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### **Search for Topological Insulators in Ternary Chalcogenides<sup>1</sup>**

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A topological insulator (TI) is a novel quantum state, which is a bulk insulator but has gapless surface states. Recently, binary chalcogenides, Bi<sub>2</sub>Te<sub>3</sub>, Bi<sub>2</sub>Se<sub>3</sub> and Sb<sub>2</sub>Te<sub>3</sub> have been theoretically predicted and experimentally observed to be a family of TIs [1]. In this talk, we extend our search of TIs to ternary chalcogenides by replacing some of Bi or Sb atoms by other atoms, such as thallium and rare earth atoms. It is found that for thallium-based materials [2], only TlSbS<sub>2</sub> is trivial and all the others are TIs, while for rare earth-based materials[3], LaBiTe<sub>3</sub> is a TI and the others are trivial. The search in ternary chalcogenides not only bring new members of TIs in the family of chalcogenides but also may provide candidates for other new topological states such as topological superconductor, quantum anomalous Hall insulator, axionic insulator and topological Kondo insulator.

Reference:

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