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Towards a Notion of Symmetry for Topological Phases MATTHEW TITSWORTH, TOBIAS HAGGE, University of Texas, Dallas — Landau's theory of group symmetry breaking has been hugely successful in the description of classical and quantum phase transitions. However, recently discovered and proposed topological phases lie outside of the Landau paradigm. The primary physical example of these are fractional quantum Hall effect (FQHE) liquids. Topological phases possess no such broken symmetry and cannot be characterized by an order parameter. The effective field theories for topological phases are topological quantum field theories (specifically (2+1)-TQFTs) with a proposed microscopic mechanism in string-net condensation. They possess a number of unique features such as ground state degeneracy and non-trivial quasi-particle exchange statistics. We investigate the mathematical tools used to characterize (2+1) TQFTs/FQHE liquids for the purpose of trying to determine appropriate "symmetry objects" for such systems and possible mechanisms for describing their phase changes.

Matthew Titsworth
University of Texas, Dallas

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