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An exactly solvable model for twisted symmetry-enriched phases
NICOLAS TARANTINO, LUKASZ FIDKOWSKI, Stony Brook University —
Topological phases in 2D have a long history of exotic behaviour, producing anyons and protected edge states. This trend continues when we impose an extra symmetry G, producing a symmetry-enriched topological (SET) phase. While the ground state will remain invariant under G, the set of anyons A may transform non-trivially. The different ways of implementing the symmetry are classified by the elements of the group cohomology $H^2_\rho(G, A)$, where ρ describes the action of G on the set of anyons. Previously constructed models fix ρ to be the identity, meaning that G can only modify anyons by a phase, whereas we could easily envision a case where G permutes anyon types, which we call twisted SETs. In this talk, we will propose a modified string-net model which allows G to act on the anyons in exactly that manner, for any choice of ρ. We will also introduce a constructive method of gauging the global symmetry, which allows us to verify that the obtained twisted SETs are distinct by showing that discrete gauge theories produced by gauging G are distinct.

Nicolas Tarantino
Stony Brook University

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