

Low Temperature Properties of the Mermin-Ho Texture of Superfluid $^3\text{He-A}$ in a Cylinder

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Existence of a coreless vortex texture in the A phase of superfluid ^3He was predicted by Mermin and Ho in 1976.¹ Recent rotating cryostat experiments indicate the existence of the Mermin-Ho texture in a cylinder and call a renewed attention to this texture. Theoretical studies of the texture have been limited, however, to the GL temperature range. In this report, we consider the low temperature properties of the Mermin-Ho texture in a cylinder using the quasiclassical theory. One of the interests is the total angular momentum. We obtain the self consistent order parameter of the Mermin-Ho texture in a cylinder and calculate the angular momentum of the system from the mass current distribution. We show that the profile of the bending angle β of the \mathbf{l} vector significantly changes at low temperatures $T < 0.5T_c$ in contrast to the behavior of the energy gap. Accordingly, the total angular momentum also changes at low temperatures, but it seems to tend to $\frac{1}{2}N\hbar$ when $T \rightarrow 0\text{K}$, which is in agreement with McClure and Takagi.²

¹N.D. Mermin and T.-L. Ho, Phys. Rev. Lett. **36**, 594 (1976).

²M. G. McClure and S. Takagi, Phys. Rev. Lett. **43**, 596 (1979).