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The Fermionic spectrum, phase transition and domain walls of confined ^{3}He-A film[1] HAO WU, J. A. SAULS, Northwestern University — The edge states of a ^{3}He-A film are Weyl Fermions propagating on the edge in a direction determined by the chirality of the bulk phase. Under lateral confinement, the wave functions for counter-propagating Weyl Fermions on opposing edges overlap. We show that the edge states hyrbridize and form a band, and the continuum states exhibit band gaps. We report self-consistent calculations of the reduction in the spontaneous edge mass currents due to hybridization as a function of lateral confinement, D. Strong lateral confinement leads to a sequence of quantum phase transitions. The A phase undergoes a transition to a pair density wave (PDW) phase with broken translational symmetry at $D_{c_1} \approx 13\xi_0$, and a transition to a polar state at $D_{c_2} \approx 9\xi_0$. The PDW phase for $D < D_{c_1}$ is periodic array of chiral domains separated by domain walls[2] with currents that conflict with the direction of edge currents. We report self-consistent calculations of the PDW phase near D_{c_1} that resolves the competition in energy between edge states and Fermions bound to the domain wall. The resulting pattern of circulating currents also resolves the apparent violation of current conser

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[2]Y. Tsutsumi, **J. Low Temp. Phys.** 175, 2014

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