Abstract Submitted
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Axion electrodynamics, S-duality, and monoid of fractional topological insulators in three dimensions[1] PENG YE, University of Illinois at Urbana-Champaign, MENG CHENG, Yale University, EDUARDO FRADKIN, University of Illinois at Urbana-Champaign — Fractional topological insulators in three dimensions admit fractional axion angles and fractionalized bulk excitations. Most of previous studies on fractional topological insulators are based on parton (Gutzwiller projective) constructions of various types (e.g., Ye, Hughes, Maciejko, Fradkin 2016). In this talk, we report new results on fractional topological insulators. First, on a general ground, we study the S-duality transformations of QED_4 coupled to fractionalized matter. When time-reversal symmetry is imposed, the duality transformations directly apply to gauged fractional topological insulators, leading to a sequence of quantized axion angles that are allowed by time-reversal symmetry. Second, we consider stacking (monoid) operation among topological insulators and fractional topological insulators. The stacking operations generate all fractional topological insulators. Third, we present a topological quantum field theory with symmetry, from which we may systematically derive fractional axion angles.

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