Anomalous superflow along an interface between aerogel and superfluid ^{3}He

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In our previous work[1], we have discussed magnetic response of odd-frequency s-wave Cooper pairs induced around the interface between aerogel and superfluid ^{3}He-B. It was shown that, unlike bulk superfluids, Pauli spin susceptibility is enhanced by the formation of the odd-frequency pairs. In this work, we investigate supercurrent along the aerogel-superfluid ^{3}He-B interface. We find that the supercurrent changes in its direction in the aerogel near the interface, in other words, the proximity-induced pairing state has a "negative" superfluid mass density. We discuss the relation between this phenomenon and odd-frequency paring.

1. Higashitani, S., Takeuchi, H., Matsuo, S., Nagato, Y., and Nagai, K. (2013). "Magnetic Response of Odd-Frequency s-Wave Cooper Pairs in a Superfluid Proximity System", Phys. Rev. Lett. **110**, 175301.

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