

Spin-Electricity Conversion Induced by Spin Injection into Topological Insulators

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Detection and manipulation of electrons' spins are key prerequisites for spin-based electronics or spintronics. In this presentation, I will report successful spin injection into the surface states of topological insulators by using a spin pumping technique. By measuring the voltage that shows up across the samples as a result of spin pumping, we demonstrate that a spin-electricity conversion effect takes place in the surface states of bulk-insulating topological insulators $\text{Bi}_{1.5}\text{Sb}_{0.5}\text{Te}_{1.7}\text{Se}_{1.3}$ and Sn-doped $\text{Bi}_2\text{Te}_2\text{Se}$. In this process, the injected spins are converted into a charge current along the Hall direction due to the spin-momentum locking on the surface states. The present results reveal a great advantage of topological insulators as ideal spintronics devices for conversion between spin and electricity.



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Dr. Shiomi's research interests include; spintronics; topological materials; condensed matter physics.