

Electrical writing and reading of Weyl semimetallic states in the chiral antiferromagnet Mn_3Sn

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Antiferromagnetic spintronics has attracted a lot of attention for its potential ultrafast operation and high integration density. Among a variety of antiferromagnets that have been studied, the chiral antiferromagnet Mn_3X systems are unique for its time-reversal breaking magnetic octupole order and the Weyl semimetallic electronic structure, exhibiting the phenomena similar to ferromagnets in the antiferromagnets such as anomalous Hall, Nernst effects and magneto-optical signals. These phenomena further enable design of the devices to write and read the magnetic states electrically. In this presentation, after presenting the review on the properties of the antiferromagnetic Weyl semimetal Mn_3Sn , we show our recent results on the electrical switching of the chiral antiferromagnetic state in its heterostructure using heavy metals and the magneto tunneling effect using all antiferromagnetic tunnel junctions.

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