Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Parafermionic wires at the interface of chiral topological states LUIZ SANTOS, TAYLOR HUGHES, University of Illinois, Urbana-Champaign — We discuss a scenario where local interactions form one-dimensional gapped interfaces between a pair of distinct chiral two-dimensional topological states such that each gapped region terminates at a domain wall separating the chiral gapless edge states of these phases. We show that this type of T-junction supports point-like fractionalized excitations obeying parafermion statistics, thus implying that the one-dimensional gapped interface forms an effective topological parafermionic wire possessing a non-trivial ground state degeneracy. The physical properties of the anyon condensate that gives rise to the gapped interface are investigated. Remarkably, this condensate causes the gapped interface to behave as a type of anyon "Andreev reflector" in the bulk, whereby anyons from one phase, upon hitting the interface, can be transformed into a combination of reflected anyons and outgoing anyons from the other phase. Thus, we conclude that while different topological orders can be connected via gapped interfaces, the interfaces are themselves topological.

Luiz Santos
University of Illinois, Urbana-Champaign

Date submitted: 10 Nov 2016 Electronic form version 1.4