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Topological mass current on a domain wall in superfluid ^{3}He A-phase YASUMASA TSUTSUMI, Condensed Matter Theory Laboratory, RIKEN — At a surface of the superfluid ^{3}He A-phase, the surface Andreev bound state accompanied with edge mass current emerges due to a topological phase transition. The topological phase transition also occurs at a domain wall in the A-phase, namely, an interface between the A-phases with the opposite directions of l-vector. In the bulk A-phase, the chiral state is characterized by a topological number $\nu = \pm 1$ whose sign depends on the direction of l-vector. Topological properties of the Andreev bound state at the domain wall depends on the difference of the topological numbers on each side of the domain wall. I report that the direction and amplitude of the topological mass current parallel to the domain wall depends on, however, not only the difference of the topological numbers but also the difference of phases. Then, we can devise the domain wall without the topological mass current by fixing the appropriate phase difference. I also show the phase dependence of energy loss at the domain wall based on the quasiclassical theory including quasiparticle's information in the Andreev bound state, which is essential for an understanding of the dynamics of the domain walls in the A-phase.

Yasumasa Tsutsumi
Condensed Matter Theory Laboratory, RIKEN

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