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Observation of the Thermal Hall Effect Using Capacitive Thermometers in Bismuth COLIN TINSMAN, GANG LI, FAN YU, TOMOYA ASABA, BENJAMIN LAWSON, Univ of Michigan - Ann Arbor, CAROLINE SU, Univ of California - Berkeley, LU LI, Univ of Michigan - Ann Arbor — The thermal Hall effect is the thermal analog of the electrical Hall effect. Rarely observed in normal metals, thermal Hall signals were argued to be a key property for a number of strongly correlated materials, such as high temperature superconductors, correlated topological insulators, and quantum magnets. The observation of the thermal Hall effect requires precise measurement of temperature in intense magnetic fields. Particularly at low temperature, resistive thermometers have a strong dependence on field, which makes them unsuitable for this purpose. We have created capacitive thermometers which instead measure the dielectric constant of stontium titanate ($SrTiO_3$). $SrTiO_3$ approaches a ferroelectic transition, causing its dielectric constant to increase by a few orders of magnitude at low temperature. As a result, these thermometers are very sensitive at low temperature while having very little dependence on the applied magnetic field, making them ideal for thermal Hall measurements. We demonstrate this by making measurements of the thermal Hall effect in Bismuth in magnetic fields of up to 10T.

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