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Quantum Hall Effect and Bound Fractional Charge in Topological Insulator Magnetic Tunnel Junctions TAYLOR HUGHES, QINGLEI MENG, SMITHA VISHVESHWARA, University of Illinois at Urbana Champaign — Proximity coupling 2D and 3D time-reversal invariant topological insulators to ferromagnetic domain walls is known to lead to bound fractional charge and an integer quantum Hall effect respectively. Here we show that by correctly engineering the sample geometry these effects can appear in the presence of only a single magnet with no domain walls, thus reducing the experimental complexity. We will prove that a magnetic layer sandwiched between 3D topological insulator films will exhibit the quantum Hall effect, possibly leading to a room-temperature realization of the quantum Hall effect.

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