Abstract Submitted
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Pairing in Luttinger Liquids and Quantum Hall States ADY STERN, Weizmann Institute of Science — We study the effect of a two-body attractive interaction on spinless electrons in a quantum wire of a single mode, and the quantum Hall states (QHS) that may be constructed by an array of such wires. For a single wire we find a Luttinger liquid phase and a strongly paired phase. In contrast to a wire that is proximity-coupled to an external superconductor, for an isolated wire the phase of a topological, weakly paired, superconductor is adiabatically connected to the Luttinger liquid phase. The QHS formed by an array of single-channel wires depend on the Landau level filling factors. For odd-denominator fillings $\nu = 1/(2n+1)$, wires at the Luttinger phase form Laughlin states while wires in the strongly paired states form bosonic fractional QHS of pairs at a filling of $1/(8n+4)$. The transition between the two is of the universality class of Ising transitions in three dimensions. For even denominator fractions $\nu = 1/2n$ the two single-wire phases translate into four quantum Hall states. Two of those are bosonic fractional QHS of weakly- and strongly- bound pairs of electrons. The other two are non-abelian QHS, which originate from coupling wires close to their critical point. One of these non-abelian states is the Moore-Read state. Work done with CL Kane and BI Halperin.

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