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Classifying fractionalization: symmetry classification of gapped Z2 spin liquids in two dimensions ANDREW ESSIN, MICHAEL HERMELE, Department of Physics, University of Colorado — Quantum number fractionalization is a remarkable property of topologically ordered states of matter, such as the fractional quantum Hall liquids, and certain quantum spin liquid states. For a given type of topological order, there are generally many ways to fractionalize the quantum numbers of a given symmetry. Not all distinct fractionalizations will necessarily correspond to distinct phases of matter, however. In this work, we establish a formalism for characterizing fractionalization in gapped, two-dimensional Z2 spin liquids, which leads immediately to a classification of these topologically ordered phases.

Andrew Essin
Department of Physics, University of Colorado

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