Current carrying edges in unconventional superconductors
RAHUL ROY, University of Illinois at Urbana Champaign — While the bulk of
a p or d wave superconductor does not carry any current, a current can run along
the edges of a sample even in the absence of a magnetic field, unlike the case of
a s wave superconductor. Such a current is often quantized and is independent of
the magnitude of the gap. However, the existence of such a current violates Bloch's
theorem. Here, we examine, by computation and analytic calculation, the question
of the edge current in p and d wave superconductors in various geometries and the
connection with the Bloch argument. The computation of the edge current also
allows us to shed some light on the angular momentum paradox in the A phase of
Helium 3.

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