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Twist liquids and gauging anyonic symmetries JEFFREY TEO, University of Virginia, TAYLOR HUGHES, EDUARDO FRADKIN, University of Illinois at Urbana-Champaign — Topological phases of matter in (2+1)D are frequently equipped with global symmetries that relabel anyons without changing the fusion and braiding structures. Twist defects are static symmetry fluxes that permute the labels of orbiting anyons. *Gauging* or *melting* these symmetries by quantizing defects into dynamical excitations leads to a wide class of more exotic topological phases known as *twist liquids*. We formulate a general gauging framework, characterize the anyon structure of twist liquids and provide solvable lattice models that capture the gauging phase transitions. Generalizing a discrete gauge theory, we represent the anyons in a twist liquid by compositions of not only fluxes and charges but also quasiparticle supersectors. We show the gauging transition amplifies the total quantum dimension by $|G|$, the order of the symmetry group, and thus modifies the topological entanglement entropy.

Jeffrey Teo
Univ of Virginia

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