Complexity measures of tangled vortex filaments

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We introduce and test measures of geometrical and topological complexity to quantify morphological aspects of a tangle of vortex filaments (see figure). The tangle is produced by standard numerical simulation of superfluid turbulence[1][2]. This form of turbulence exists in superfluid helium at temperatures near absolute zero; it consists of thin-cored inviscid vortex filaments of quantized circulation, and is a convenient benchmark for numerical investigations of complex systems. Complexity measures such as linking number, writhing number, average crossing number and helicity are computed and their relation to the energy to the fluid is investigated[3].
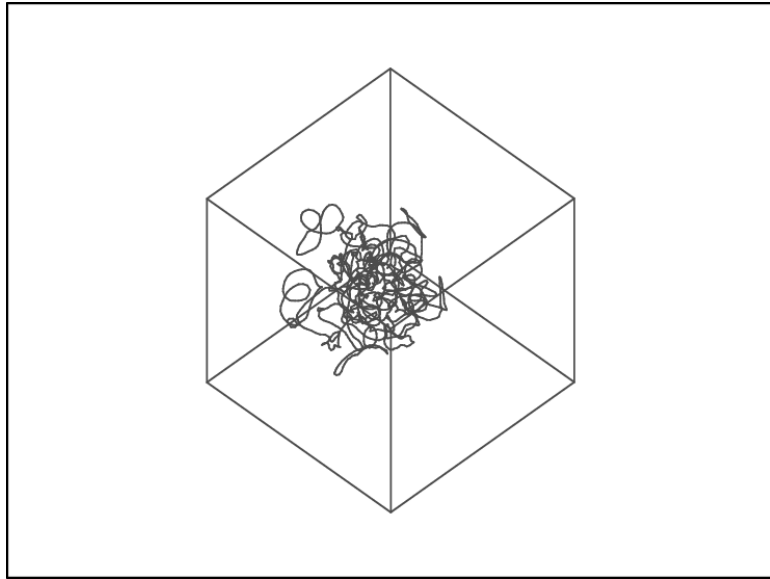
References

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