Answers and questions on path integrals for superconductivity in a wedge*

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Some time ago, DeWitt-Morette *et al.* [1] discussed the wedge problem as *"the propagation of radiation or particles in the presence of a wedge"*. Their treatment includes path integral solutions of the wedge problem for various situations, e.g. for a magnetic field in an Aharonov-Bohm configuration, and the knife edge problem for Dirichlet and Neumann boundary conditions.

But more recently, due to the increasing possibilities of engineering confinement and quantization phenomena, the superconducting phase in a wedge has become an interesting research topic, and in particular the nucleation of the order parameter. [A nucleation field should be present in order to prevent dissipative currents at the surface of the superconductor.] Although the linearized Ginzburg-Landau equation for the order parameter is formally quite similar to the Schrödinger equation, the conditions of no ingoing or outgoing current at the boundary pose specific problems to the path integral treatment, which are not covered in [1]. In this talk the new insights and, most importantly, many remaining difficulties are discussed concerning the path integral description of the superconducting wedge.

References

[1] C. DeWitt-Morette, S. G. Low, L. S. Schulman, and A. Y. Shiekh, Foundations of Physics **16**, 311–349 (1986)

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