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Composite Dirac liquids: parent states of symmetric surface topological orders[1] ANDREW ESSIN, DAVID MROSS, IQIM, Caltech, JASON ALICEA, Caltech — In the absence of interactions, topological insulators surfaces must be gapless or break symmetry. With the addition of strong interactions at the surface, a third possibility is a gapped, symmetric surface that supports anyons, as has been recognized in a number of recent developments. The composite Dirac liquid (CDL) provides a natural stepping stone to identifying such states. The CDL consists of neutral, fractional Dirac fermions coupled to gapped charges, and the addition of pairing to the neutral sector produces a gap for all excitations without breaking any symmetry. The quasi-1d technology we have used in the study of the CDL also allows us to construct and characterize such gapped surface phases, and generalizes naturally to (bosonic) symmetry protected topological phases as well.

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Andrew Essin
Caltech

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