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Seeing the magnetic monopole through the mirror of topological surface states[1] XIAO-LIANG QI, RUN-DONG LI, Stanford University, JIADONG ZANG, Fudan University, SHOU-CHENG ZHANG, Stanford University — Existence of the magnetic monopole is compatible with the fundamental laws of nature, however, this illusive particle has yet to be detected experimentally. In this work, we show that an electric charge near the topological surface state induces an image magnetic monopole charge due to the topological magneto-electric effect. The magnetic field generated by the image magnetic monopole can be experimentally measured, and the inverse square law of the field dependence can be determined quantitatively. We propose that this effect can be used to experimentally realize a gas of quantum particles carrying fractional statistics, consisting of the bound states of the electric charge and the image magnetic monopole charge.

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