insulator MnBi_2Te_4 with superconducting contacts

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MnBi_2Te_4 is an intrinsic magnetic topological insulator with A-type antiferromagnetic order, where the neighboring ferromagnetic Mn layers are coupled in an antiparallel manner. It was reported that Quantum anomalous Hall effect (QAHE) can be observed at 1.4 Kelvin in five-SL MnBi_2Te_4 [1]. Even more interesting topic is the study of interaction of a magnetic topological insulator with a superconductor. The chiral Majorana fermions [2], cooper-pair splitting [3] have been theoretically predicted in such systems. These types of structures have a potential application in quantum technologies and need to be developed.

The presentation will contain general information about sample manufacturing, ultra-low temperature transport measuring and discussion of transport properties of structures. Devices are flakes of Sb, Ge doped MnBi_2Te_4 with contacts from Nb, Al in SNS junction and Hall geometries.

Bibliography

- [1] Yujun Deng *et al.*, Science 367, 895 (2020).
- [2] Xiao-Liang Qi *et al.*, Phys Rev B 82:184516 (2010).
- [3] Ying-Tao Zhang. *et al.*, Sci. Rep. 5, 14892 (2015).