

Abstract Submitted
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Vortex Motion in Superfluid 4He: Reformulation in the Extrinsic Vortex Filament Coordinate Space BHIMSEN SHIVAMOGGI, University of Central Florida — Vortex motion in superfluid ^4He is considered by reformulating the Hall-Vinen equation (originally formulated in the intrinsic geometric parameter space) in the extrinsic vortex filament coordinate space which is shown to provide a useful alternative approach [1]. It provides insights into the physical implications of one aspect of the friction term, associated with the friction coefficient α , in the Hall-Vinen notation, as well as the previous neglect of the other aspect, associated with the friction coefficient α' . A nonlinear Schrodinger equation for the propagation of nonlinear Kelvin waves on a vortex filament in a superfluid is given. The localized vortex kink solution of this equation is shown to be driven unstable by the normal fluid flow along the vortex in qualitative similarity with the Donnelly-Glaberson instability of Kelvin waves on a vortex. Though the friction term associated with α , for very small α , has little capacity to make significant contribution to the vortex motion in a quantitative way, it appears to be able to influence the vortex kink characteristics in a qualitative way.

[1] B.K. Shivamoggi: *Phys. Rev. B* **84**, 012506, (2011).

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