Abstract Submitted
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Non-Abelian two dimensional topological phases constructed from coupled wires and connections to exceptional lie algebras MAYUKH KHAN, Department of Physics, University of Illinois at Urbana-Champaign, IL 61801, USA, JEFFREY TEO, Department of Physics, University of Virginia, Charlottesville, VA 22904 USA, TAYLOR HUGHES, Department of Physics, University of Illinois at Urbana-Champaign, IL 61801, USA — Non-abelian anyons exhibit exotic braiding statistics which can be utilized to realize a universal topological quantum computer. In this work we focus on Fibonacci anyons which occur in Z_3 Read Rezayi fractional quantum hall states. Traditionally they have been constructed using $su(2)_3/u(1)$ coset theories. We introduce conformal field theories(CFTs) of exceptional and non-simply laced Lie Algebras at level 1, for example G_2, F_4 which host Fibonacci anyons. We realize these CFT's concretely on the 1d gapless edge of an anisotropic 2d system built out of coupled, interacting Luttinger wires. Interactions are introduced within a bundle of wires to fractionalize the original chiral bosons into different sectors. Next, we couple these sectors to get the desired topological phase in the bulk. The 2d bulk of the stack is gapped by backscattering terms between counterpropagating modes on different bundles. The emergence of this topological phase can be interpreted using techniques of anyon condensation . We also explicitly construct the Kac Moody algebra on the edge CFT using original bosonic degrees of freedom.We acknowledge support from NSF CAREER DMR-1351895(TH) and Simons Foundation (JT).

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