Abstract Submitted
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Exotic circuit elements from hybrid superconductor/quantum Hall systems[1] DAVID CLARKE, JASON ALICEA, Caltech, KIRILL SHTENGEL, UC Riverside — Heterostructures formed by quantum Hall systems and superconductors have recently been shown to support widely coveted Majorana fermion zero-modes and still more exotic 'parafermionic' generalizations [1-3]. Here we establish that probing such zero-modes using quantum Hall edge states yields *non-local* transport signatures that pave the way towards a variety of novel circuit elements. In particular, we demonstrate quite generally that at low energies the zero-modes convert chirally moving quasiparticles into oppositely charged quasiholes propagating in the same direction—that is, they swap the sign of the chiral edge currents [4]. One may then construct new and potentially useful circuit elements using this 'perfect Andreev conversion' process, including superconducting current and voltage mirrors as well as transistors for fractional charge currents. Characterization of these circuit elements should provide striking evidence of the zero mode physics.

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