Semiclassical dynamics of vortices in superfluid helium thin films
XIAO LI, RAN CHENG, QIAN NIU, The University of Texas at Austin — Based on the Berry phase theory, we consider the case of two vortices in Bosonic superfluids and try to extract the interaction between them. Under the adiabatic approximation, we use semiclassical Lagrangian formalism to describe the system and found that in addition to the universal background “magnetic field” which results in the Magnus force, there exists a new interaction mediated by the density profile of the background fluid due to its finite compressibility. Finally, numerical solutions from the nonlinear Schrodinger equation were employed to gain better insight into this problem.

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