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Spin and mass currents on the surface of the topological superfluid, ^{3}He-B[1] HAO WU, JAMES SAULS, Northwestern University — The surface excitation spectrum of superfluid ^{3}He-B is discussed for a translationally invariant interface (specular surface). We report calculations of surface spectral spin-current and mass current densities originating from the Andreev bound state and the continuum response. Two branches of gapless Fermions, bound to the surface, disperse linearly with momentum $\vec{p}_\parallel$ along the surface. These states are spin polarized transverse to their direction of propagation, $\vec{p}_\parallel$. The spectral functions reveal the subtle role of the spin-polarized surface states in relation to the ground-state spin current. By contrast, these states do not contribute to the ground-state mass current density. However, the surface states do give rise to a power law suppression of the superfluid mass current for $0 \ll T \ll T_c$, providing a direct signature of the Majorana branches of surface excitations in the fully gapped 3D topological superfluid, ^{3}He-B.

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