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Experimental realization of quantized anomalous Hall effect

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Anomalous Hall effect was discovered by Edwin Hall in 1880. In this talk, we report the experimental observation of the quantized version of AHE, the quantum anomalous Hall effect (QAHE) in thin films of Cr-doped $(\text{Bi,Sb})_2\text{Te}_3$ magnetic topological insulator. At zero magnetic field, the gate-tuned anomalous Hall resistance exhibits a quantized value of h/e^2 accompanied by a significant drop of the longitudinal resistance. The longitudinal resistance vanishes under a strong magnetic field whereas the Hall resistance remains at the quantized value. The realization of QAHE paves a way for developing low-power-consumption electronics. Implications on observing Majorana fermions and other exotic phenomena in magnetic topological insulators will also be discussed. The work was collaborated with Ke He, Yuyu Wang, Xucun Ma, Xi Chen, Li Lv, Dai Xi, Zhong Fang and Shoucheng Zhang.